European Food Safety Authority

ZOONOSES MONITORING

FINLAND

The Report referred to in Article 9 of Directive 2003/99/EC

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

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

IN 2008

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Finland**

Reporting Year:

Laboratory name	Description	Contribution
Finnish Food Safety Authority Evira	The operation of Evira is focused on ensuring the safety of food, promoting the health and welfare of animals and providing the required preconditions for plant and animal production as well as plant health. Evira is a central competent authority for food and feed control as well as for animal health and welfare control. The duties of Evira also include scientific research and risk assessment on food safety and animal diseases. Evira operates also as a national reference laboratory in its own field.	Texts and tables: animals, foodstuffs, feedstuffs, antimicrobial resistance, foodborne outbreaks, data on slaughtered animals
Ministry of Agriculture and Forestry (MAF) - Food and Health Department	Food and Health Department is concerned with veterinary issues in general, prevention and combating of animal diseases and zoonoses, animal welfare, hygiene of foodstuffs of animal origin, animal medication, production inputs used in agriculture and plant health.	Some texts
Finnish Zoonosis Centre	Finnish Zoonosis Centre forms a cooperation body between Finnish Food Safety Authority Evira and the National Institute for Health and Welfare(THL). The Centre ensures a close cooperation between relevant experts in the field of animal health, human health, and food and feed safety.	General coordination and officering of the report

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Laboratory name	Description	Contribution
Information Centre of the Ministry of Agriculture and Forestry (Tike)	Tike provides administrative, informative and data management services to the MAF and other administrative organizations within its branch. Tike develops national official statistics in the field of food safety in co-operation with control authorities. At the moment, Tike complies most of the statistics on agriculture and food production in Finland.	Data on animal populations (holdings and live animals)

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 2008 .

The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given. The information given covers both zoonoses that are important for the public health in the whole European Community as well as zoonoses, which are relevant on the basis of the national epidemiological situation.

The report describes the monitoring systems in place and the prevention and control strategies applied in the country. For some zoonoses this monitoring is based on legal requirements laid down by the Community Legislation, while for the other zoonoses national approaches are applied.

The report presents the results of the examinations carried out in the reporting year. A national evaluation of the epidemiological situation, with special reference to trends and sources of zoonotic infections, is given. Whenever possible, the relevance of findings in foodstuffs and animals to zoonoses cases in humans is evaluated.

The information covered by this report is used in the annual Community Summary Report on zoonoses that is published each year by EFSA.

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* 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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1. ANIMAL POPULATIONS

The relevance of the findings on zoonoses and zoonotic agents has to be related to the size and nature of the animal population in the country.

A. Information on susceptible animal population

Sources of information:

Data on holdings and live animals:
Information Centre of the Ministry of Agriculture and Forestry, Farm Register 2008
Data on reindeers:
Statistics of the Reindeer Herders' Association
Data on farmed deer:
Provincial veterinary offices
Data on slaughtered animals:
Meat inspection statistics of Food Safety Authority of Finland, Evira

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

Data on holdings and live animals:
Final data, situation as of 1 April 2008.

Data on reindeers:
Final data, 2007/2008, reindeer herding year: 1 June-31 May.

Data on slaughtered animals: All animals slaughtered in 2008.

Definitions used for different types of animals, herds, flocks and holdings as well as

Fattening pigs contain all pigs except boars and sows. In national statistics pigs are divided in the following categories: boars over 50 kg, sows over 50 kg, fattening pigs over 50 kg, pigs 20-50 kg and piglets under 20 kg.

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

The production structure has changed considerably over the past decades. While some 70 per cent of farms had livestock in the 1970s and a good 62 per cent in the 1990s, in 2008 only 39 per cent of farms reared livestock. The number of dairy cows in 2008 was about 289000 and in 2000 they were 364000. There is a decrease of 21 per cent in the number of dairy cows. Number of pigs has increased 14 per cent durin last eight years: in 2000 the number of pigs in total was 1.3 million whereas in 2008 it was 1.5 million.

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

Livestock production is concentrated in certain areas and, thus, there are large differencies in livestock numbers between different parts of the country. Dairy farms are particularly common in the Northern Finland, and fattening pigs in the Southern and Western parts of the country. The differencies are most marked in poultry production which are mostly located nearby the slaughter houses and processors.

In 2008, farms with dairy cows had 22 dairy cows per farm on average. 21% of all milk farms had at least 30 heads and 6% of farms at least 50 heads. Pig farms had 235 fattening pigs over 50 kg per farm on average. 25% of pig farms

had at least 300 fattening pigs over 50 kg and 6% of farms at least 800 pigs. Farms with laying hens had 2734 hens per farm on average. 44% of farms with laying hens had less than 50 heads and 32% at least 2000 heads.

Table Susceptible animal populations

		Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
Animal species	**Category of animals**		**Year**		**Year**		**Year**		**Year**
Cattle (bovine animals)	**calves (under 1 year)**					304577		16493	
	dairy cows and heifers					423457		13340	
	in total			265664		915345		17437	
	meat production animals					120484		11960	
	mixed herds					66827			
Deer	**farmed - in total**							6	
Ducks	**in total**			8984		5847		82	
	mixed flocks/holdings					5847		82	
Gallus gallus (fowl)	**broilers**			55200016		5674546		141	
	elite breeding flocks for egg production line					865464		100	
	in total			55596527		10087706		1751	
	laying hens					3190248		1214	
	parent breeding flocks for meat production line			396511					
	parent breeding flocks, unspecified - in total					338858		40	

Table Susceptible animal populations

		Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
Animal species	**Category of animals**		**Year**		**Year**		**Year**		**Year**
Geese	**in total**					961		62	
Goats	**in total**					5918		448	
Pigs	**breeding animals**			64386		168628		1689	
	fattening pigs			2371875		1310176		2461	
	in total			2436261		1482762		2529	
Reindeers	**farmed - in total**			76834		198015		4800	
	in total			76834		198015		4800	
Sheep	**animals over 1 year**					59201		1802	
	animals under 1 year (lambs)					4410		218	
	in total			23808		122218		1789	
	meat production animals					58607		1498	
Solipeds, domestic	**horses - in total**			1150		69000		15000	
Turkeys	**in total**			1180188		414770		103	
Wild boars	**farmed - in total**			118					

2. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

Zoonoses are diseases or infections, which are naturally transmissible directly or indirectly between animals and humans. Foodstuffs serve often as vehicles of zoonotic infections. Zoonotic agents cover viruses, bacteria, fungi, parasites or other biological entities that are likely to cause zoonoses.

2.1 SALMONELLOSIS

2.1.1 General evaluation of the national situation

A. General evaluation

History of the disease and/or infection in the country

The Finnish situation regarding Salmonella in feedingstuffs, animals and food of animal origin has been very favourable for years. Majority of human salmonellosis cases have been acquired aboard.

Recent actions taken to control the zoonoses

The Finnish Salmonella Control Programme for poultry was amended from the beginning of the year 2007.

2.1.2 Salmonellosis in humans

2.1.3 Salmonella in foodstuffs

A. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

The Finnish Salmonella Control Programme:
Sampling is compulsory for all cutting plants.
Random sampling; frequency is depending on production capacity of the cutting plant.
Sampling is performed by food business operator under supervison of offcial veterinarian.

Frequency of the sampling

At slaughterhouse and cutting plant

Other: Cutting plant production over 100 000 kg in a week: one sample every day, production between 20 000 -100 000 kg in a weeek: one sample every week, production less that 20 000 kg in a week: one sample every month, small-capacity cutting plants: two samples in a year

Type of specimen taken

At slaughterhouse and cutting plant

Fresh meat

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

A sample consists of at least 25 grams of crushed meat taken from a cleaning tool of a conveyer belt, from tables or from similar point.

Definition of positive finding

At slaughterhouse and cutting plant

Foodstuff is considered to be positive when salmonella spp is isolated from a sample

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Other: Bacterilogical method: ISO 6579:2002 or NMKL No 71:1999

Preventive measures in place

All focks must be tested for Salmonella before slaughter. If the flock is Salmonella positive, meat must be heat treated.

Control program/mechanisms

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Measures in case of the positive findings or single cases

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

Notification system in place

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

Results of the investigation

See table Salmonella in poultry meat.

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

Domestic broiler meat is not considered to be an important source of human salmonellosis cases in Finland.

B. Salmonella spp. in turkey meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

The Finnish Salmonella Control Programme:
Sampling is compulsory in all cutting plants.
Random sampling, frequency is depending on production capacity of the cutting plant.
Sampling is carried out by food business operator under supervision of the competent authority.

Frequency of the sampling

At slaughterhouse and cutting plant

Other: Cutting plant production capacity over 100 000 kg in a week: one sample every day, production between 20 000 - 100 000 kg in a week: one sample in a week, production less than 20 000 kg in a week: one sample every month, low-capacity cutting plants: two samples in a year

Type of specimen taken

At slaughterhouse and cutting plant

Fresh meat

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

Cutting plant: a sample consists of at least 25 gram of crushed meat taken from a cleaning tool of a conveyer belt, from tables or from similar points.

Definition of positive finding

At slaughterhouse and cutting plant

Foodstuff is considered to be positive when salmonella spp is isolated from a sample.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002 or NMKL No 71:1999

Preventive measures in place

All flocks must be tested for Salmonella before slaughter, if the flock is positive meat is heat treated.

Control program/mechanisms

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Measures in case of the positive findings or single cases

After a positive salmonella result increased sampling is carried out in the cutting

plant. The origin of contamination must be traced back, if possible. Effective cleaning and disinfection of the premises and equipment.

Notification system in place

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

Results of the investigation

See table Salmonella in poultry meat.

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

Salmonella situation in domestic turkey meat has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases

Domestic turkey meat is not considered to be an important source of human salmonellosis in Finland.

C. Salmonella spp. in pig meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

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

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Other: At slaughterhouse: surface of carcass, at cutting plant: fresh meat

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

At slaughterhouse: 3 surface swab samples are taken from a carcass before refrigation. A total area of 1400 cm2 is swabbed. Sampling sites: the upper inner part of hind legs includung 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 similar point.

Definition of positive finding

At slaughterhouse and cutting plant

Foodstuff is considered to be positive when salmonella spp is isolated from a sample

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002 or NMKL No 71:1999

Control program/mechanisms

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

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.

Notification system in place

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

Results of the investigation

See table Salmonella in read meat and products thereof

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

Salmonella situation in Finnish pig meat is very favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases

Domestic pig meat is not considered to be an important source of human salmonellosis cases in Finland.

D. Salmonella spp. in bovine meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

The Finnish Salmonella Control Programme:
- at slaughterhouses: together 3000 carcasses are sampled each year randomly from the cattle population. Sampling is carried out by food business operator under supervision of the official veterinarian.
- at cutting plants:
Sampling is compulsory for all cutting plants.
Random sampling, frequency is depending on production capacity of the cutting plant.
Sampling is performed by food business operator under supervison of offcial veterinarian.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Other: At slaughterhouse: surface of carcass, at cutting plant: fresh meat

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

At slaughterhouse: 2 surface swab samples are taken from a carcass before refrigation. A total area of 1400 cm2 is swabbed. Sampling sites: the upper inner part of hind legs includung 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 similar point.

Definition of positive finding

At slaughterhouse and cutting plant

Foodstuff is considered to be positive when salmonella spp is isolated from a sample

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002 or NMKL No 71:1999

Control program/mechanisms

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

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.

Notification system in place

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

Results of the investigation

See Table Salmonella in red meat.

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

Salmonella situation in domestic bovine meat is very favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases

Domestic bovine meat is not considered to be an important source of human salmonellosis cases in Finland.

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from broilers (Gallus gallus) - fresh - - neck skin - Survey - EU baseline survey	Evira	single	25 g	369	0			
Meat from broilers (Gallus gallus) - fresh - at processing plant - Control and eradication programmes - industry sampling - objective sampling (crushed meat)	Evira	single	25 g	768	0			
Meat from turkey - fresh - at processing plant - Control and eradication programmes - industry sampling - objective sampling (crushed meat)	Evira	single	25 g	513	0			

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from bovine animals - fresh - - carcass swabs - Control and eradication programmes - industry sampling - objective sampling	Evira	animal	1400 cm2	3125	0			
Meat from bovine animals - fresh - at processing plant - Control and eradication programmes - industry sampling - objective sampling (crushed meat)	Evira	single	25 g	2054	0			
Meat from pig - fresh - - carcass swabs - Control and eradication programmes - industry sampling - objective sampling	Evira	animal	1400 cm2	6447	2		2	
Meat from pig - fresh - at processing plant - Control and eradication programmes - industry sampling - objective sampling (crushed meat)	Evira	single	25 g	2058	0			

2.1.4 Salmonella in animals

A. Salmonella spp. in turkey - breeding flocks and meat production flocks

Monitoring system

Sampling strategy

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

The Finnish Salmonella Control Programme:
Day-old chicks are sampled by the food business operator after arrived to the holding.
Rearing flocks are sampled at the holding by the food business opearator at four weeks old and two weeks before moving to laying unit or phase. Once a year samples are taken by the official veterinarian at each holding.
Adult breeding flocks are sampled at the hatchery every two weeks by food business operators and every 16 weeks by official veterinarians. Every flock is sampled twice during the production cycle at the holding by the official veterinarian. Official sampling is also carried out at the holding if Salmonella spp. is detected from the sampling at the hatchery.
In addition, a flock is 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 holdings within three weeks before slaughter.
At each holding sampling is carried out by an official veterinarian once a year, otherwise sampling is carried out by a food business operator.
In addition, a flock is always sampled by the official veterinarian if there is any reason to suspect that the flock is positive for Salmonella spp.

Frequency of the sampling

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

Every flock is sampled

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

Other: At the age of 4 weeks and 2 weeks before transfer

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

Other: At hatchery: every 2 weeks, at holding: twice

Meat production flocks: Before slaughter at farm

Other: Every flock is sampled within three weeks before salughter

Type of specimen taken

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

Internal linings of delivery boxes

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

Socks/ boot swabs

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

At hatchery: internal linings of hatching baskets, at holding: socks/boot swabs

Meat production flocks: Before slaughter at farm

Socks/ boot swabs

Methods of sampling (description of sampling techniques)

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

Internal linigs are collected from ten delivery boxes. Five papers are pooled together. If papers are not used swab sampels from ten delivery boxes are taken. Five swab samples are pooled together.

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

Five pairs of boot swabs/sock samples are taken and pooled to two.

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

At hatchery: five internal linings paper from hatching baskets or 25 x 10 g of broken egg shells are collected and pooled together. If hatching eggs from a breeding flock occupy more than one incubator, one composite sample is taken from each incubator.
At holding: five pairs of boot swabs/sock samples are taken and pooled to two.

Meat production flocks: Before slaughter at farm

Five pairs of boot swabs/sock samples are taken and pooled to two.

Case definition

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

Flock is considered to be positive when Salmonella spp is isolated from any sample.

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

Flock is considered to be positive when Salmonella spp is isolated from any sample taken at the holding.

Meat production flocks: Before slaughter at farm

Flock is considered to be positive when Salmonella spp is isolated from any sample.

Diagnostic/analytical methods used

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

ISO 6579:2002 /Amd. 1:2007

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

ISO 6579:2002/Amd. 1:2007

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

ISO 6579:2002/Amd. 1:2007

Meat production flocks: Before slaughter at farm

ISO 6579:2002/Amd. 1:2007

Vaccination policy

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

Vaccination against salmonella is not allowed in Finland.

Meat production flocks

Vaccination against salmonella is not allowed in Finland.

Other preventive measures than vaccination in place

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

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

Meat production flocks

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

Control program/mechanisms

The control program/strategies in place

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

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Meat production flocks

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Recent actions taken to control the zoonoses

Salmonella control programme for breeding and meat production flocks of turkeys was amended from the beginning of the year 2007. The major amendments concerned routine sampling schemes and sampling and analysing methods. Boot swabs or sock samples are taken instead of feacal samples collection. The analysing method is ISO 6579:2002/Amendment 1:2007.

Measures in case of the positive findings or single cases

Breeding flocks: In case of positive finding at holding: the flock is destructed or slaughtered and meat heat treated. Hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and desinficted, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella.
In case of positive finding at hatchery: the flock of origin is sampled at the holding by the official veterinarian. Environmental samples are taken at the hatchery.
Meat production flocks: In case of positive finding the flock is destructed or slaughtered and meat heat treated. The holding is cleaned and desinficted,

official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella.

Notification system in place

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

Results of the investigation

See table Salmonella in other poultry.

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

Salmonella situation in turkey flocks has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases

Domestic turkey meat is not considered to be an important source of human salmonellosis cases in Finland.

B. Salmonella spp. in pigs

Monitoring system

Sampling strategy

Breeding herds

The Finnish Salmonella Control Programme:
- all nucleus herds are sampled at farm once a year by operators.
- Together 3000 sows are sampled each year randomly from the sow population at slaughterhouses. Sampling is carried out by food business operator under supervision of the official veterinarian.
- Suspected herds (clinical symptoms or positive finding at slaughterhouse or other suspicion) are sampled at farm by an official veterinarian.

Note! All sampling at slaughterhouses has an animal based approach, not herd based.

Multiplying herds

The Finnish Salmonella Control Programme:
- Together 3000 sows are sampled each year randomly from the sow population at slaughterhouses. Sampling is carried out by food business operator under supervision of the official veterinarian.
- Suspected herds (clinical symptoms or positive finding at slaughterhouse or other suspicion) are sampled at farm by an official veterinarian.

Note! All sampling at slaughterhouses has an animal based approach, not herd based.

Fattening herds

The Finnish Salmonella Control Programme:
- Together 3000 fattening pigs are sampled each year randomly from the population at slaughterhouses. Sampling is carried out by food business operator under supervision of the official veterinarian.
- Suspected herds (clinical symptoms or positive finding at slaughterhouse or other suspicion) are sampled at farm by an official veterinarian.

Note! All sampling at slaughterhouses has an animal based approach, not herd based.

Frequency of the sampling

Breeding herds

At slaughterhouses: sampling distibuted evenly throughout the year. At farm: nucleus herds once a year

Multiplying herds

At slaughterhouses: sampling distibuted evenly throughout the year.

Fattening herds at slaughterhouse (herd based approach)

Sampling distributed evenly throughout the year

Type of specimen taken

Breeding herds

Other: At farm: faeces, at slaughterhouse: lymph nodes

Multiplying herds

Other: At farm: faeces, at slaughterhouse: lymph nodes

Fattening herds at farm

Faeces

Fattening herds at slaughterhouse (herd based approach)

Other: Lymph nodes

Methods of sampling (description of sampling techniques)

Breeding herds

At holding:
Routine sampling of nucleus herds:
From each department composite samples are collected from five pens of weaned piglets, growers or young breeding animals. The samples are analysed as two pools.

Suspected herds:
Adult animals: feacal sample is collected from every fift animal. 20 samples are pooled together.
Young animals: composite faecal sample is collected from a group of 10-15 animals. 20 composite samples are pooled together.

Sampling of salmonella positive herds for releasing the restrictions:
Adult animals: feacal sample is collected from every animal. 10-20 samples are pooled together.
Young animals: composite faecal sample is collected from a group of 20-30 animals. Composite samples are not pooled.

Slaughterhouse:
From each carcass five ileo-caecal lymphnodes are taken. Lymph nodes are divided into two equal parts. Lymph nodes parts from five animals are pooled together for analyse. If the sample is positive each of the five individually

samples are analysed separately.

Multiplying herds

At holding:
Suspected herds:
Adult animals: feacal sample is collected from every fift animal. 20 samples are pooled together.
Young animals: composite faecal sample is collected from a group of 10-15 animals. 20 composite samples are pooled together.

Sampling of salmonella positive herds for releasing the restrictions:
Adult animals: feacal sample is collected from every animal. 10-20 samples are pooled together.
Young animals: composite faecal sample is collected from a group of 20-30 animals. Composite samples are not pooled.

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

Fattening herds at farm

Suspected herds:
composite faecal sample is collected from pens of a group of 10-15 animals. 20 composite samples are pooled together.

Sampling of salmonella positive herds for releasing the restrictions:
composite faecal sample is collected from pens of a group of 20-30 animals. Composite samples are not pooled.

Fattening herds at slaughterhouse (herd based approach)

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

Case definition

Breeding herds

Herd is positive if one or more animals are salmonella spp positive.

Multiplying herds

Herd is positive if one or more animals are salmonella spp positive.

Fattening herds at farm

Herd is positive if one or more animals are salmonella spp positive.

Fattening herds at slaughterhouse (herd based approach)

Animal is positive if salmonella spp has been isolated from a sample.

Diagnostic/analytical methods used

Breeding herds

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

Multiplying herds

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

Fattening herds at farm

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

Fattening herds at slaughterhouse (herd based approach)

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

Vaccination policy

Breeding herds

Vaccination against salmonella is not allowed in Finland.

Fattening herds

Vaccination against salmonella is not allowed in Finland.

Control program/mechanisms

The control program/strategies in place

Breeding herds

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Multiplying herds

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Fattening herds

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Measures in case of the positive findings or single cases

At slaughterhouse: If a positive lymh node sample is detected in the slaughterhouse, the herd of origin is sampled by an official veterinarian.
At farm: official restrictions: no trade on live animals except to slaughterhouse (meat is heat treated). Restrictions are removed after herd has been negative in two consecutive sampling sessions with one month intervals. Epidemiological investigation.
Feedingstuffs are analysed for salmonella.

Notification system in place

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

Results of the investigation

See table Salmonella in other animals.

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

Salmonella situation in pigs has been very favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases

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

C. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

The Finnish Salmonella Control Programme:
- Together 3000 animals are sampled each year randomly from the cattle population at slaughterhouses. Sampling is carried out by food business operator under supervision of the official veterinarian.
- Suspected herds (clinical symptoms or positive finding at slaughterhouse or other suspicion) are sampled at farm by an official veterinarian
- Herds of origin of AI-bulls are sampled at farm before transfer by food business operator.

Note! All sampling at slaughterhouses has an animal based approach, not herd based.

Frequency of the sampling

Animals at slaughter (herd based approach)

Sampling distributed evenly throughout the year

Type of specimen taken

Animals at farm

Faeces

Animals at slaughter (herd based approach)

Other: Lymph nodes

Methods of sampling (description of sampling techniques)

Animals at farm

Sampling of suspect herds or herds of origin of AI bulls:
Adult animals: individual faecal samples are colected from 30 animals and analysed individually.
Young animals: all animals are sampled by composite faecal sample. One sample represent the group of 5-10 animals.

Sampling of salmonella positive herds for releasing the restrictions:
Adult animals: individual feacal samples from all animals.
Young animals: all animals are sampled by composite faecal sample. One sample represent the group of 5-10 animals.

Animals at slaughter (herd based approach)

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

Case definition

Animals at farm

Animal is positive if salmonella spp has been isolated from a sample. Herd is positive if one or more animals are salmonella spp positive.

Animals at slaughter (herd based approach)

Animal is positive if salmonella spp has been isolated from a sample.

Diagnostic/analytical methods used

Animals at farm

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

Animals at slaughter (herd based approach)

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

Vaccination policy

Vaccination against Salmonella is not allowed in Finland.

Control program/mechanisms

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Measures in case of the positive findings or single cases

At slaughterhouse: If a positive lymh node sample is detected in the slaughterhouse, the herd of origin is sampled by an official veterinarian.
At farm: official restrictions: no trade on live animals except to slaughterhouse (meat is heat treated), milk is allowed to deliver only to establishment for pasteurasitation. Restrictions are removed after herd has been negative in two consecutive sampling sessions with interval of one month. Epidemiological investigation. Feedingstuffs are analysed for Salmonella.

Notification system in place

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

Results of the investigation

See table Salmonella in other animals.

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

Salmonella situation in cattle has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases

Cattle is not considered to be an important source of human salmonellosis cases in Finland.

D. Salmonella spp. in Gallus Gallus - breeding flocks

Monitoring system

Sampling strategy

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

The Finnish Salmonella Control Programme:
Day-old chicks are sampled by the food business operator after arrived to the holding.
Rearing flocks are sampled at the holding by the food business operator at four weeks old and two weeks before moving to laying unit or phase. Once a year samples are taken by the official veterinarian.
Adult breeding flocks are sampled at the hatcheries every second week by food business operator and every 16 weeks by official veterinarians. Every flock is sampled twice during the production cycle at the holding by official veterinarian. Official sampling is also carried out at the holding if salmonella spp. is detected from the sampling at the hatchery.
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.

Frequency of the sampling

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

Every flock is sampled

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

Every flock is sampled at age of four weeks and two weeks before moving to laying unit

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

Every flock is sampled at the hatchery every second week and twice during the production cycle at the holding

Type of specimen taken

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

Internal linings of delivery boxes

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

Socks/ boot swabs

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

At hatchery: internal linings of hatching baskets or egg shells / At holding: socks/boot swabs

Methods of sampling (description of sampling techniques)

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

Internal linigs are collected from ten delivery boxes. Five papers are pooled together. If papers are not used swab sampels from ten delivery boxes is taken. Five swab samples are pooled together.

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

Five pairs of boot swabs/socks samples are taken and pooled to two.

Breeding flocks: Production period

At hatchery: five internal linings paper from hatching baskets or 25 x 10 g of broken egg shells are collected and pooled together. If hatching eggs from a breeding flock occupy more than one incubator, one composite sample is taken from each incubator.
At holding: five pairs of boot swabs/ sock samples are taken and pooled to two.

Case definition

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

Flock is considered to be positive when Salmonella spp. is isolated from any sample.

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

Flock is considered to be positive when Salmonella spp. is isolated from any sample.

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

Flock is considered to be positive when Salmonella spp. is isolated from any sample taken at the holding.

Diagnostic/analytical methods used

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

ISO 6579:2002 / Amendment 1:2007

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

ISO 6579:2002 / Amendment 1:2007

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

ISO 6579:2002 / Amendment 1:2007

Vaccination policy

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

Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place

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

Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.

Control program/mechanisms

The control program/strategies in place

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

The Finnish Salmonella Control Programme, approved by Commission Decision 2007/849/EC.

Recent actions taken to control the zoonoses

Salmonella control programme for breeding flocks was amended from the beginning of the year 2007. The major amendments concerned routine sampling

schemes and sampling and analysing methods. Boot swabs or socks samples are taken instead of faecal samples collection. The analysing method is ISO 6579:2002/Amendment 1:2007.

Measures in case of the positive findings or single cases

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

In case of positive finding at holding: the flock is destructed or slaughtered and meat heat treated. Hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and desinficted, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella. In case of positive finding at hatchery: the flock of origin is sampled at the holding by the official veterinarian. Environmental samples are taken at the hatchery.

Notification system in place

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

Results of the investigation

see table Salmoenlla in Gallus Gallus breeding flocks

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

Breeding flocks are not considered to be an important source of human salmonellosis cases in Finland.

E. Salmonella spp. in Gallus Gallus - flocks of laying hens

Monitoring system

Sampling strategy

Laying hens flocks

The Finnish Salmonella Control Programme:
Flocks of day-old chicks are sampled at the hatcheries or at the holdings by food business operator.
Raering flocks are sampled at the holding two weeks before laying period by the food business operator.
Production flocks are sampled at the holdings every 15 weeks by the food business operator.
Sampling is carried out by the official veterinarian once a year at each holding.
In addition, the flock is sampled by the official veterinarian every time when a resason to suspect that the flock is positive for Salmonella spp.

Frequency of the sampling

Laying hens: Day-old chicks

Every flock is sampled

Laying hens: Rearing period

two weeks before laying period

Laying hens: Production period

Every 15 weeks

Type of specimen taken

Laying hens: Day-old chicks

Internal linings of delivery boxes

Laying hens: Rearing period

faeces or sock samples / boot swabs

Laying hens: Production period

feaces or sock samples / boot swabs, dust

Methods of sampling (description of sampling techniques)

Laying hens: Day-old chicks

If sampling takes place at the hatchery five internal linings papers from hatching baskets or 25 x 10 g of broken egg shells are collected and pooled together.
If sampling takes place at the holding five internal lining papers are collected from delivery baskets and pooled together. If papers are not used five swab samples are taken.

Laying hens: Rearing period

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

Laying hens: Production period

Two pairs of boot swabs/sock samples are taken and pooled to one.
In cage flocks: two samples of 150 g of naturally mixed faeces are collected and pooled to one.
In official sampling also a dust sample (250 ml, 100 g) is taken.

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

ISO 6579:2002 / Amendment 1:2007

Laying hens: Rearing period

ISO 6579:2002 / Amendment 1:2007

Laying hens: Production period

ISO 6579:2002 / Amendment 1:2007

Vaccination policy

Laying hens flocks

Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place

Laying hens flocks

Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.

Control program/mechanisms

The control program/strategies in place

Laying hens flocks

The Finnish Salmonella Control Programme, approved by Commission Decision 2007/849/EC

Recent actions taken to control the zoonoses

Salmonella control programme for laying flocks was amended from the beginning of the year 2007. The major amendments concerned routine sampling schemes and sampling and analysing methods. Boot swabs or socks samples are taken instead of faecal samples collection. The analysing method is ISO

6579:2002/Amendment 1:2007.

Measures in case of the positive findings or single cases

Laying hens flocks

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

Notification system in place

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

Results of the investigation

See table Salmonella in other poultry.

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

Salmonella situation has been very favourable in flocks of laying hens for years. 0-2 positive flocks have been detected yearly.

Relevance of the findings in animals to findings in foodstuffs and to human cases

Flocks of laying hens or eggs are not considered to be important source of human salmonellosis cases in Finland.

F. Salmonella spp. in Gallus Gallus - broiler flocks

Monitoring system

Sampling strategy

Broiler flocks

The Finnish Salmonella Control Programme:
All broiler flocks are sampled at the holdings within three weeks before slaughter by the food business operator.
Sampling is carried out by the official veterinarian once a year at each holding.
In addition, the flock is sampled by the official veterinarian every time when a resason to suspect that the flock is positive for Salmonella spp.

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

Socks/ boot swabs

Methods of sampling (description of sampling techniques)

Broiler flocks: Before slaughter at farm

Five pairs of boot swabs/sock samples are taken and pooled to two.

Case definition

Broiler flocks: Before slaughter at farm

Flock is considered to be positive when Salmonella spp is isolated from any sample.

Diagnostic/analytical methods used

Broiler flocks: Before slaughter at farm

ISO 6579:2002 / Amendment 1:2007

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.

Control program/mechanisms

The control program/strategies in place

Broiler flocks

The Finnish Salmonella Control Programme, approved by Commission Decision 2008/815/EC

Recent actions taken to control the zoonoses

Salmonella control programme for broiler flocks was amended from the beginning of the year 2007. The major amendments concerned routine sampling schemes and sampling and analysing methods. Boot swabs or socks samples are taken instead of faecal samples collection. The analysing method is ISO 6579:2002/Amendment 1:2007.

Measures in case of the positive findings or single cases

Broiler flocks: Before slaughter at farm

In case of positive finding the flock is destructed or slaughtered and meat heat treated. The holding is cleaned and desinficted, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella.

Notification system in place

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

Results of the investigation

See table Salmonella in other poultry

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

Salmonella situation has been favourable in broiler flock for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases

Domestic broiler meat is not considered to be an important source of human salmonellosis cases in Finland.

Table Salmonella in breeding flocks of Gallus gallus

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Hadar	S. Infantis	S. Typhimurium	S. Virchow	Salmonella spp., unspecified
Gallus gallus (fowl) - grandparent breeding flocks for egg production line - day-old chicks - at farm - Control and eradication programmes - industry sampling - census sampling	2	Evira	flock	2	0						
Gallus gallus (fowl) - grandparent breeding flocks for egg production line - during production period - at hatchery - Control and eradication programmes - official and industry sampling - census sampling [1)]	2	Evira	flock	2	0						
Gallus gallus (fowl) - grandparent breeding flocks for egg production line - during rearing period - at farm - Control and eradication programmes - official and industry sampling - census sampling	2	Evira	flock	2	0						
Gallus gallus (fowl) - grandparent breeding flocks for meat production line - day-old chicks - at farm - Control and eradication programmes - industry sampling - census sampling	3	Evira	flock	3	0						
Gallus gallus (fowl) - grandparent breeding flocks for meat production line - during production period - at hatchery - Control and eradication programmes - official and industry sampling - census sampling [2)]	5	Evira	flock	5	0						
Gallus gallus (fowl) - grandparent breeding flocks for meat production line - during rearing period - at farm - Control and eradication programmes - official and industry sampling - census sampling	4	Evira	flock	4	0						
Gallus gallus (fowl) - parent breeding flocks for egg production line - day-old chicks - at farm - Control and eradication programmes - industry sampling - census sampling	8	Evira	flock	8	0						

Table Salmonella in breeding flocks of Gallus gallus

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Hadar	S. Infantis	S. Typhimurium	S. Virchow	Salmonella spp., unspecified
Gallus gallus (fowl) - parent breeding flocks for egg production line - during production period - at hatchery - Control and eradication programmes - official and industry sampling - census sampling [3]	24	Evira	flock	24	0						
Gallus gallus (fowl) - parent breeding flocks for egg production line - during rearing period - at farm - Control and eradication programmes - official and industry sampling - census sampling	11	Evira	flock	11	0						
Gallus gallus (fowl) - parent breeding flocks for meat production line - day-old chicks - at farm - Control and eradication programmes - industry sampling - census sampling	75	Evira	flock	75	0						
Gallus gallus (fowl) - parent breeding flocks for meat production line - during production period - at hatchery - Control and eradication programmes - official and industry sampling - census sampling [4]	144	Evira	flock	144	0						
Gallus gallus (fowl) - parent breeding flocks for meat production line - during rearing period - at farm - Control and eradication programmes - official and industry sampling - census sampling	92	Evira	flock	92	0						

Comments:

[1] also sampled at farm
[2] also sampled at farm
[3] also sampled at farm
[4] also sampled at farm

Table Salmonella in other poultry

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Livingstone	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl) - broilers - during rearing period - at farm - environmental sample - boot swabs - Control and eradication programmes - official and industry sampling - census sampling	3311	Evira	flock	3311	3		3		
Gallus gallus (fowl) - laying hens - day-old chicks - at hatchery - Control and eradication programmes - industry sampling - census sampling		Evira	flock	112	0				
Gallus gallus (fowl) - laying hens - during production period - at farm - Control and eradication programmes - industry sampling - census sampling		Evira	flock	950	0				
Gallus gallus (fowl) - laying hens - during production period - at farm - Control and eradication programmes - official and industry sampling - census sampling [1)]	950	Evira	flock	950	1			1	
Gallus gallus (fowl) - laying hens - during production period - at farm - Control and eradication programmes - official sampling - objective sampling		Evira	flock	485	1			1	
Gallus gallus (fowl) - laying hens - during production period - at farm - Control and eradication programmes - official sampling - suspect sampling		Evira	flock	4	0				
Gallus gallus (fowl) - laying hens - during rearing period - at farm - Control and eradication programmes - official and industry sampling - census sampling	110	Evira	flock	110	0				
Turkeys - meat production flocks - at farm - environmental sample - boot swabs - Control and eradication programmes - official and industry sampling	466	Evira	flock	466	1			1	

Table Salmonella in other poultry

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Livingstone	S. Typhimurium	Salmonella spp., unspecified
Turkeys - parent breeding flocks - day-old chicks - at farm - Control and eradication programmes - industry sampling - census sampling	14	Evira	flock	14	0				
Turkeys - parent breeding flocks - during production period - at hatchery - Control and eradication programmes - official and industry sampling - census sampling (also sampled at farm)	18	Evira	flock	18	0				
Turkeys - parent breeding flocks - during rearing period - at farm - environmental sample - boot swabs - Control and eradication programmes - official and industry sampling - census sampling	13	Evira	flock	13	0				

Comments:

[1)] The number of existing flocks and units tested is an estimate

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Konstanz	S. Panama	S. Typhimurium	Salmonella spp., unspecified
Cattle (bovine animals) - breeding bulls - - faeces - Control and eradication programmes - industry sampling - census sampling (samplig of herds of origin of AI-bulls)	Evira	herd	246	1				1	
Cattle (bovine animals) - unspecified - - faeces - Control and eradication programmes - official sampling - suspect sampling [1)]	Evira	herd	43	8	1	1	1	6	
Cattle (bovine animals) - unspecified - - lymph nodes - Control and eradication programmes - industry sampling - objective sampling	Evira	animal	2988	1				1	
Pigs - - faeces - Control and eradication programmes - official sampling - suspect sampling	Evira	herd	7	0					
Pigs - breeding animals - - faeces - Control and eradication programmes - industry sampling - census sampling (Nucleus herds)	Evira	herd	45	0					
Pigs - breeding animals - - faeces - Survey - EU baseline survey	Evira	herd	207	0					
Pigs - breeding animals - - lymph nodes - Control and eradication programmes - industry sampling - objective sampling	Evira	animal	3040	2				2	
Pigs - fattening pigs - - lymph nodes - Control and eradication programmes - official and industry sampling - objective sampling	Evira	animal	3112	3				3	

Comments:

[1)] One herd was positive for both Enteritidis and Konstanz.

2.1.5 Salmonella in feedingstuffs

A. Salmonella spp. in feed

Additional information

Finnish Food Safety Authority Evira carries out inspections of feedingstuffs concerning manufacturing, marketing, distribution and import.

The Regulation of the Ministry of Agriculture and Forestry on undesirable substances, products and organisms in animal feed (No 10/2008) includes requirements for hygienic quality of feedingstuffs. According to this decision, feeds should not contain salmonella. According to the Finnish Feed Act (No 86/2008), the feed operator is obligated to pay compensation for damages caused by salmonella-contaminated feeds.

All feed business operators must inform Evira when salmonella is found in feeds, feed materials or manufacturing processes.

- Import from EU or third countries:
Imported lots of plant origin feeds are sampled according to the risk-based annual control plan. Salmonella analyses are made in Evira or in laboratories approved by Evira.
Custom is responsible for the documentary checks and to carry out the import quarantine restrictions on feeds of plant origin originating from third countries.
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 Feedingstuffs Act in accordance with Regulation (EC) 882/2004.

- Marketing control:
Evira provides the inspectors of Employment and Economic Development Centres with a sampling programme for the whole year in which the types of operators, the number of visits, the types of feed and the number of samples to be taken are specified.

- Control of domestic production:
Regulation (EC) No 183/2005 of the European Parliament and of the Council laying down requirements for feed hygiene describes general rules on feed hygiene, conditions and arrangements ensuring traceability of feed and conditions for registration and approval of establishments. The sampling of production is risk-based and targeted to specified feeds. The amount of

production, the type of operator, the hygienic risk and the feed materials used have an impact on the amount so samples taken annually from the production.

- Measures in case of positive findings:
When salmonella is found in import control or from market, a prohibition concerning the lot, from which the sample was taken, is immediately issued. If salmonella is found in domestic feed production, the production line is stopped and disinfected.

Evira may upon reguest grant a permission to decontaminate the lot of feed material containing salmonella. The decontamination must be carried out according to instructions of Evira. After decontamination, Evira will resample the lot and if the lot is verified to be free from salmonella, Evira gives a permission to use the lot as feed.

In market control, the shop, where the salmonella was found, is contacted. The importer or the representative is also immediately informed, and the shop and the importer or representative are responsible for withdrawal of the product from market according to instructions of Evira

- Sampling:
Sampling for official control is carried out according to Evira's written directions which are based on the Regulation of Ministry of Agriculture and Forestry 3/2006.

- Analysis method:
In Evira salmonella is analysed mainly as described in the ISO 6579, 2002 with some minor modifications. Serotyping is performed when salmonella is detected in a sample.

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of land animal origin - dairy products	Evira	single	25 g	38	0			
Feed material of land animal origin - meat and bone meal	Evira	single	25 g	42	0			
Feed material of land animal origin - offal	Evira	single	25 g	8	0			
Feed material of marine animal origin - fish meal	Evira	batch	25 g	2	0			
Feed material of marine animal origin - fish oil	Evira	batch	25 g	1	0			

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Abony	S. Agona	S. Cubana	S. Enteritidis	S. Mbandaka	S. Rissen
Feed material of cereal grain origin - barley derived	Evira	single	25 g	2	0						
Feed material of cereal grain origin - barley derived - at feed mill - imported	Evira	batch	25 g	1	0						
Feed material of cereal grain origin - maize - at feed mill - imported	Evira	batch	25 g	1	0						
Feed material of cereal grain origin - maize - derived - at feed mill - imported	Evira	batch	25 g	30	0						
Feed material of cereal grain origin - other cereal grain derived	Evira	single	25 g	17	0						
Feed material of cereal grain origin - other cereal grain derived - at feed mill - imported	Evira	batch	25 g	1	0						
Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling	Evira	single	25 g	18	0						
Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - at feed mill - imported	Evira	batch	25 g	97	0						
Feed material of cereal grain origin - wheat derived	Evira	single	25 g	26	2	2	0				
Feed material of cereal grain origin - wheat derived - at feed mill - imported	Evira	batch	25 g	24	0						
Feed material of oil seed or fruit origin - groundnut derived	Evira	single	25 g	1	0						
Feed material of oil seed or fruit origin - linseed derived	Evira	single	25 g	45	0						
Feed material of oil seed or fruit origin - linseed derived - at feed mill - imported	Evira	batch	25 g	21	0						

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Abony	S. Agona	S. Cubana	S. Enteritidis	S. Mbandaka	S. Rissen
Feed material of oil seed or fruit origin - rape seed derived	Evira	single	25 g	56	0						
Feed material of oil seed or fruit origin - rape seed derived - at feed mill - imported [1)]	Evira	batch	25 g	53	3		1			1	
Feed material of oil seed or fruit origin - soya (bean) derived	Evira	single	25 g	7	0						
Feed material of oil seed or fruit origin - soya (bean) derived - at feed mill - imported [2)]	Evira	batch	25 g	82	3			1			1
Feed material of oil seed or fruit origin - sunflower seed derived	Evira	single	25 g	36	0						
Feed material of oil seed or fruit origin - sunflower seed derived - at feed mill - imported	Evira	batch	25 g	7	0						
Other feed material - forages and roughages - at feed mill - imported	Evira	batch	25 g	11	0						
Other feed material - other seeds and fruits	Evira	single	25 g	2	0						
Other feed material - other seeds and fruits - at feed mill - imported	Evira	batch	25 g	1	0						
Other feed material - tubers, roots and similar products	Evira	single	25 g	8	0						
Other feed material - tubers, roots and similar products - at feed mill - imported	Evira	batch	25 g	29	0						
Other feed material - yeast	Evira	single	25 g	2	0						
Other feed material - yeast - at feed mill - imported	Evira	batch	25 g	4	0						

Table Salmonella in other feed matter

	S. Senftenberg	S. Typhimurium	Salmonella spp.	Salmonella spp., unspecified
Feed material of cereal grain origin - barley derived				
Feed material of cereal grain origin - barley derived - at feed mill - imported				
Feed material of cereal grain origin - maize - at feed mill - imported				
Feed material of cereal grain origin - maize - derived - at feed mill - imported				
Feed material of cereal grain origin - other cereal grain derived				
Feed material of cereal grain origin - other cereal grain derived - at feed mill - imported				
Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling				
Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - at feed mill - imported				
Feed material of cereal grain origin - wheat derived				
Feed material of cereal grain origin - wheat derived - at feed mill - imported				
Feed material of oil seed or fruit origin - groundnut derived				
Feed material of oil seed or fruit origin - linseed derived				
Feed material of oil seed or fruit origin - linseed derived - at feed mill - imported				
Feed material of oil seed or fruit origin - rape seed derived				

Table Salmonella in other feed matter

	S. Senftenberg	S. Typhimurium	Salmonella spp.	Salmonella spp., unspecified
Feed material of oil seed or fruit origin - rape seed derived - at feed mill - imported [1)]	2		1	
Feed material of oil seed or fruit origin - soya (bean) derived				
Feed material of oil seed or fruit origin - soya (bean) derived - at feed mill - imported [2)]		1	1	
Feed material of oil seed or fruit origin - sunflower seed derived				
Feed material of oil seed or fruit origin - sunflower seed derived - at feed mill - imported				
Other feed material - forages and roughages - at feed mill - imported				
Other feed material - other seeds and fruits				
Other feed material - other seeds and fruits - at feed mill - imported				
Other feed material - tubers, roots and similar products				
Other feed material - tubers, roots and similar products - at feed mill - imported				
Other feed material - yeast				
Other feed material - yeast - at feed mill - imported				

Comments:

[1)] In two positive samples two serotypes isolated

[2)] In one positive sample two serotypes isolated

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Aberdeen	S. Agona	S. Amsterdam	S. Anatum	S. Bredeney	S. Derby
Complementary feedingstuffs [1)]	Evira	single	25 g	60	0						
Compound feedingstuffs for cattle - final product	Evira	single	25 g	287	0						
Compound feedingstuffs for fur animal [2)]	Evira	single	25 g	89	6		3				
Compound feedingstuffs for horses	Evira	single	25 g	40	1						
Compound feedingstuffs for pigs - final product	Evira	single	25 g	231	0						
Compound feedingstuffs for poultry (non specified) - final product	Evira	single	25 g	39	0						
Compound feedingstuffs for reindeers	Evira	single	25 g	10	0						
Compound feedingstuffs for sheep	Evira	single	25 g	4	0						
Compound feedingstuffs, not specified	Evira	single	25 g	46	0						
Compund feedingstuffs for poultry - broilers - final product	Evira	single	25 g	44	0						
Pet food - dog snacks (pig ears, chewing bones) [3)]	Evira	single	25 g	235	12		2	1	2	1	1
Pet food - final product [4)]	Evira	single	25 g	192	3	1	1				

	S. Enteritidis	S. Give	S. Hvittingfoss	S. Infantis	S. Kentucky	S. Landau	S. Livingstone	S. Mbandaka	S. Montevideo	S. Poona	S. Senftenberg
Complementary feedingstuffs [1)]											
Compound feedingstuffs for cattle - final product											
Compound feedingstuffs for fur animal [2)]							1			3	
Compound feedingstuffs for horses									1		
Compound feedingstuffs for pigs - final product											

Table Salmonella in compound feedingstuffs

	S. Enteritidis	S. Give	S. Hvittingfoss	S. Infantis	S. Kentucky	S. Landau	S. Livingstone	S. Mbandaka	S. Montevideo	S. Poona	S. Senftenberg
Compound feedingstuffs for poultry (non specified) - final product											
Compound feedingstuffs for reindeers											
Compound feedingstuffs for sheep											
Compound feedingstuffs, not specified											
Compund feedingstuffs for poultry - broilers - final product											
Pet food - dog snacks (pig ears, chewing bones) [3]		1	1	2	1	1	1	1	1		1
Pet food - final product [4]				1							

	S. Typhimurium	Salmonella spp.	Salmonella spp., unspecified
Complementary feedingstuffs [1]			
Compound feedingstuffs for cattle - final product			
Compound feedingstuffs for fur animal [2]			
Compound feedingstuffs for horses			
Compound feedingstuffs for pigs - final product			
Compound feedingstuffs for poultry (non specified) - final product			
Compound feedingstuffs for reindeers			
Compound feedingstuffs for sheep			
Compound feedingstuffs, not specified			

Table Salmonella in compound feedingstuffs

	S. Typhimurium	Salmonella spp.	Salmonella spp., unspecified
Compund feedingstuffs for poultry - broilers - final product			
Pet food - dog snacks (pig ears, chewing bones) [3)]	1	1	
Pet food - final product [4)]			

Comments:

[1)] Mixed mineral feed (28 units tested) and feed additive products (32 units tested)
[2)] In one positive sample two serotypes isolated
[3)] In one positive sample four serotypes isolated, in four positive samples two serotypes isolated
[4)] Other pet food than dog snacks

2.1.6 Salmonella serovars and phagetype distribution

The methods of collecting, isolating and testing of the Salmonella isolates are described in the chapters above respectively for each animal species, foodstuffs and humans. The serotype and phagetype distributions can be used to investigate the sources of the Salmonella infections in humans. Findings of same serovars and phagetypes in human cases and in foodstuffs or animals may indicate that the food category or animal species in question serves as a source of human infections. However as information is not available from all potential sources of infections, conclusions have to be drawn with caution.

Table Salmonella serovars in animals

Serovars	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Turkeys	
Sources of isolates	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**
Number of isolates in the laboratory	**99**		**5**		**7**				**1**	
Number of isolates serotyped	**99**	**0**	**5**	**0**	**7**	**0**	**0**	**0**	**1**	**0**
Number of isolates per serovar										
S. Enteritidis	2									
S. Konstanz	1									
S. Livingstone					6					
S. Panama	1									
S. Typhimurium	95		5		1				1	

Table Salmonella serovars in food

Serovars	Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**
Number of isolates in the laboratory			**2**							
Number of isolates serotyped	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Number of isolates per serovar										
S. Typhimurium			2							

Table Salmonella Enteritidis phagetypes in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**
Number of isolates in the laboratory	**1**							
Number of isolates phagetyped	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Number of isolates per type								
PT 21	1							

Table Salmonella Typhimurium phagetypes in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Turkeys	
Sources of isolates	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**
Number of isolates in the laboratory										
Number of isolates phagetyped	**7**	**0**	**5**	**0**	**1**	**0**	**0**	**0**	**1**	**0**
Number of isolates per type										
DT 104	1									
DT 104b	1									
DT 40			1							
DT 41	4									
DT 1	1		4						1	
DT 2					1					

Table Salmonella Typhimurium phagetypes in food

Phagetype	Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**	**Monitoring**	**Clinical**
Number of isolates in the laboratory			**2**							
Number of isolates phagetyped	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Number of isolates per type										
DT 40			1							
DT 1			1							

2.1.7 Antimicrobial resistance in Salmonella isolates

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Frequency of the sampling

See Salmonella spp. in bovine animals.

Type of specimen taken

Details of sampling are described in the text Salmonella spp. in bovine animals.

Methods of sampling (description of sampling techniques)

Methods of sampling are described in the text Salmonella spp. in bovine animals.

Procedures for the selection of isolates for antimicrobial testing

The samples were taken as a part of the National Control Programme

Methods used for collecting data

The strains were isolated and identified in local laboratories and the diagnosis was confirmed in Evira.

Laboratory methodology used for identification of the microbial isolates

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

Laboratory used for detection for resistance

Antimicrobials included in monitoring

VetMIC broth microdilution method (NVI, Sweden); testing performed according to CLSI Document M31-A2 Vol. 22 No. 6, 2002 until May and then Version M31-A3 Vol. 28 No 8. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as a quality control strain.

Microbiology Unit is accredited according to standard SFS-EN ISO/IEC 17025 to perform the antimicrobial susceptibility testing. The department participates regularly in proficiency tests.

The antimicrobials included are listed in the tables.

Breakpoints used in testing

Epidemiological cut-off values were used; primarily those recommended by the EUCAST, if available.

Preventive measures in place

See Salmonella spp. in bovine animals.

Control program/mechanisms

The control program/strategies in place

See Salmonella spp. in bovine animals.

Results of the investigation

Multiresistance was detected in two S. Typhimurium isolates; resistance was detected to ampicillin, chloramphenicol, sulfamethoxazole, tetracycline and trimethoprim. These two strains were phage type 104b. Resistance was also detected in one S. Enteritidis isolate to ciprofloxacin and nalidixic acid., and in one S. Typhimurium isolate to ampicillin and sulfamethoxazol. Other bovine isolates were susceptible to the antimicrobials tested. S. Dublin was not encountered.

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

The resistance situation in bovine Salmonella in Finland has been favourable for years. This trend continued in 2008.

B. Antimicrobial resistance in Salmonella in pigs

Sampling strategy used in monitoring

Frequency of the sampling

Samples originate from the Finnish Salmonella control programme.

Type of specimen taken

Details of sampling are described in the text Salmonella spp in pigs.

Methods of sampling (description of sampling techniques)

Methods of sampling are described in the text Salmonella spp in pigs.

Procedures for the selection of isolates for antimicrobial testing

The sampling frequency is determined in the national control programme

Methods used for collecting data

Primary isolation and identification was performed in local laboratories and the diagnosis was confirmed in Evira.

Laboratory methodology used for identification of the microbial isolates

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

Laboratory used for detection for resistance

Antimicrobials included in monitoring

VetMIC broth microdilution method (NVI, Sweden); testing performed according to CLSI Document M31-A2 Vol. 22 No. 6, 2002 until May and then Version M31-A3 Vol. 28 No 8. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as a quality control strain.
Microbiology Unit is accredited according to standard SFS-EN ISO/IEC 17025 to perform the antimicrobial susceptibility testing. The unit participates regularly in proficiency tests.
The antimicrobials included are listed in the tables.

Breakpoints used in testing

Epidemiological cut-off values were used; primarily those recommended by the EUCAST, if available.

Preventive measures in place

See Salmonella spp. in pigs.

Control program/mechanisms

The control program/strategies in place

See Salmonella spp. in pigs.

Results of the investigation

The five S. Typhimurium isolates were fully susceptible to the tested antibiotics

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

The overall salmonella situation and antimicrobial resistance in pigs is very favourable.

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Frequency of the sampling

See Salmonella spp. in Gallus gallus - breeding flocks for egg production and flocks of laying hens,- breeding flocks for meat production and broiler flocks, and Salmonella spp. in turkey breeding flocks and meat production flocks

Type of specimen taken

See Salmonella spp. in Gallus gallus - breeding flocks for egg production and flocks of laying hens,- breeding flocks for meat production and broiler flocks, and Salmonella spp. in turkey breeding flocks and meat production flocks

Methods of sampling (description of sampling techniques)

See Salmonella spp. in Gallus gallus - breeding flocks for egg production and flocks of laying hens,- breeding flocks for meat production and broiler flocks, and Salmonella spp. in turkey breeding flocks and meat production flocks

Procedures for the selection of isolates for antimicrobial testing

One isolate from each production batch was included.

Methods used for collecting data

Isolates were collected from local laboratories and tested in Evira.

Laboratory methodology used for identification of the microbial isolates

Details of the laboratory methodology are described in the texts Salmonella spp in Gallus gallus and turkey.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

VetMIC broth microdilution method (NVI, Sweden); testing performed according to CLSI Document M31-A2 Vol. 22 No. 6, 2002 until May and then Version M31-A3 Vol. 28 No 8. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as a quality control strain.
Microbiology Research Unit is accredited according to standard SFS-EN ISO/IEC 17025 to perform the antimicrobial susceptibility testing. The department participates regularly in proficiency tests.

The antimicrobials included are listed in the tables.

Breakpoints used in testing

Epidemiological cut-off values were used; primarily those recommended by the EUCAST, if available.

Control program/mechanisms

The control program/strategies in place

See Salmonella spp. in Gallus gallus and turkeys.

Results of the investigation

There were altogether five isolates of salmonella in poultry: one S. Typhimurium from an egg-laying hen and one from a turkey production batch. The other three isolates were S. Livingstone from broiler production batches; two of the three were coinciding isolates from separate halls of one farm. All five isolates were fully susceptible to the tested antibiotics.

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

The overall antimicrobial resistance situation in salmonella isolates from poultry continues to be highly favourable.

D. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Sampling strategy used in monitoring

Frequency of the sampling

See Salmonella spp. in pig meat and products thereof.

Type of specimen taken

See Salmonella spp. in pig meat and products thereof.

Methods of sampling (description of sampling techniques)

See Salmonella spp. in pig meat and products thereof.

Methods used for collecting data

Isolates are collected from local laboratories and tested in Evira.

Laboratory methodology used for identification of the microbial isolates

See Salmonella spp. in pig meat and products thereof.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

broth microdilution method (NVI, Sweden); testing performed according to CLSI Document M31-A2 Vol. 22 No. 6, 2002 until May and then Version M31-A3 Vol. 28 No 8. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as a quality control strain.

Microbiology Unit is accredited according to standard SFS-EN ISO/IEC 17025 to perform the antimicrobial susceptibility testing. The department participates regularly in proficiency tests.

The antimicrobials included are listed in the tables.

Breakpoints used in testing

Epidemiological cut-off values are used; primarily those recommended by the EUCAST, if available.

Preventive measures in place

See Salmonella spp. in pig meat and products thereof.

Control program/mechanisms

The control program/strategies in place

See Salmonella spp. in pig meat and products thereof.

Results of the investigation

In 2008 there were two isolations of salmonella from domestic foodstuffs derived from pigs. The isolates were susceptible to the antimicrobials included.

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

The antimicrobial resistance situation of Salmonella in foodstuff derived from domestically raised pigs is very favourable.

E. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Sampling strategy used in monitoring

Frequency of the sampling

Determined in the decree 20/EEO/2001 of the Ministry of Agriculture and Forestry

Methods used for collecting data

The strain was isolated and identified in a local laboratory and the diagnosis was confirmed in Evira.

Laboratory methodology used for identification of the microbial isolates

Details of the laboratory methodology are described in the texts Salmonella spp in Gallus gallus and turkey.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

VetMIC broth microdilution method (NVI, Sweden); testing performed according to CLSI Document M31-A2 Vol. 22 No. 6, 2002 until May and then Version M31-A3 Vol. 28 No 8. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as a quality control strain.
Microbiology Research Unit is accredited according to standard SFS-EN ISO/IEC 17025 to perform the antimicrobial susceptibility testing. The department participates regularly in proficiency tests.

The antimicrobials included are listed in the tables.

Breakpoints used in testing

Epidemiological cut-off values were used; primarily those recommended by the EUCAST, if available.

Results of the investigation

There was only one isolate of domestic origin. This S. Typhimurium isolate was susceptible to all tested antibiotics.

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

The situation in domestic poultry meat production is very favourable.

Table Antimicrobial susceptibility testing of S.Enteritidis in animals

S. Enteritidis		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys		Gallus gallus (fowl) - laying hens		Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		yes											
Number of isolates available in the laboratory		1											
Antimicrobials:		N	n	N	n	N	n	N	n	N	n	N	n
Aminoglycosides	Gentamicin	1	0										
	Streptomycin	1	0										
Amphenicols	Chloramphenicol	1	0										
Cephalosporins	Cefotaxim	1	0										
Fluoroquinolones	Ciprofloxacin	1	1										
Penicillins	Ampicillin	1	0										
Quinolones	Nalidixic acid	1	1										
Resistant to 2 antimicrobials	Resistant to 2 antimicrobials	1	1										
Sulfonamides	Sulfamethoxazol	1	0										
Tetracyclines	Tetracyclin	1	0										
Trimethoprim	Trimethoprim	1	0										

Table Antimicrobial susceptibility testing of S. Konstanz - qualitative data

S. Konstanz		Cattle (bovine animals) - Control and eradication programmes	
Isolates out of a monitoring program (yes/no)		yes	
Number of isolates available in the laboratory		1	
Antimicrobials:		N	n
Aminoglycosides	Gentamicin	1	0
	Streptomycin	1	0
Amphenicols	Chloramphenicol	1	0
Cephalosporins	Cefotaxim	1	0
Fluoroquinolones	Ciprofloxacin	1	0
Fully sensitive	Fully sensitive	1	1
Penicillins	Ampicillin	1	0
Quinolones	Nalidixic acid	1	0
Sulfonamides	Sulfamethoxazol	1	0
Tetracyclines	Tetracyclin	1	0
Trimethoprim	Trimethoprim	1	0

Table Antimicrobial susceptibility testing of S. Livingstone - qualitative data

S. Livingstone		Gallus gallus (fowl) - broilers - Control and eradication programmes	
Isolates out of a monitoring program (yes/no)		yes	
Number of isolates available in the laboratory		3	
Antimicrobials:		N	n
Aminoglycosides	Gentamicin	3	0
	Streptomycin	3	0
Amphenicols	Chloramphenicol	3	0
Cephalosporins	Cefotaxim	3	0
Fluoroquinolones	Ciprofloxacin	3	0
Fully sensitive	Fully sensitive	3	3
Penicillins	Ampicillin	3	0
Quinolones	Nalidixic acid	3	0
Sulfonamides	Sulfamethoxazol	3	0
Tetracyclines	Tetracyclin	3	0
Trimethoprim	Trimethoprim	3	0

Table Antimicrobial susceptibility testing of S. Panama - qualitative data

S. Panama		Cattle (bovine animals) - Control and eradication programmes	
Isolates out of a monitoring program (yes/no)		yes	
Number of isolates available in the laboratory		1	
Antimicrobials:		N	n
Aminoglycosides	Gentamicin	1	0
	Streptomycin	1	0
Amphenicols	Chloramphenicol	1	0
Cephalosporins	Cefotaxim	1	0
Fluoroquinolones	Ciprofloxacin	1	0
Fully sensitive	Fully sensitive	1	1
Penicillins	Ampicillin	1	0
Quinolones	Nalidixic acid	1	0
Sulfonamides	Sulfamethoxazol	1	0
Tetracyclines	Tetracyclin	1	0
Trimethoprim	Trimethoprim	1	0

Table Antimicrobial susceptibility testing of S. Typhimurium in Turkeys - Control and eradication programmes - quantitative data [Dilution method]

S. Typhimurium		Turkeys - Control and eradication programmes																								
Isolates out of a monitoring program (yes/no)		yes																								
Number of isolates available in the laboratory		1																								
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	2	1	0								1													0.5	64
	Kanamycin		0	0																						
	Neomycin		0	0																						
	Streptomycin	32	1	0												1									2	256
Amphenicols	Chloramphenicol	16	1	0										1											1	128
	Florfenicol		0	0																						
Cephalosporins	3rd generation cephalosporins		0	0																						
	Cefotaxim	0.5	1	0					1																0.06	2
Fluoroquinolones	Ciprofloxacin	0.06	1	0			1																		0.008	1
	Enrofloxacin		0	0																						
Penicillins	Ampicillin	4	1	0								1													0.25	32
Quinolones	Nalidixic acid	16	1	0										1											1	128
Sulfonamides	Sulfamethoxazol	256	1	0												1									16	2048
	Sulfonamide		0	0																						
Tetracyclines	Tetracyclin	8	1	0									1												0.5	64
Trimethoprim	Trimethoprim	2	1	0							1														0.25	32
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0																						

Table Antimicrobial susceptibility testing of S. Typhimurium in Gallus gallus (fowl) - laying hens - Control and eradication programmes - quantitative data [Dilution method]

S. Typhimurium		Gallus gallus (fowl) - laying hens - Control and eradication programmes																								
Isolates out of a monitoring program (yes/no)		yes																								
Number of isolates available in the laboratory		1																								
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	2	1	0								1													0.5	64
	Kanamycin		0	0																						
	Neomycin		0	0																						
	Streptomycin	32	1	0											1										2	256
Amphenicols	Chloramphenicol	16	1	0										1											1	128
	Florfenicol		0	0																						
Cephalosporins	Cefotaxim	0.5	1	0				1																	0.06	2
Fluoroquinolones	Ciprofloxacin	0.06	1	0			1																		0.008	1
	Enrofloxacin		0	0																						
Penicillins	Ampicillin	4	1	0								1													0.25	32
Quinolones	Nalidixic acid	16	1	0										1											1	128
Sulfonamides	Sulfamethoxazol	256	1	0												1									16	2048
	Sulfonamide		0	0																						
Tetracyclines	Tetracyclin	8	1	0									1												0.5	64
Trimethoprim	Trimethoprim	2	1	0						1															0.25	32
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0																						

Table Antimicrobial susceptibility testing of S.Typhimurium in animals

S. Typhimurium		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys		Gallus gallus (fowl) - laying hens		Gallus gallus (fowl) - broilers	
Isolates out of a monitoring program (yes/no)		no		yes				yes		yes			
Number of isolates available in the laboratory		8		5				1		1			
Antimicrobials:		N	n	N	n	N	n	N	n	N	n	N	n
Aminoglycosides	Gentamicin	8	0	5	0			1	0	1	0		
	Streptomycin	8	0	5	0			1	0	1	0		
Amphenicols	Chloramphenicol	8	2	5	0			1	0	1	0		
Cephalosporins	Cefotaxim	8	0	5	0			1	0	1	0		
Fluoroquinolones	Ciprofloxacin	8	0	5	0			1	0	1	0		
Fully sensitive	Fully sensitive	8	5	5	5			1	1	1	1		
Penicillins	Ampicillin	8	3	5	0			1	0	1	0		
Quinolones	Nalidixic acid	8	0	5	0			1	0	1	0		
Resistant to 1 antimicrobial	Resistant to 1 antimicrobial	8	0	5	0			1	0	1	0		
Resistant to 2 antimicrobials	Resistant to 2 antimicrobials	8	1	5	0			1	0	1	0		
Resistant to 3 antimicrobials	Resistant to 3 antimicrobials	8	0	5	0			1	0	1	0		
Resistant to 4 antimicrobials	Resistant to 4 antimicrobials	8	0	5	0			1	0	1	0		
Resistant to >4 antimicrobials	Resistant to >4 antimicrobials	8	2	5	0			1	0	1	0		
Sulfonamides	Sulfamethoxazol	8	3	5	0			1	0	1	0		
Tetracyclines	Tetracyclin	8	2	5	0			1	0	1	0		
Trimethoprim	Trimethoprim	8	2	5	0			1	0	1	0		

Table Antimicrobial susceptibility testing of S. Typhimurium in Cattle (bovine animals) - Control and eradication programmes - quantitative data [Dilution method]

S. Typhimurium		Cattle (bovine animals) - Control and eradication programmes																								
Isolates out of a monitoring program (yes/no)		yes																								
Number of isolates available in the laboratory		8																								
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	2	8	0							1	7													0.5	64
	Kanamycin		0	0																						
	Neomycin		0	0																						
	Streptomycin	32	8	0												5	3								2	256
Amphenicols	Chloramphenicol	16	8	2									4	2						2					1	128
	Florfenicol		0	0																						
Cephalosporins	3rd generation cephalosporins		0	0																						
	Cefotaxim	0.5	8	0				7	1																0.06	2
Fluoroquinolones	Ciprofloxacin	0.06	8	0			4	4																	0.008	1
	Enrofloxacin		0	0																						
Penicillins	Ampicillin	4	8	3							5							3							0.25	32
Quinolones	Nalidixic acid	16	8	0										8											1	128
Sulfonamides	Sulfamethoxazol	256	8	3												2	3							3	16	2048
	Sulfonamide		0	0																						
Tetracyclines	Tetracyclin	8	8	2								5	1			2									0.5	64
Trimethoprim	Trimethoprim	2	8	2						4	2							2							0.25	32
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0																						

Table Antimicrobial susceptibility testing of S. Typhimurium in Pigs - Control and eradication programmes - quantitative data [Dilution method]

S. Typhimurium		Pigs - Control and eradication programmes																								
Isolates out of a monitoring program (yes/no)		yes																								
Number of isolates available in the laboratory		5																								
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	2	5	0							3	2													0.5	64
	Kanamycin		0	0																						
	Neomycin		0	0																						
	Streptomycin	32	5	0											4	1									2	256
Amphenicols	Chloramphenicol	16	5	0									1	4											1	128
	Florfenicol		0	0																						
Cephalosporins	3rd generation cephalosporins		0	0																						
	Cefotaxim	0.5	5	0				2	3																0.06	2
Fluoroquinolones	Ciprofloxacin	0.06	5	0			2	3																	0.008	1
	Enrofloxacin		0	0																						
Penicillins	Ampicillin	4	5	0							2	3													0.25	32
Quinolones	Nalidixic acid	16	5	0										3	2										1	128
Sulfonamides	Sulfamethoxazol	256	5	0												1	4								16	2048
	Sulfonamide		0	0																						
Tetracyclines	Tetracyclin	8	5	0								2	3												0.5	64
Trimethoprim	Trimethoprim	2	5	0						2	3														0.25	32
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0																						

Table Antimicrobial susceptibility testing of S. Typhimurium - qualitative data

S. Typhimurium		Meat from turkey - at cutting plant - Monitoring		Meat from pig - carcass - - carcass swabs - Control and eradication programmes	
Isolates out of a monitoring program (yes/no)		yes		yes	
Number of isolates available in the laboratory		1		2	
Antimicrobials:		N	n	N	n
Aminoglycosides	Gentamicin	1	0	2	0
	Streptomycin	1	0	2	0
Amphenicols	Chloramphenicol	1	0	2	0
Cephalosporins	Cefotaxim	1	0	2	0
Fluoroquinolones	Ciprofloxacin	1	0	2	0
Fully sensitive	Fully sensitive	1	1	2	2
Penicillins	Ampicillin	1	0	2	0
Quinolones	Nalidixic acid	1	0	2	0
Sulfonamides	Sulfamethoxazol	1	0	2	0
Tetracyclines	Tetracyclin	1	0	2	0
Trimethoprim	Trimethoprim	1	0	2	0

Footnote:

One of the multiresistant isolates from pig meat was phage type 104b

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from pig - carcass - at slaughterhouse - animal sample - carcass swabs - Control and eradication programmes - quantitative data [Dilution method]

S. Typhimurium		Meat from pig - carcass - - carcass swabs - Control and eradication programmes																								
Isolates out of a monitoring program (yes/no)		yes																								
Number of isolates available in the laboratory		2																								
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	2	2	0							2														0.5	64
	Kanamycin		0	0																						
	Neomycin		0	0																						
	Streptomycin	32	2	0												2									2	256
Amphenicols	Chloramphenicol	16	2	0										2											1	128
	Florfenicol		0	0																						
Cephalosporins	3rd generation cephalosporins		0	0																						
	Cefotaxim	0.5	2	0					2																0.06	2
Fluoroquinolones	Ciprofloxacin	0.06	2	0			2																		0.008	1
	Enrofloxacin		0	0																						
Penicillins	Ampicillin	4	2	0								2													0.25	32
Quinolones	Nalidixic acid	16	2	0										2											1	128
Sulfonamides	Sulfamethoxazol	256	2	0												1	1								16	2048
	Sulfonamide		0	0																						
Tetracyclines	Tetracyclin	8	2	0									2												0.5	64
Trimethoprim	Trimethoprim	2	2	0							2														0.255	32
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0																						

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from turkey - at cutting plant - Monitoring - quantitative data [Dilution method]

S. Typhimurium		Meat from turkey - at cutting plant - Monitoring																								
Isolates out of a monitoring program (yes/no)		yes																								
Number of isolates available in the laboratory		1																								
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	2	1	0							1														0.5	64
	Kanamycin		0	0																						
	Neomycin		0	0																						
	Streptomycin	32	1	0											1										2	256
Amphenicols	Chloramphenicol	16	1	0										1											1	128
	Florfenicol		0	0																						
Cephalosporins	3rd generation cephalosporins		0	0																						
	Cefotaxim	0.5	1	0					1																0.06	2
Fluoroquinolones	Ciprofloxacin	0.06	1	0				1																	0.008	1
	Enrofloxacin		0	0																						
Penicillins	Ampicillin	4	1	0								1													0.25	32
Quinolones	Nalidixic acid	16	1	0										1											1	128
Sulfonamides	Sulfamethoxazol	256	1	0														1							16	2048
	Sulfonamide		0	0																						
Tetracyclines	Tetracyclin	8	1	0									1												0.5	64
Trimethoprim	Trimethoprim	2	1	0							1														0.25	32
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0																						

Table Antimicrobial susceptibility testing of Other serotypes in Cattle (bovine animals) - Control and eradication programmes - quantitative data [Dilution method]

Other serotypes		Cattle (bovine animals) - Control and eradication programmes																								
Isolates out of a monitoring program (yes/no)		yes																								
Number of isolates available in the laboratory		3																								
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	2	3	0							1	2													0.5	64
	Kanamycin		0	0																						
	Neomycin		0	0																						
	Streptomycin	32	3	0										1	2										2	256
Amphenicols	Chloramphenicol	16	3	0										3											1	128
	Florfenicol		0	0																						
Cephalosporins	3rd generation cephalosporins		0	0																						
	Cefotaxim	0.5	3	0					3																0.06	2
Fluoroquinolones	Ciprofloxacin	0.06	3	1			1	1		1															0.008	1
	Enrofloxacin		0	0																						
Penicillins	Ampicillin	4	3	0								3													0.25	32
Quinolones	Nalidixic acid	16	3	1										2						1					1	128
Sulfonamides	Sulfamethoxazol	256	3	0												3									16	2048
	Sulfonamide		0	0																						
Tetracyclines	Tetracyclin	8	3	0									3												0.5	64
Trimethoprim	Trimethoprim	2	3	0						1	2														0.25	32
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0																						

Table Antimicrobial susceptibility testing of Other serotypes in Gallus gallus (fowl) - broilers - at farm - Control and eradication programmes - quantitative data [Dilution method]

Other serotypes		Gallus gallus (fowl) - broilers - at farm - Control and eradication programmes																								
Isolates out of a monitoring program (yes/no)		yes																								
Number of isolates available in the laboratory		3																								
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	2	3	0							1	2													0.5	64
	Kanamycin		0	0																						
	Neomycin		0	0																						
	Streptomycin	32	3	0											1	1	1								2	256
Amphenicols	Chloramphenicol	16	3	0										3											1	128
	Florfenicol		0	0																						
Cephalosporins	3rd generation cephalosporins		0	0																						
	Cefotaxim	0.5	3	0					3																0.06	2
Fluoroquinolones	Ciprofloxacin	0.06	3	0				3																	0.008	1
	Enrofloxacin		0	0																						
Penicillins	Ampicillin	4	3	0							2	1													0.25	32
Quinolones	Nalidixic acid	16	3	0										3											1	128
Sulfonamides	Sulfamethoxazol	256	3	0												2	1								16	2048
	Sulfonamide		0	0																						
Tetracyclines	Tetracyclin	8	3	0									3												0.5	64
Trimethoprim	Trimethoprim	2	3	0						3															0.25	32
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0																						

Table Breakpoints for antibiotic resistance testing

Test Method Used	
Disc diffusion	○
Agar dilution	○
Broth dilution	◉
E-test	○

Standards used for testing
NCCLS

			Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		Disk content	Breakpoint Zone diameter (mm)		
		Standard for breakpoint	Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Aminoglycosides	**Gentamicin**	EUCAST	2		2	0.5	64				
	Streptomycin		32		32	2	256				
Amphenicols	**Chloramphenicol**	EUCAST	16		16	1	128				
Cephalosporins	**Cefotaxim**	EUCAST	0.5		0.5	0.06	2				
Fluoroquinolones	**Ciprofloxacin**	EUCAST	0.06		0.06	0.008	1				
Penicillins	**Ampicillin**	EUCAST	4		4	0.25	32				
Quinolones	**Nalidixic acid**	EUCAST	16		16	1	128				
Sulfonamides	**Sulfamethoxazol**		256		256	16	2048				
Tetracyclines	**Tetracyclin**	EUCAST	8		8	0.5	64				
Trimethoprim	**Trimethoprim**	EUCAST	2		2	0.25	32				

Table Breakpoints for antibiotic resistance testing

Test Method Used	
Disc diffusion	○
Agar dilution	○
Broth dilution	◉
E-test	○

Standards used for testing
NCCLS

			Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		Disk content	Breakpoint Zone diameter (mm)		
		Standard for breakpoint	Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Aminoglycosides	**Gentamicin**	EUCAST	2		2	0.5	64				
	Streptomycin		32		32	2	256				
Amphenicols	**Chloramphenicol**	EUCAST	16		16	1	128				
Cephalosporins	**Cefotaxim**	EUCAST	0.5		0.5	0.06	2				
Fluoroquinolones	**Ciprofloxacin**	EUCAST	0.06		0.06	0.008	1				
Penicillins	**Ampicillin**	EUCAST	4		4	0.25	32				
Quinolones	**Nalidixic acid**	EUCAST	16		16	1	128				
Sulfonamides	**Sulfamethoxazol**		256		256	16	2048				
Tetracyclines	**Tetracyclin**	EUCAST	8		8	0.5	64				
Trimethoprim	**Trimethoprim**	EUCAST	2		2	0.25	32				

2.2 CAMPYLOBACTERIOSIS

2.2.1 General evaluation of the national situation

A. Thermophilic Campylobacter general evaluation

History of the disease and/or infection in the country

The number of reported cases of campylobacteriosis in Finland increased from the beginning of the 1990's to the year 2001. From 2002 to 2003 the number of cases decreased, but after that the trend has been increasing again. Since 1998 campylobacters have been more commonly reported cause of enteritis than salmonellas.
All Finnish broiler slaughterhouses have voluntarily monitored the prevalence of campylobacter in broilers at slaughter as a part of the own-check programme since the 1990's. From 1999 to 2002 the flock prevalence was on average 7.9% between June and September and 1.1% during the other months.
Since 2004, when the campylobacter control programme was implemented, the prevalence of campylobacters in broiler slaughterbatches has been between 6.2 and 7.3% during June-October and below 1% during the rest of the year.

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

Thermophilic campylobacters are the most common bacterial cause of human enteric infections in Finland. The annual average proportion of domestic cases is about 30%, and most of them are caused by Campylobacter jejuni.
There is a clear seasonal trend: both the number of human cases and the campylobacter prevalence in broiler flocks peak in July-August. Almost 70% of campylobacter infections detected in July-August in Finland are domestically acquired. Still, the percentage of campylobacter positive broiler flocks has been constantly at a low level even during the summer months.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases

In late summer thermophilic campylobacters are detected in 20 to 30% of retail poultry meat of domestic origin. Poultry meat is considered as source of campylobacters in part of the sporadic cases. Contaminated drinking water caused six large outbreaks in the years 1999 - 2007. Unpasteurized milk, imported turkey meat, chicken and strawberries have been suspected as source of few small outbreaks.

Recent actions taken to control the zoonoses

A campylobacter monitoring programme for broilers was introduced in June 2004. All broiler slaughter batches between June and October are sampled and

examined for thermophilic campylobacters at slaughter. From November to May random samples are taken.
If campylobacters are detected in two consecutive flocks from the same holding, all the flocks from the holding will be slaughtered at the end of the day until two consecutive flocks are negative. Special attention to the production hygiene in the holding will be paid.

2.2.2 Campylobacteriosis in humans

2.2.3 Campylobacter in foodstuffs

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus) - fresh - - neck skin - Survey - EU baseline survey		single	1 g	369	22		22			

2.2.4 Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

A compulsory monitoring programme for broilers was introduced in June 2004. From June to October, when the prevalence is known to be at the highest, all broiler slaughter batches are sampled at slaughter. From November to May, when the prevalence is low, random sampling of slaughter batches is performed according to a particular sampling scheme. Since 2008 the number of batches sampled is calculated with the following criteria: expected prevalence 1 %, accuracy 1 %, confidence level 95%.

Type of specimen taken

At slaughter

Other: Caecum samples

Methods of sampling (description of sampling techniques)

At slaughter

Intact caeca from ten birds are taken. Caecal contents are pooled into one sample in the laboratory.

Case definition

At slaughter

A case is defined as a slaughter batch, that is positive for Campylobacter jejuni or C. coli.

Diagnostic/analytical methods used

At slaughter

Bacteriological method: NMKL No 119 with modifications (no enrichment)

Vaccination policy

There is no vaccination against campylobacter in Finland.

Other preventive measures than vaccination in place

Strict biosecurity and production hygiene in holdings.

Control program/mechanisms

The control program/strategies in place

The Finnish campylobacter monitoring programme was introduced in June 2004. It is compulsory for all broiler slaughterhouses.

Measures in case of the positive findings or single cases

If campylobacters are detected in two consecutive flocks from the same holding, all the flocks from the holding will be slaughtered at the end of the day until two consecutive flocks are negative. Special attention to the production hygiene in the holding will be paid together with the local municipal veterinarian.

Notification system in place

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

Results of the investigation

A total of 1276 slaughter batches were examined for thermophilic campylobacters between June and October 2008 in the monitoring programme. Campylobacters were detected in 83(6.5%) of these slaughter batches. In January-May and November-December, the samples (n=199)taken for the survey on Campylobacter spp. in broiler flocks and Campylobacter spp. and Salmonella spp. in broiler carcasses (Commission decision 2007/516/EC)replaced the monitoring programme sampling. Campylobacter was detected in 6 (3%) of these slaughter batches.

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

The results of the campylobacter monitoring programme in 2008 are consistent with the previous data concerning broiler flocks. The prevalence of campylobacter in Finnish broiler flocks is very low.

Relevance of the findings in animals to findings in foodstuffs and to human cases

Consumption of poultry meat is considered as a source of campylobacter in part of the sporadic human cases.

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for thermophilic Campylobacter spp.	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - caecum - Control and eradication programmes - industry sampling - census sampling (Sampling between June - October)	Evira	slaughter	1276	83	1	81		1	
Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - caecum - Survey - EU baseline survey	Evira	slaughter	411	17		17			

2.2.5 Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Sampling strategy used in monitoring

Frequency of the sampling

The 81 isolates of Campylobacter jejuni and 1 Campylobacter coli included were collected in the Finnish campylobacter control programme in 2008. Details of sampling in the Finnish campylobacter control programme are described in Thermophilic Campylobacter in Gallus gallus.

The 17 Campylobacter jejuni isolates included were collected in the EU baseline survey in 2008 (Commission decision 2007/516/EY). A total of 411 samples were examined in the EU baseline survey.

Type of specimen taken

Details of sampling in the Finnish campylobacter control programme are described in Thermophilic Campylobacter in Gallus gallus. EU baseline survey was performed according to the Commission decision 2007/516/EY.

Methods of sampling (description of sampling techniques)

Details of sampling in the Finnish campylobacter control programme are described in Thermophilic Campylobacter in Gallus gallus. EU baseline survey was performed according to the Commission decision 2007/516/EY.

Procedures for the selection of isolates for antimicrobial testing

One isolate from each slaughter batch was included. A total of 81 C. jejuni strains and 1 C. coli strain were obtained from the Finnish campylobacter control programme and susceptibility results were obtained for all 82 strains. Seventeen C. jejuni strains were obtained from the EU baseline survey (Commission decision 2007/516/EY) for susceptibility testing and susceptibility results were obtained for 16 strains.

Methods used for collecting data

Isolates out of the Finnish campylobacter control programme were sent from slaughterhouse laboratories to Evira. Samples in the EU baseline survey were examined in Evira. Microbiological confirmation for all of the isolates and antimicrobial susceptibility testing was performed in Evira.

Laboratory methodology used for identification of the microbial isolates

Details of the laboratory methodology used for isolates in the Finnish campylobacter control programme are described in Thermophilic Campylobacter in Gallus gallus. The methodology used in the EU baseline survey is described in the Commission decision 2007/516/EY.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Antimicrobial susceptibility testing was performed in the Microbiology Unit in Evira using the microdilution method (VetMIC, NVI, Sweden). CLSI document M31-A3 (vol. 28, no. 8, February 2008) was used as a reference method. Quality control was performed according to CLSI standards; Campylobacter jejuni ATCC 33560 was used as the quality control strain.

The antimicrobials included and the breakpoints used are listed in the table "Breakpoints used for antimicrobial susceptibility testing in Animals".

Breakpoints used in testing

Epidemiological cut-off values, based on EUCAST distributions for Campylobacter jejuni and for Campylobacter coli, were used.

Control program/mechanisms

The control program/strategies in place

The susceptibility testing of Campylobacters in broilers is one part of the Finnish campylobacter control programme. The antimicrobial susceptibility of isolates obtained in the control programme is tested yearly.

Results of the investigation

Resistance among C. jejuni from broilers in the Finnish campylobacter control programme was rare. Rare resistance was detected to streptomycin (4.9%), gentamicin (1.2%) and ciprofloxacin (1.2%). The one C. coli isolated from the Finnish campylobacter control programme was sensitive to all antimicrobials tested. Rare resistance was detected in C. jejuni from broilers in the EU baseline survey. Resistance to streptomycin (12.5%) and tetracycline (6.2%) was observed.

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

Resistance among C. jejuni and C. coli from broilers was rare as in previous years.

Table Antimicrobial susceptibility testing of C. coli in Gallus gallus (fowl) - at slaughterhouse - animal sample - Monitoring - quantitative data [Dilution method]

C. coli		Gallus gallus (fowl) - at slaughterhouse - animal sample - Monitoring																							
Isolates out of a monitoring program (yes/no)		yes																							
Number of isolates available in the laboratory		1																							
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	*2*	1	0								1												0.12	16
	Streptomycin	*4*	1	0									1											0.5	64
Fluoroquinolones	Ciprofloxacin	1	1	0					1															0.06	8
Macrolides	Erythromycin	*16*	1	0							1													0.5	64
Penicillins	Ampicillin		0	0																					
Quinolones	Nalidixic acid		0	0																					
Tetracyclines	Tetracyclin	2	1	0					1															0.12	16

Table Antimicrobial susceptibility testing of C. jejuni in Gallus gallus (fowl) - at slaughterhouse - animal sample - Survey - EU baseline survey - quantitative data [Dilution method]

C. jejuni		Gallus gallus (fowl) - at slaughterhouse - animal sample - Survey - EU baseline survey																							
Isolates out of a monitoring program (yes/no)		no																							
Number of isolates available in the laboratory		17																							
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	1	16	0					1		7	8													0.12	16
	Streptomycin	2	16	2							1	1	12	2											0.5	64
Fluoroquinolones	Ciprofloxacin	1	16	0				2	9	5															0.06	8
Macrolides	Erythromycin	4	16	0							15	1													0.5	64
Penicillins	Ampicillin		0	0																						
Quinolones	Nalidixic acid		0	0																						
Tetracyclines	Tetracyclin	2	16	1					15						1										0.12	16

Table Antimicrobial susceptibility testing of C. jejuni in Gallus gallus (fowl) - at slaughterhouse - animal sample - Monitoring - quantitative data [Dilution method]

C. jejuni		Gallus gallus (fowl) - at slaughterhouse - animal sample - Monitoring																							
Isolates out of a monitoring program (yes/no)		yes																							
Number of isolates available in the laboratory		81																							
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	1	81	1					1	2	58	19				1									0.12	16
	Streptomycin	2	81	4								23	54	3		1									0.5	64
Fluoroquinolones	Ciprofloxacin	1	81	1				10	64	6			1												0.06	8
Macrolides	Erythromycin	4	81	0							75	6													0.5	64
Penicillins	Ampicillin		0	0																						
Quinolones	Nalidixic acid		0	0																						
Tetracyclines	Tetracyclin	2	81	0					73	5	3														0.12	16

Table Antimicrobial susceptibility testing of Campylobacter in animals

Campylobacter spp., unspecified		Gallus gallus (fowl)		Cattle (bovine animals)		Pigs	
Isolates out of a monitoring program (yes/no)		yes					
Number of isolates available in the laboratory		99					
Antimicrobials:		N	n	N	n	N	n
Aminoglycosides	Gentamicin	98	1				
	Streptomycin	98	6				
Fluoroquinolones	Ciprofloxacin	98	1				
Macrolides	Erythromycin	98	0				
Resistant to 1 antimicrobial	Resistant to 1 antimicrobial	98	6				
Resistant to 2 antimicrobials	Resistant to 2 antimicrobials	98	0				
Resistant to 3 antimicrobials	Resistant to 3 antimicrobials	98	1				
Resistant to 4 antimicrobials	Resistant to 4 antimicrobials	98	0				
Resistant to >4 antimicrobials	Resistant to >4 antimicrobials	98	0				
Tetracyclines	Tetracyclin	98	1				

Footnote:

Includes Campylobacter jejuni and C. coli isolates out of the monitoring programme (82) and Campylobacter jejuni from EU baseline survey (17, susceptibility results for 16).

Table Breakpoints used for antimicrobial susceptibility testing

Test Method Used	
Disc diffusion	○
Agar dilution	○
Broth dilution	◉
E-test	○

Standards used for testing
NCCLS

			Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		Disk content	Breakpoint Zone diameter (mm)		
		Standard for breakpoint	Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Aminoglycosides	**Gentamicin**		1		1	0.12	16				
	Streptomycin		2		2	0.5	64				
Fluoroquinolones	**Ciprofloxacin**		1		1	0.06	8				
Macrolides	**Erythromycin**		4		4	0.5	64				
Tetracyclines	**Tetracyclin**		2		2	0.12	16				

Footnote:

Epidemiological cut-off values for Campylobacter jejuni

2.3 LISTERIOSIS

2.3.1 General evaluation of the national situation

A. Listeriosis general evaluation

History of the disease and/or infection in the country

Since 1995 18-53 human listeriosis cases have been recorded annually.

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

Since 1995 the annual incidence in humans has been 0,4-1,0 per 100 000. The actual source of infection is usually not identified but most cases are believed to be food-borne. Cold-smoked and cold-salted fishery products are considered to be risk foodstuffs. Food business operators monitor occurence of Listeria according to the Regulation 2073/2005, and also municipal food control authorities take samples for Listeria anlyses. Evira carries out special surveys for Listeria, but not annually.

2.3.2 Listeriosis in humans

2.3.3 Listeria in foodstuffs

A. L. monocytogenes in food

Monitoring system

Sampling strategy

National survay was carried out by Evira to investigate the occurrence and levels of Listeria monocytogenes in vacuum and modified atmosphire packaged, gravad and cold-salted fishery products. The samples were collected from retail shops in the Southern part of Finland, which was assessed to represent the whole country. The products available in the shops were sampled focusing to take 1-2 products from small producers monthly. Totally the samples originated from 14 producers.

Frequency of the sampling

At retail

Sampling distributed evenly throughout the study period April-December

Type of specimen taken

At retail

Sliced and unsliced, vacuum and modified atmosphire packaged products, weight 100-800g. One sample per batch and product was taken at a sampling time.

Methods of sampling (description of sampling techniques)

At retail

The samples were stored in lab at max 4 C and were analysed 2-3 days before the best before date. A laboratory sample of 50-100 g was composed of different parts of the sample and was homogenized. 25 g of the homogenized sample was analysed by qualitative method. The rest of the sample stored in refrigerator max 4 C for quantitative analysis. Quantitave analysis was started immediately after the presumptive positive result was obtained by qualitative method, i.e. start 2-3 days later than the qualitative analysis, or simultaneously with the qualitative analysis in case the best before date was too close to start later.

Definition of positive finding

At retail

L. monocytogenes detected in 25 g sample using qualitative analysis. Positive samples were quantitatively analysed using 10 g samples.

Diagnostic/analytical methods used

At retail

Bacteriological method: ISO 11290- 1 and 2:1996, 1998; Amendments 2004

Preventive measures in place

Sampling for listeria is included in own check programmes and official control carried out by the local food control authorities. The NCA has given guidelines on sampling and control of listeria in RTE-products.

Control program/mechanisms

Recent actions taken to control the zoonoses

In the survey carried out in 2008, establishments repeatedly found to have products, in which listeria was detected, or products with listeria levels >100 cfu/g, were informed about the findings. The local food control authority carried out inspections to these establishments and corrective measures were taken. The establishments and local food control authorities were given guidance by the NCA.

Measures in case of the positive findings

See above. In case the products containing L. monocytogenes >100 cfu/g are still on the market, the products are withdrawn. In the survay, findings >100 cfu/g leaded to re-sampling and withdrawal, if levels >100 occured.

Notification system in place

In case of findings of L. monocytogenes in food samples taken by FBO, the findings must be reported to the local food control authority.

Results of the investigation

L. monocytogenes was detected in 50/149 cold-smoked and in 65/192 gravad fishery products. One of the cold-smoked and six of the gravad fishery products contained L. monocytogenes > 100 cfu/g.

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

The occurence of levels <100 cfu/g was increased since the former survey carried out by the NCA 2004.

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

The same PFGE-types have been detected from fishery products and human listeriosis cases, but the connection has remained unclear.

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g	L. monocytogenes
Fish - gravad /slightly salted - at retail - Survey - national survey	Evira	single	25 g	192	65	192	65	65	59	6	65
Fish - smoked - cold-smoked - at retail - Survey - national survey [1)]	Evira	single	25 g	149	50	149	50	49	48	1	50

Comments:

[1)] One of the positive samples by detection method was not analysed by enumeration method.

Footnote:

The samples that are in the column "> detection limit but <= 100 cfu/g" were >0 but <=100 cfu/g with the enumeration method.

2.3.4 Listeria in animals

A. L. monocytogenes in animal - All animals

Monitoring system

Sampling strategy

L. monocytogenes causes most commonly neural and visceral infections and abortions in animals. The bacterium can also cause iritis in cattle. Mastitis caused by L. monocytogenes is rare. Samples are usually taken from diseased animals in post mortem examination but sometimes also from diseased live animals.

Case definition

Listeriosis diagnosis can be made by histopathological examination and/or microbiologically by isolation of the causative agent. Histopathological findings in brain tissue are so specific to neural listeriosis that diagnosis can also be made solely based on these findings without isolation of the bacterium. In other forms of Listeria infections diagnosis is based on isolation of causative agent.

Diagnostic/analytical methods used

Histopatholgy and/or cultivation.

Notification system in place

Listeriosis is classified as a monthly notifiable other infectious disease in the Decision N:o 1346/1995 of the Veterinary and Food Department of the Ministry of Agriculture and Forestry. It is therefore obligatory for any veterinarian to notify monthly any occurrence of listeriosis.

Results of the investigation

Listeria monocytogenes bacteria were isolated from 25 cases in 7 different animal species in 2008. Listeriosis was diagnosed in 10 cattle, in 7 sheep, in 4 wild hares, in 1 alpacka, in 1 goat, in 1 pig and in 1 pet chinchilla.

Relevance of the findings in animals to findings in foodstuffs and to human cases

The relevance of findings in animals to findings in foodstuffs is negligible. Consumed milk and milk used in dairy products is mainly pasteurised. Other forms of listeriosis than mastitis in animals do not pose a public health risk.

Table Listeria in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria spp.	L. monocytogenes	Listeria spp., unspecified
Alpacas - farmed - - organ/tissue - Clinical investigations	Evira	animal		1	1	
Cattle (bovine animals)	Evira	animal		10	10	
Chinchillas - pet animal	Evira	animal		1	1	
Goats	Evira	animal		1	1	
Hares - wild	Evira	animal		4	4	
Pigs	Evira	animal		1	1	
Sheep	Evira	animal		7	7	

Footnote:

The numbers of tested animals are not given because listeriosis diagnosis can be made histopathologically (brain tissue) or by general bacterilogical aerobic cultivation on blood agar as well as by cultivation on selective agar media. So all animals of all animal species from which samples are examined histopathologically or (brain samples) and/or by cultivation on blood agar or on selective media should be counted. For the same reason only the data of the species from which listeriosis diagnosis is made is reported.

2.4 E. COLI INFECTIONS

2.4.1 General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

History of the disease and/or infection in the country

Before 1996, only sporadic human cases of VTEC were diagnosed. The reporting of VTEC in humans was voluntary until 1994. An enhanced surveillance of bloody diarrhoea was initiated in 1996-1997 which resulted in 8 diagnosed cases. The first Finnish outbreak of VTEC (E. coli O157) occurred in 1997. The outbreak was associated with swimming in a shallow lake in western Finland and involved 14 confirmed cases. The incidence of VTEC in humans has varied from 0.06 (1990) to 1.0 (1997), being between 0.2-0.9/100,000 during 1998-2007. Most human cases are sporadic. Family outbreaks or sporadic cases have been associated with consumption of unpasteurised milk or contact with a cattle farm.

Prevalence studies in slaughter cattle were performed in 1997 and 2003. The prevalence of E. coli O157 in cattle faeces in 1997 was 1.3%. In the latter study the prevalence of E. coli O157 in cattle faeces was 0.4%, in carcass surface samples 0.07%. The prevalence of non-O157 VTEC in cattle faeces was 30%, in carcass samples 11%.

A compulsory control programme for all bovine slaughterhouses started in January 2004. The total number of bovines sampled in a year is calculated with the following criteria: expected prevalence 1 %, accuracy 1 %, confidence level 95 %. The total number is divided between the different slaughterhouses depending on their slaughter capacity. The sampling is evenly distributed throughout the year.

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

The number of cases has been quite stable during the recent years although under-reporting might exist. Non-O157 serotypes have increased partly due to the development of laboratory methods. Cattle contact remains a risk of infection, espacially for young children.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases

The figures of VTEC cases are relatively low but the disease caused can be severe and lead to death which makes VTEC a serious zoonosis. Cattle seem to be the biggest reservoir of VTEC. Same PFGE subtypes are detected in strains of human cases and cattle which suggests a common source. More information is needed on the potential control strategies especially on farms and at slaughter

level.

Recent actions taken to control the zoonoses

The Association for Animal Disease Prevention (industrial association) has launched on 2002 guidelines:
General hygienic guidelines for bovine holdings to prevent faecal transmitted infections (Salmonella, VTEC, Campylobacter, Listeria).

In 2003, common guidelines were established by the authorities and by the industry. The guidelines give recommendations of how to prevent spreading of VTEC in bovine holdings and slaughterhouses. According to the recommendations a special risk management plan is planned by a official municipal veterinarian and health care veterinarian for the holding where VTEC is deteced in animals. The purpose of the plan is to minimize the spreading of the infection to other animals in the holding, to neighbouring holdings and to people.

2.4.2 E. coli infections in humans

2.4.3 Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

A compulsory control programme for all bovine slaughterhouses started in January 2004. Samples are taken from slaughtered bovines by the industry. The total number of bovines sampled in a year is calculated with the following criteria: expected prevalence 1 %, accuracy 0,5 %, confidence level 95 %. The total number is divided between the different slaughterhouses depending on their slaughter capacity. The sampling is evenly distributed throughout the year.
Note! Sampling at slaughter has an animal based approach, not herd based.

Frequency of the sampling

Animals at slaughter (herd based approach)

Sampling distributed evenly throughout the year

Type of specimen taken

Animals at farm

Faeces

Animals at slaughter (herd based approach)

Faeces

Methods of sampling (description of sampling techniques)

Animals at farm

If possible, 50 g of faeces is taken from the rectum and placed to plastic container and cooled to a temperature of 4 (+/-2)C. The sample is sent to Evira laboratory for analysis.

Animals at slaughter (herd based approach)

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

Case definition

Animals at farm

Animal/herd is considered to be positive when E.coli O157 strain with the capacity of producing shigatoxin (stx I and/or stx II) and adhesion genes (eae) or an other VTEC-strain which has been connected to human cases is isolated

from a a sample.

Animals at slaughter (herd based approach)

An animal is considered to be positive when E.coli O157 strain with the capacity of producing shigatoxin (stx I and/or stx II) and adhesion genes (eae) is isolated from a sample.

Diagnostic/analytical methods used

Animals at farm

Other: E. coli O157 was isolated according to ISO 16654:2001. Other VTEC were analysed using PCR method detecting the genes of stx1, stx2, ehxA and saa.

Animals at slaughter (herd based approach)

Bacteriological method: NMKL 164:2005

Other preventive measures than vaccination in place

Evira has published in 2006 an updated guideline for the prevention of VTEC on farms ans slaughterhouses.

Control program/mechanisms

The control program/strategies in place

A compulsory control/monitoring programme for bovine slaughterhouses started in 2004. In addition it is compulsory to sample all bovine holdings which are suspected to have a connection to human VTEC cases. Sampling is carried out by the official municipal veterinarian.

Recent actions taken to control the zoonoses

In 2003, common guidelines were established by the authorities and by the industry. The guidelines were updated in 2006. They give recommendations of how to prevent spreading of VTEC in bovine holdings and slaughterhouses. According to the recommendations a special risk management plan is planned by the official municipal veterinarian and health care veterinarian for the holding where VTEC is detetced in animals. The purpose of the plan is to minimize the spreading of the infection to other animals in the holding, to neighbouring holdings and to people.

Measures in case of the positive findings or single cases

In case of the positive finding at the slaughterhouse the herd of origin is sampled by the official municipal veterinarian.
In case of positive finding at the holding the risk mangement plan is launched (see above). If the farmer does not follow the plan, the animals from the holding are slaughtered at the end of the working day with special attention to slaughter hygiene. Milk is allowed to deliver only to establishments for pasteurization. The access of visitors to the farm is restricted (especially children).

Notification system in place

National reference laboratory Evira notifies all the positive results to the competent authorities.

Results of the investigation

See Table VT E.coli in animals

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

VTEC is regarded as a serious zoonosis. Cattle are considered a reservoir of these organisms. Most human infections are sporadic and the source remains unclear. Farm-associated small outbreaks have occurred. The first Finnish outbreak was swimming-associated. One outbreak in 2001 was traced to eating imported kebab meat. The number of reported human cases has been at a relatively constant level during the recent years.

Relevance of the findings in animals to findings in foodstuffs and to human cases

Direct or indirect contact with cattle is an important risk factor. Same PFGE subtypes are detected in strains of human cases and cattle which suggests a common source.

Table VT E. coli in animals

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC)- VTEC O157	Verotoxigenic E. coli (VTEC)- VTEC non-O157	Verotoxigenic E. coli (VTEC)- VTEC, unspecified
Cattle (bovine animals) - unspecified - - faeces - Control and eradication programmes - industry sampling - objective sampling	Evira	animal	10 g	1497	3	3		

2.5 TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1 General evaluation of the national situation

A. Tuberculosis general evaluation

History of the disease and/or infection in the country

M. bovis was eradicated to a large extent during the 1960's. The last case of M. bovis infection in cattle in Finland was detected in one herd in 1982.
Finland has been granted the officially tuberculosis free status of bovine herds according to Council Directive 64/432/EEC. The disease status was established by Commission Decision 94/959/EC of 28 December 1994, confirmed by Commission Decision 2000/69/EC in 2000.

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

The national situation remains favourable.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases

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

2.5.2 Tuberculosis, mycobacterial diseases in humans

2.5.3 Mycobacterium in animals

A. Mycobacterium bovis in bovine animals

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

Finland has been granted the officially tuberculosis free status of bovine herds by a Commission Decision 94/959/EC of 28 December 1994, confirmed by Commission Decision 2000/69/EC.

Monitoring system

Sampling strategy

All AI-bulls are tested by intradermal tuberculin test not more than 30 days before moving to AI-station and annually thereafter.
Clinical suspect cases are investigated by pathological examination of suspect lymph nodes or lesions.
All slaughter animals are inspected for tuberculotic lesions.

Frequency of the sampling

AI bulls are tested annually. In addition, samples are taken from all suspected cases.

Type of specimen taken

Organs/tissues: lymph nodes or tuberculotic lesions.

Methods of sampling (description of sampling techniques)

Testing in live animals is done by intradermal tuberculin testing.
In suspect cases, biopsy of a lymph node or a whole lymph node is taken from a living animal. One or more tuberculotic lesions are collected from a dead animal. These samples are divided into two parts, one of which is sent without preservatives and the other part in 10 % buffered formalin solution.

Case definition

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

Diagnostic/analytical methods used

Histology, Ziehl-Neelsen staining, cultivation.

Vaccination policy

Vaccination of animals against tuberculosis is prohibited in Finland.

Control program/mechanisms

The control program/strategies in place

Continuous monitoring by Decision 2/EEO/95 of the Ministry of Agriculture and Forestry. Culling of positive animals.

Measures in case of the positive findings or single cases

Movement restrictions, quarantine of suspect animals and orders as regards use of milk are given by official veterinarian. Culling of positive animals in case of confirmed findings.

Notification system in place

M. bovis and M. tuberculosis infections are immediately notifiable and classified as dangerous animal disease in the Decision No 1346/95 of the Veterinary and Food Department, 28 November 1995. Possible cases of avian tuberculosis are also notifiable according to the same decision.

Results of the investigation

No cases of M.bovis were detected in cattle in 2008.

291085 bovine animals were slaughtered and subject to a routine post mortem examination. Samples were collected from 4 suspicious animals and sent to the Finnish Food Safety Authority Evira for examination. All results were negative.

A total of 937 intradermal tuberculin tests were performed on AI bulls.

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

The relation between human cases of tuberculosis and Finnish cattle population seems to be close to zero.

B. Mycobacterium bovis in farmed deer

Monitoring system

Sampling strategy

Post mortem examination is performed on all slaughtered animals and samples are sent for examination.
The farms that deliver live deer are tested regularly with intradermal comparative test. A blood sample is collected from every tested deer before performing the first initial testing. An official veterinarian is responsible for performing these tests.
The deer in farms that do not deliver live deer are tested for tuberculosis by taking samples at meat inspection. An official meat inspecting veterinarian is responsible for taking these samples.
Imported deer are tested before import.
Clinically ill deer are killed and tested if tuberculosis is suspected.

Frequency of the sampling

The intradermal comparative testing is initially done three times during 12 to 24 months, then repeated at 24 to 30 months interval.

Type of specimen taken

Other: intradermal comparative test. In suspect cases and post mortem examination lymph nodes.

Methods of sampling (description of sampling techniques)

0,1 ml avian tuberculin and 0,1 ml bovine tuberculin are injected 12,5 cm apart from each other intradermally at a shaved area in the neck in healthy skin between the cranially first and middle thirds. A skin fold at the sampling site is measured before and 72 hours after injections.
Blood sample of 10 ml is collected in a glass tube without preservatives.
At meat inspection, lymph nodes are collected from healthy animals from pharynx, throat, mediastinum, intestines and groin.
When tuberculosis is suspected, a whole animal or its head and organs including lymph nodes from chest, abdomen and groin are sent for examination.

Case definition

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

Diagnostic/analytical methods used

Histology, Ziehl-Neelsen stain, cultivation.

Vaccination policy

Vaccination against tuberculosis is prohibited.

Control program/mechanisms

The control program/strategies in place

There is a compulsory health control programme for farmed deer. Detailed instructions are included in the Decision No 16/1997 of the Veterinary and Food Department (6 June 1997) as amended by 11/EEO/2006.

Measures in case of the positive findings or single cases

The whole deer farm is classified as tuberculosis positive farm. Following measures include restrictive orders, killing of positive animals, re-testing of remaining animals, epidemiological investigation and investigations in contact herds. Investigations also includes investigating presence of tuberculosis in wild fauna around the deer farm.

Notification system in place

M. bovis and M. tuberculosis infections are immediately notifiable and classified as dangerous animal disease in the Decision No 1346/95 of the Veterinary and Food Department, 28 November 1995. Possible cases of avian tuberculosis are also notifiable according to the same decision.

Results of the investigation

No tuberculosis was detected in farmed deer in 2008.

Samples of 18 animals at post mortem examination were collected and sent for laboratory examination. All results were negative.

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

The relevance seems to be negligible.

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
FINLAND	17437	915345	17437	100	0	0				4	0
Total	17437	915345	17437	100.0	0	0.0	0	0	0	4	0
Total - 1											

Footnote:

In addition 937 intradermal tuberculin tests were done on bulls standing at the A.I. bull stations or new bulls introduced to the A.I. bull stations.

Table Tuberculosis in farmed deer

Region	Total number of existing farmed deer		Free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
FINLAND	6		6	100	0	0				18	0
Total	6	0	6	100.0	0	0.0	0	0	0	18	0

2.6 BRUCELLOSIS

2.6.1 General evaluation of the national situation

A. Brucellosis general evaluation

History of the disease and/or infection in the country

The last case of Brucella abortus in Finland was recorded in 1960. Ovine and caprine brucellosis or porcine brucellosis have never been detected.

Finland is officially free from bovine, ovine and caprine brucellosis.

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

The situation remains favourable.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases

Brucellosis has no relevance to public health in Finland.

2.6.2 Brucellosis in humans

2.6.3 Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Finland has been granted the officially brucellosis free status of bovine herds according to Council Directive 64/543/EEC. The disease free status was established by Commission Decision 94/960/EC of 28 December 1994, confirmed by Commission Decision 2000/69/EC in 2000.

Monitoring system

Sampling strategy

1. Breeding animals: samples are taken at the AI station and from the herds of the origin sending bulls to the AI stations
2. Suspicious animals due to abortions.

Frequency of the sampling

1. Continuous
2. On suspicion

Type of specimen taken

2. blood and samples from afterbirth and fetus

Methods of sampling (description of sampling techniques)

Samples are taken from living animals at the AI station or at the farm.

Case definition

The animal is seropositive, if confirmation test is positive.

Diagnostic/analytical methods used

Screening: RBT, Confirmation: CFT

Vaccination policy

Vaccination against brucellosis is prohibited.

Control program/mechanisms

The control program/strategies in place

Continuous surveillance based on the Decision No 14/95 of the Veterinary and Food Department, 12 May 1995.

Measures in case of the positive findings or single cases

Measures include notification measures, investigation of all suspected cases by veterinary authorities by serological testing on blood samples and microbiological testing in case of abortions, isolation of suspect cases and herd

restrictions, killing of positive herds and disinfection of the shed.

Notification system in place

The disease is obligatorily notifiable according to the Finnish veterinary legislation (Decision No 1346/95 of the Veterinary and Food Department, 28 November 1995). Brucellosis is classified as a dangerous animal disease.

Results of the investigation

No cases of brucellosis were recorded in 2008.

1294 blood samples from AI bulls were tested for brucellosis. In addition, 53 microbiological examinations and 57 serological tests from one herds were performed due to abortion or neonatal death. All of these tests have been negative.

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

There is no relevance to human cases.

B. Brucella melitensis in sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Finland has been granted the officially brucellosis free status of ovine herds established by Commission Decision 94/965/EC of 28 December 1994.

Monitoring system

Sampling strategy

Individual blood samples from ovine herds are taken according to Council Directive 91/68/EEC, which provides for random checks to be carried out on sheep holdings in order to maintain the officially brucellosis free status with regard to B. melitensis. An official veterinarian takes the blood samples.

Frequency of the sampling

Continuous

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Blood samples are taken from living animals at the farm.

Case definition

The animal is seropositive, if the confirmation test is positive.

Diagnostic/analytical methods used

Screening: Rose Bengal test, Confirmation: CFT

Vaccination policy

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

The control program is included in the national veterinary legislation, where brucellosis is classified as a dangerous animal disease. Detailed instructions are in the Decision No 7/1997 of the Veterinary and Food Department, 31 January 1997.

Measures in case of the positive findings or single cases

Notification procedures, investigation of all suspected cases by veterinary authorities, isoaltion of suspected cases and herd restrictions, killing and destruction of all ovine and caprine animals in the herd.

Notification system in place

The disease is obligatorily notifiable (Decision No 1346/95 of the Veterinary and Food Department, 28 November 1995)

Results of the investigation

All results have been negative in 2008.

3474 random blood samples from healthy sheep were tested. In addition 5 clinical suspect cases due to abortion were investigated.

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

There is no relevance to human cases.

C. Brucella melitensis in goats

Status as officially free of caprine brucellosis during the reporting year

The entire country free

Finland has been granted the officially brucellosis free status of caprine herds established by Commission Decision 94/965/EC of 28 December 1994.

Monitoring system

Sampling strategy

Individual blood samples are collected from caprine herds according to the Council Directive 91/68/EEC, which provides for random checks to be carried out on goat holdings in order to maintain the officially brucellosis free status with regard to B. melitensis.

Frequency of the sampling

Continuous

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Blood samples are taken from living animals at the farm.

Case definition

The animal is seropositive, if the confirmation test is positive

Diagnostic/analytical methods used

Screening: Rose Bengal test, Confirmation: CF

Vaccination policy

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

Detailed instructions concerning combating brucellosis in ovine and caprine animals are in the Decision No 7/1997 of the Veterinary and Food Department, 31 January 1997.

Measures in case of the positive findings or single cases

Notification procedures, investigation of all suspected cases by veterinary authrities, isolation of suspected cases and herd restrictions, killing and destruction of herds.

Notification system in place

The disease is classified as a dangerous animal disease and obligatorily notifiable (Decision No 1346/95 of the Veterinary and Food Department, 28 November 1995)

Results of the investigation

All results have been negative in 2008.

1459 random blood samples from healthy animals were tested. In addition one clinical suspect case due to abortion was investigated.In addition 6 clinical suspect cases due to abortion were investigated.

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

There is no relevance to human cases.

D. B. suis in animal - Pigs

Monitoring system

Sampling strategy

All boars are sampled at the AI quarantine station before transfer to AI station. All boars at the AI station are sampled annually and at the time of slaughter.

All suspected animals are tested for brucellosis.

All pigs sent for slaughter from progeny testing stations are sampled for B. suis.

Herds belonging to the Finnish SPF (specific pathogen free) system for breeding herds and multiplying herds were monitored.

Frequency of the sampling

Annual sampling at AI stations. Periodical or continuous sampling of the SPF herds

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Blood samples are collected for prevalence studies and in suspect cases. In suspect cases placental tissue and vaginal mucus is collected from sows that have aborted. Also whole piglets with skeletal or joint problems should be sent for laboratory examination if possible.

Case definition

The animal is considered seropositive, if the CFT is positive.

Diagnostic/analytical methods used

Screening: Rose Bengal test, Confirmation: CFT

Vaccination policy

Vaccination against brucellosis is prohibited in Finland.

Measures in case of the positive findings or single cases

Measures include herd restrictions and killing of all animals of positive herds. A herd is construed as positive if at least one animal is found positive of brucellosis.

Notification system in place

The disease is compulsorily notifiable according to the Decision No 1346/95 of the Veterinary and Food Department, 28 November 1995. Brucellosis in all animals is classified as a dangerous animal disease.

Results of the investigation

Altogether 2578 serological samples were tested fro Brucella suis in 2008, all with negative results.

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

The relevance seems to be negligible.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella spp.	B. abortus	B. melitensis	B. suis	Brucella spp., unspecified
Pigs	Evira	animal	2578	0	0	0	0	0

Footnote:

Sampling stage: AI stations, SPF herds, progeny testing

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk			Information about			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds	Number of bovine herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals		Number of animals examined microbiologically	Number of animals positive microbiologically
																		Sero logically	BST		
FINLAND	17437	915345	17437	100	0	0		1294	0	0	0	0		0	0	57	0	0	0	53	0
Total	17437	915345	17437	100.0	0	0.0	0	1294	0	0	0	0	0	0	0	57	0	0	0	53	0
Total - 1																					

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

Region	Total number of existing		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of herds	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbio logically	Number of animals positive microbio logically	Number of suspended herds
FINLAND	2237	128136	2237	100	0	0	252	4933	0	0	0	11	0	0
Total	2237	128136	2237	100.0	0	0.0	252	4933	0	0	0	11	0	0
Total - 1														

2.7 YERSINIOSIS

2.7.1 General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

History of the disease and/or infection in the country

In the years 1995- 2008 the number of reported cases of human yersiniosis has been on average ca. 700, most of which are caused by Yersinia enterocolitica.

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

Most of the reported human cases are of domestic origin. The number of cases is higher than the number of domestic salmonella infections. A decreasing trend in number of cases caused by Yersinia enterocolitica can be seen from 1995 to 2007.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases

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.

2.7.2 Yersiniosis in humans

2.7.3 Yersinia in foodstuffs

2.7.4 Yersinia in animals

2.8 TRICHINELLOSIS

2.8.1 General evaluation of the national situation

A. Trichinellosis general evaluation

History of the disease and/or infection in the country

In Finland, domestic pork examination for Trichinella was initiated during the 1860s. In 1923, meat inspection including Trichinella examination of swine carcasses became mandatory in municipalities with more than 4000 inhabitants, and later in the entire country. Three cases of human trichinellosis originating from imported pork were diagnosed around 1890. The last autochthonous human cases (three) originated from eating bear meat in 1977. The first diagnosis in domestic swine was made in 1954. There were very few pig cases until 1981 when the number of Trichinella positive pigs started to increase reaching even hundreds of infected swine a year. During the last few years, however, the number of diagnosed cases in pigs has decreased again to a couple of animals a year. The reason for the recent change is not known.
The infection was known in the brown bear and other wildlife during the 1950s, but since the 1980s trichinellosis has been found to be prevalent among wild carnivores 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 the four Trichinella species.

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

It appears that the Trichinella situation in Finland may be changing with decreasing incidence in swine. However, no sign of such change in wildlife has been seen. The apparent change in swine may be due to the pig production becoming more intensive with bigger industrialized units. In wildlife, a big proportion of infections are caused by T. nativa, the arctic species, which does not readily infect swine.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases

Because meat inspection of swine is mandatory to all commercial swine production, no human infection derived from domestic swine has been diagnosed even though swine have been infected. Therefore, pig meat inspection for Trichinella is essential. Moreover, hunters need to be continuously educated about the risks of eating undercooked bear, badger, lynx, wild boar or other carnivore or omnivore meat.

Recent actions taken to control the zoonoses

The Trichinella species present in Finland have been identified and the work on the epidemiology of different Trichinella species will continue. Understanding the epidemiology of the various Trichinella species will aid in managing their human health risks.

2.8.2 Trichinellosis in humans

2.8.3 Trichinella in animals

A. Trichinella in pigs

Monitoring system

Sampling strategy

General

Every single pig is examined for trichinellosis at obligatory, official meat inspection in slaughterhouse. The sampling is 100%.

Frequency of the sampling

General

All pigs are sampled at meat inspection.

Type of specimen taken

General

The sample for trichinella test from pigs is taken primarily from diaphragm muscle and secondarily from tongue, masseter or abdominal muscles.

Methods of sampling (description of sampling techniques)

General

Muscle sample is taken according to 2075/2005 at meat inspection.

Case definition

General

Positive case is a pig from which the trichinella test (2075/2005) is positive i.e. trichinella larva has been detected at test from a muscle sample. All positive results have to be confirmed at national reference laboratory Evira.

Diagnostic/analytical methods used

General

Diagnostic methods used are in accordance with 2075/2005. In Finland the methods used are the magnetic stirrer method with pooled samples and mechanically assisted pooled sample digestion method (Stomacher).

Control program/mechanisms

Recent actions taken to control the zoonoses

No recent action has been taken. Current routine meat inspection eliminates infected carcasses from human consumption.

Measures in case of the positive findings or single cases

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

Results of the investigation including description of the positive cases and the

No positive cases were found in 2008.

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

It appears that Trichinella infection incidence and prevalence in swine in Finland may be decreasing in spite of its persisting abundance in wildlife. This may be caused by the change in swine husbandry, which has become more industrialized. Therefore, the number of small family farms with old pighouses has decreased.

Relevance of the findings in animals to findings in foodstuffs and to human cases

The risk of obtaining trichinellosis from pig meat is negligible.

B. Trichinella in horses

Monitoring system

Sampling strategy

Every single slaughtered horse is examined for trichinella at meat inspection.

Frequency of the sampling

Trichinella examination is mandatory for horses at meat inspection. All slaughtered horses are introduced to official meat inspection.

Type of specimen taken

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

Methods of sampling (description of sampling techniques)

Sampling and analysing is done according to 2075/2005 EU.

Case definition

Positive result from examination according to 2075/2005 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 2075/2005.

Results of the investigation including the origin of the positive animals

Equine trichinellosis has never been found in Finland.

Control program/mechanisms

The control program/strategies in place

Trichinella examination at meat inspection is mandatory.

Notification system in place

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

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. spiralis	T. britovi	T. nativa	Trichinella spp., unspecified
Bears - from hunting - Monitoring	Evira	animal	45	4			4	
Foxes - from hunting - Monitoring	Evira	animal	445	100	1	1	3	95
Lynx - wild - from hunting - Monitoring	Evira	animal	147	61		1	6	54
Minks - wild - from hunting - Monitoring	Evira	animal	13	1				1
Pigs - at slaughterhouse - animal sample	Evira	animal	2436261	0				
Pigs - breeding animals - unspecified - sows and boars - at slaughterhouse - animal sample	Evira	animal	64386	0				
Pigs - fattening pigs - not raised under controlled housing conditions in integrated production system - at slaughterhouse - animal sample	Evira	animal	2371875	0				
Polecats - wild - from hunting - Monitoring	Evira	animal	5	1			1	
Raccoon dogs - wild - from hunting - Monitoring	Evira	animal	280	92			4	88
Solipeds, domestic - horses - at slaughterhouse - animal sample	Evira	animal	1150	0				
Wild boars - farmed - at slaughterhouse - animal sample	Evira	animal	118	0				
Wild boars - wild - from hunting	Evira	animal	12	1			1	
Wolves - wild - from hunting - Monitoring	Evira	animal	39	16			4	12

2.9 ECHINOCOCCOSIS

2.9.1 General evaluation of the national situation

A. Echinococcus spp. general evaluation

History of the disease and/or infection in the country

Echinococcus granulosus was endemic in reindeer husbandry (reindeer -reindeer herding dog -cycle) but disappeared because of control action by authorities, and because of the changes in reindeer husbandry rendering herding dogs redundant.
In the early 1990's, echinococcosis started to re-emerge, then in the southeastern part of the Finnish reindeer husbandry area. The cycle involves reindeer, elk (moose) and wolves. Hitherto, no other definitive hosts have been identified although dogs, red foxes and raccoon dogs have been examined in hundreds during the last few years.

Echinococcus multilocularis has never been diagnosed in Finland.
The rodent scientists at Finnish Forest Research Institute (METLA) perform long-term surveys twice a year at least on 50 locations to detect fluctuations of small mammal populations. Longest data sets cover more than 50 years. All animals are dissected, and their gross parasitological conditions checked. In addition, other researches send liver samples from small mammals if they find something suspicious (usually Taenid cysts) to the METLA rodent scientists. In the METLA survey in 2008, about 2100 small mammals were studied. Animals are mostly sampled from high-density habitat patches, preferred by foxes as hunting grounds. Species include bank vole Clethrionomys glareolus (whole Finland), red and grey-sided voles C. rutilus and C. rufocanus (Lapland), field vole Microtus agrestis (whole Finland), sibling vole M. rossiaemeridionalis (south-central Finland), root vole M. oeconomus (Lapland), Norway lemming Lemmus lemmus (Lapland) and water vole Arvicola terrestris. Also common shrews Sorex araneus (whole Finland), masked shrews S. caecutiens (Northern Finland) and pygmy shrews S. minutus were studied.

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

The low endemic E. granulosus strain in Finland has been described as G10 (Fennoscandian cervid strain). Its host spectrum is not well-known. It can be assumed that if the wolf population in Finland grows and expands its distribution, the parasite will benefit. New intermediate hosts may be identified in new biotopes. So far the zoonotic infection risk is to be characterized as very low, but if dogs get infected, the situation may change. Therefore, active surveillance is needed.

Surveillance is also needed for E. multilocularis, which has never been diagnosed in Fennoscandia, but is known from neighbouring areas.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases

Human infection risk from wildlife (wolf faeces) is regarded as very low. In any case, not much can be done to reduce the prevalence in wildlife. However, it is recommended to treat hunting dogs with anticestodal drugs both prior to and after hunting season. Moreover, it is recommended that cervid offals are only given to dogs following thorough cooking.

2.9.2 Echinococcosis in humans

2.9.3 Echinococcus in animals

A. Echinococcus spp. in animal

Monitoring system

Sampling strategy

- Mandatory meat inspection covers all known potential intermediate hosts slaughtered. In post mortem inspection, lungs are palpated and incised to discover hydatid cysts. The cysts are sent to Evira for confirmation.
- METLA performs long-term surveys of small mammal populations (see text in general evaluation chapter)
- Evira performs surveillance of possible definitive hosts (dogs, foxes, wolves, raccoon dogs)

Frequency of the sampling

Continuous sampling

Type of specimen taken

Faeces

Methods of sampling (description of sampling techniques)

In connection of post mortem examination, a piece of rectum containing faeces is taken for sample. Intestine is saved in freezer (-80 degrees Celsius) for possible confirmation of infection.

Case definition

Definitive host: 1) positive reaction in copro-ELISA test, 2) taeniid eggs in faeces (faecal flotation) and 3) eggs positive in Echinococcus PCR OR adult Echinococcus worms found in intestine.

Intermediate host: positive protoscolex finding in microscopic examination of a hydatid cyst.

Diagnostic/analytical methods used

Copro Elisa test

Control program/mechanisms

The control program/strategies in place

Mandatory official meat inspection.

Measures in case of the positive findings or single cases

Organs with cystic echinococcosis are condemned in meat inspection.

Notification system in place

Echinococcosis is a notifiable disease in all animals.

Results of the investigation

In 2008, hydatid cysts of Echinococcus granulosus were found in two slaughtered reindeer. One wolf out of 12 examined was copro-ELISA positive and had adult Echinococcus granulosus in the intestine. No echinococcus infections were found in foxes or raccoon dogs.

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

Echinococcus granulosus persists at seemingly low prevalences in the wolves and cervids of eastern Finland.

Table Echinococcus in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals) - at slaughterhouse	Evira	animal	265664	0			
Foxes - from hunting - Monitoring	Evira	animal	411	0			
Moose - at game handling establishment	Evira	animal	547	0			
Pigs - at slaughterhouse	Evira	animal	2436379	0			
Raccoon dogs - from hunting - Monitoring	Evira	animal	143	0			
Reindeers - at slaughterhouse	Evira	animal	76834	2	2		
Sheep - at slaughterhouse	Evira	animal	23808	0			
Solipeds, domestic - at slaughterhouse	Evira	animal	1150	0			
Voles - Monitoring	Metla	animal	2100	0			
Wolves - from hunting - Monitoring	Evira	animal	27	1	1		

2.10 TOXOPLASMOSIS

2.10.1 General evaluation of the national situation

A. Toxoplasmosis general evaluation

History of the disease and/or infection in the country

From 30 to 50 human cases have been reported yearly.

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

Toxoplasma gondii is endemic in Finland, although the prevalence seems to be lower than in central Europe.

Additional information

Toxoplasma gondii can cause a severe disease in children whose mother has been infected during pregnancy. Also immunocompromised persons, like AIDS patients, may develop a severe disease. Screening of pregnant women is currently not done in Finland.

2.10.2 Toxoplasmosis in humans

2.10.3 Toxoplasma in animals

A. T. gondii in animal

Monitoring system

Sampling strategy

Toxoplasma gondii is a notifiable disease in all animals except, hares, rabbits and rodents. The occurence of toxoplasmosis is based on diagnosis at necropsy on animals sent to the Finnish Food Safety Auhority Evira for determination of cause of death. There is no monitoring programme at present.

Case definition

Laboratory diagnosis is based on demonstration of typical cysts in tissues examined histologically during routine necropsy, when necessary other methods are used for confirmation (immunohistochemistry, PCR).

Diagnostic/analytical methods used

Laboratory diagnosis is based on demonstration of typical cysts in tissues examined histologically during routine necropsy, when necessary other methods are used for confirmation
(immunohistochemistry, PCR).

Measures in case of the positive findings or single cases

None

Notification system in place

Toxoplasma gondii is a notifiable disease in all animals except, hares, rabbits and rodents.

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii
Cats - at farm - animal sample - Clinical investigations (necropsy)	Evira	animal	282	8	8
Cattle (bovine animals) - at farm - animal sample - Clinical investigations (necropsy)	Evira	animal	85	0	
Dogs - at farm - animal sample - Clinical investigations (necropsy)	Evira	animal	496	1	1
Goats - at farm - animal sample - Clinical investigations (necropsy)	Evira	animal	3	0	
Hares - from hunting - Monitoring (animals found dead sent for necropsy)	Evira	animal	109	4	4
Pigs - at farm - animal sample - Clinical investigations (necropsy)	Evira	animal	393	0	
Sheep - at farm - animal sample - Clinical investigations (necropsry)	Evira	animal	20	0	
Solipeds, domestic	Evira	animal	54	0	
Zoo animals, all - at zoo - Monitoring (Necropsy of dead animals)	Evira	animal	41	4	4

2.11 RABIES

2.11.1 General evaluation of the national situation

A. Rabies general evaluation

History of the disease and/or infection in the country

Rabies was common in the Finnish dog population at the beginning of the 20th century but the disease was eradicated from the country by vaccinating local dog populations during the 1950's. In April 1988, a local spot of essentially sylvatic rabies was discovered in south-eastern Finland. Between April 1988 and February 1989 a total of 66 virologically verified cases were recorded within a geographical area of 1 700 km2. As a first measure the local dog population in the area, some 8 000 animals, were vaccinated against rabies at the expense of the state. At the same time it was also highly recommended to vaccinate all the other dogs. In co-operation with the WHO surveillance centre in Tübingen, Germany, a field campaign of oral vaccination of raccoon dogs and foxes was started in September 1988. During four distribution operations, the last one in the autumn 1990, a total of 200 000 Tübingen baits were distributed. In accordance with the WHO standards, Finland was declared rabies free in March 1991 after two years with no cases of rabies.

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

After February 1989 no rabies cases have been found in Finland (except two imported cases in a horse in 2003 and in a dog from India in 2007). However, the infection pressure in wild carnivores species in Russia and Baltic countries is high and it poses a continuous risk for the reintroduction of the disease. The present control of wildlife rabies appears successful and important. The import of animals from endemic areas, however, remains a risk, which can be reduced by increasing public awareness of the disease.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases

As no indigenous rabies cases were detected, the risk for humans is very low at this moment. However, there might be a risk for the introduction of rabies through imported animals which could also pose a risk for humans.

Recent actions taken to control the zoonoses

Rabies bait vaccination campaigns for wildlife have been continued along the south eastern border against Russia. Since 2004 distribution is carried out biannually, in spring and in autumn. Continuous surveillance and monitoring for rabies is carried out by Evira in Finland.

Suggestions to the Community for the actions to be taken

Oral vaccination campaigns should be continued annually.

2.11.2 Rabies in humans

2.11.3 Lyssavirus (rabies) in animals

A. Rabies in dogs

Monitoring system

Sampling strategy

The monitoring of rabies in pets is based on the detection of clinical signs, background information, and laboratory testing.

Frequency of the sampling

On clinical suspicion

Type of specimen taken

Organs/tissues: brains

Methods of sampling (description of sampling techniques)

Thalamus, pons and medulla

Case definition

When the cell culture and/or RT-PCR test is positive.

Diagnostic/analytical methods used

Other: FAT, cell culture and RT-PCR

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 (Decision No 9/EEO/1999, 12.5.1999). Dogs, cats and ferrets entering Finland shall be vaccinated against rabies in accordance with the Regulation (EC) No 998/2003 of the European Parliament and of the Council.

Other preventive measures than vaccination in place

Infected animals will be destroyed.

Control program/mechanisms

The control program/strategies in place

The measures for control of rabies are in the Decision No 9/EEO/1999 of the Veterinary and Food Department (12 May 1999) 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 killed and sent to Evira for laboratory analysis.

Measures in case of the positive findings or single cases

Epidemiological studies and information campaigns will be started. Infected

animals will be destroyed and measures taken to prevent further cases.

Notification system in place

According to the Finnish legislation rabies has been notifiable and controlled since 1922 (Act 338/22, 29 Dec 1922). Rabies is classified as a dangerous animal disease according to Decision No 1346/1995 of the Veterinary and Food Department (28 Nov 1995).

Results of the investigation

In 2008 36 dogs were investigated, all with negative results.

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

Indigenous rabies has not been detected in dogs since 1988. Illegal import of pet animals could pose a risk for the introduction of rabies.

B. Rabies virus in animal - Wildlife

Monitoring system

Sampling strategy

Sampling in a part of permanent monitoring scheme. Wild animals that are found dead in the nature are sent to the Finnish Food Safety Authority (Evira) for examination free of charge. The tests carried out include an examination for rabies. Samples are send by local veterinarians, hunters etc.

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

Frequency of the sampling

Random, about 500 animals per year.

Type of specimen taken

Organs/tissues: brains

Methods of sampling (description of sampling techniques)

Thalamus, pons and medulla

Case definition

Samples are considered positive if the cell culture and/or RT-PCR test is positive.

Diagnostic/analytical methods used

FAT, cell culture and RT-PCR if the animal has bitten a human or other animal or is suspected.

Vaccination policy

An annual programme for the immunisation of wild carnivores is carried out since 1989 in the south eastern border area. In 2007, 80 000 bait vaccines were distributed aerially in May and in September over a 20-25 km wide and 300 km long zone along the south eastern border against Russia.

Control program/mechanisms

The control program/strategies in place

The measures for control of rabies are in the Decision No 9/EEO/1999 of the Veterinary and Food Department (12 May 1999) including post mortem examination of wildlife found dead in the nature and investigations of all suspected cases in Evira.

Recent actions taken to control the zoonoses

Since 2004 bait vaccine distribution is carried out biannually, in spring and in autumn.

Measures in case of the positive findings or single cases

Epidemiological studies and information campaigns will be started. Infected animals will be destroyed and measures taken to prevent further cases.

Notification system in place

According to the Finnish legislation rabies has been notifiable and controlled since 1922 (Act 338/22, 29 Dec 1922). Rabies is classified as a dangerous animal disease according to Decision No 1346/1995 of the Veterinary and Food Department (28 Nov 1995).

Results of the investigation

In 2008 a total of 838 wild animals were examined for rabies, all with negative results.

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

No indigenous rabies cases have been found after February 1989. The infection pressure in wild carnivores in Russia and in Baltic countries is however high and it poses a risk for the reintroduction of the disease.

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	Unspecified Lyssavirus	Classical rabies virus (genotype 1)	European Bat Lyssavirus - unspecified
Badgers - wild - from hunting - Surveillance - official controls - suspect sampling	Evira	animal	17	0			
Cats - in total - Clinical investigations	Evira	animal	10	0			
Cattle (bovine animals) - in total - Clinical investigations	Evira	animal	3	0			
Dogs - in total - Clinical investigations	Evira	animal	36	0			
Foxes - wild - from hunting - Surveillance	Evira	animal	437	0			
Lynx - wild - from hunting - Surveillance - official controls - suspect sampling	Evira	animal	36	0			
Marten - wild - from hunting - Surveillance - official controls - suspect sampling	Evira	animal	4	0			
Minks - wild - from hunting - Surveillance - official controls - suspect sampling	Evira	animal	14	0			
Muskrats - wild - from hunting - Surveillance - official controls - suspect sampling	Evira	animal	1	0			
Other carnivores - wild - from hunting - Surveillance - official controls - suspect sampling [1)]	Evira	animal	4	0			
Raccoon dogs - wild - from hunting - Surveillance	Evira	animal	270	0			
Solipeds, domestic - in total - Clinical investigations	Evira	animal	2	0			
Wolves - wild - from hunting - Surveillance - official controls - suspect sampling	Evira	animal	4	0			

Comments:

[1)] European polecat

2.12 Q-FEVER

2.12.1 General evaluation of the national situation

2.12.2 Coxiella (Q-fever) in animals

A. C. burnetii in animal

Monitoring system

Sampling strategy

Clinical suspicion or for export purposes

Methods of sampling (description of sampling techniques)

The serum and milk samples were stored at -20 C, if not tested immediately.

Diagnostic/analytical methods used

Detection of antibodies from serum, milk and bulk milk: ELISA-test
Detection of antigen from milk: PCR

Notification system in place

Immediately notifiable since 1995.

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

The agent was identified for the first time in 2008.

Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii
Cattle (bovine animals) - at farm	Evira	herd	8	1	1

Footnote:

Sampling context: Export samples, official control samples

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1 ENTEROCOCCUS, NON-PATHOGENIC

3.1.1 General evaluation of the national situation

3.1.2 Antimicrobial resistance in Enterococcus, non-pathogenic isolates

A. Antimicrobial resistance of Enterococcus spp., unspecified in animal - Gallus gallus (fowl) - broilers - at slaughterhouse - Monitoring

Sampling strategy used in monitoring

Frequency of the sampling

Indicator bacteria were isolated from the samples collected as described in the Commission Decision 2007/516/EC.

Methods of sampling (description of sampling techniques)

The number of caeacal samples was 405. Both E. faecalis and E. faecium were isolated from 81 samples. If two E. faecalis or E. faecium isolates were obtained from a sample, only one was included in susceptibility testing. The total number of E. faecalis isolates was 202, and of E. faecium isolates 214.

Methods used for collecting data

Antimicrobial susceptibility testing was performed in Evira.

Laboratory methodology used for identification of the microbial isolates

Isolation of enterococci: Dilution in peptone-saline broth. Slanetz-Bartley-agar 37 ± 1,0ºC / 48 ± 4 h, bile-esculine agar 37,0 ± 1,0ºC / 24 ± 3 h, blood agar 37,0 ± 1,0ºC / 24 ± 3 h, motility agar 37,0ºC ± 1,0º C / 24 ± 3 h, arginine dihydrolase 37,0 ºC ± 1,0ºC / 24 ± 3 h, mannitol, arabinose, melibiose, raffinose, sorbitol and ribose 37,0 ºC ± 1,0ºC / 24 ± 3 h and 48 h.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Susceptibility testing: VetMIC broth microdilution method (NVI, Sweden); testing performed according to CLSI Document M31-A2, Vol. 26, 2002, or M31-A3 Vol. 28, 2008. Quality control according to the CLSI standards; Enterococcus faecalis ATCC 29212 was used as a quality control strain.
Microbiology Unit is accredited according to standard SFS-EN ISO/IEC 17025 to perform the antimicrobial susceptibility testing. The unit participates regularly in proficiency tests.

The antimicrobials included are listed in the tables.

Breakpoints used in testing

Epidemiological cut-off values given by EUCAST were used.

Results of the investigation

Resistance percentages were low for most antimicrobials tested. In E. faecalis, resistance for erythromycin and tetracycline was most common; 26% and 30%, respectively. Eleven E. faecium isolates were resistant to vancomycin.

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

The antimicrobial resistance situation is fairly favourable in indicator enterococci from broilers.

Table Antimicrobial susceptibility testing of E. faecium in broilers - Gallus gallus (fowl) - before slaughter - at slaughterhouse - Monitoring - quantitative data [Dilution method]

E. faecium		Gallus gallus (fowl) - broilers - before slaughter - at slaughterhouse - Monitoring																							
Isolates out of a monitoring program (yes/no)		yes																							
Number of isolates available in the laboratory		214																							
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	32	214	0									2	36	151	25								2	256
	Streptomycin	128	214	2												2	43	151	16			1	1		8	1024
Amphenicols	Chloramphenicol	32	214	1									3	60	149	1		1							0.5	64
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin	4	214	11								185	12	6	1			3	4	3					1	128
Macrolides	Erythromycin	4	214	30							75	50	56	3	1	9	12	1	7						0.5	64
Penicillins	Ampicillin	4	214	3						18	55	74	48	16	3										0.25	32
Tetracyclines	Tetracyclin	*2*	214	33							150	31		2	3		7	20	1						0.5	64
	Tetracyclines		0	0																						

Table Antimicrobial susceptibility testing of E. faecium - qualitative data

E. faecium		Gallus gallus (fowl) - at slaughterhouse - Monitoring	
Isolates out of a monitoring program (yes/no)		yes	
Number of isolates available in the laboratory		214	
Antimicrobials:		N	n
Aminoglycosides	Gentamicin	214	0
	Streptomycin	214	2
Amphenicols	Chloramphenicol	214	1
Fully sensitive	Fully sensitive	214	147
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin	214	11
Macrolides	Erythromycin	214	30
Penicillins	Ampicillin	214	3
Resistant to 1 antimicrobial	Resistant to 1 antimicrobial	214	57
Resistant to 2 antimicrobials	Resistant to 2 antimicrobials	214	8
Resistant to 3 antimicrobials	Resistant to 3 antimicrobials	214	1
Resistant to 4 antimicrobials	Resistant to 4 antimicrobials	214	1
Tetracyclines	Tetracyclin	214	33

Table Antimicrobial susceptibility testing of E. faecalis - qualitative data

E. faecalis		Gallus gallus (fowl) - broilers - at slaughterhouse - Monitoring	
Isolates out of a monitoring program (yes/no)		yes	
Number of isolates available in the laboratory		202	
Antimicrobials:		N	n
Aminoglycosides	Gentamicin	202	0
	Streptomycin	202	5
Amphenicols	Chloramphenicol	202	0
Fully sensitive	Fully sensitive	202	107
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin	202	0
Macrolides	Erythromycin	201	52
Penicillins	Ampicillin	202	0
Resistant to 1 antimicrobial	Resistant to 1 antimicrobial	202	73
Resistant to 2 antimicrobials	Resistant to 2 antimicrobials	202	22
Tetracyclines	Tetracyclin	202	60

Table Antimicrobial susceptibility testing of E. faecalis in Gallus gallus (fowl) - broilers - at slaughterhouse - Monitoring - quantitative data [Dilution method]

E. faecalis		Gallus gallus (fowl) - broilers - at slaughterhouse - Monitoring																							
Isolates out of a monitoring program (yes/no)		yes																							
Number of isolates available in the laboratory		202																							
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	32	202	0									4	5	85	105	3								2	256
	Streptomycin	*512*	202	5												1	7	86	103			1	4		8	1024
Amphenicols	Chloramphenicol	32	202	0									1	113	87	1									0.5	64
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin	4	202	0								28	121	53											1	128
Macrolides	Erythromycin	4	201	52							41	33	45	30	19	19	6	1	7						0.5	64
Penicillins	Ampicillin	4	202	0						1	24	173	4												0.25	32
Tetracyclines	Tetracyclin	2	202	60							109	30	3		2	1	11	40	6						0.5	64
	Tetracyclines		0	0																						

Table Breakpoints for antibiotic resistance of Enterococcus, non-pathogenic

Test Method Used	
Disc diffusion	○
Agar dilution	○
Broth dilution	◉
E-test	○

Standards used for testing
NCCLS

			Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		Disk content	Breakpoint Zone diameter (mm)		
		Standard for breakpoint	Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Aminoglycosides	**Gentamicin**	EUCAST	32		32	2	256				
	Streptomycin	EUCAST	128		128	8	1024				
Amphenicols	**Chloramphenicol**	EUCAST	32		32	0.5	64				
Glycopeptides (Cyclic peptides, Polypeptides)	**Vancomycin**	EUCAST	4		4	1	128				
Macrolides	**Erythromycin**	EUCAST	4		4	0.5	64				
Penicillins	**Ampicillin**	EUCAST	4		4	0.25	32				
Tetracyclines	**Tetracyclin**	EUCAST	2		2	0.5	64				

3.2 ESCHERICHIA COLI, NON-PATHOGENIC

3.2.1 General evaluation of the national situation

A. Escherichia coli general evaluation

History of the disease and/or infection in the country

Monitoring of antimicrobial resistance in indicator Escherichia coli from cattle, pigs and broilers is a part of the FINRES-Vet programme. One animal species per year is included in the programme. In 2008 the target species was broilers (Gallus gallus).

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

According to the results of the FINRES-Vet programme prevalence of antimicrobial resistance in indicator E. coli from broilers has been low or moderate.

3.2.2 Escherichia coli, non-pathogenic in animals

3.2.3 Antimicrobial resistance in Escherichia coli, non-pathogenic

A. Antimicrobial resistance of E. coli in animal - Gallus gallus (fowl) - broilers - at slaughterhouse - Monitoring

Sampling strategy used in monitoring

Frequency of the sampling

Indicator bacteria were isolated from the samples collected as described in the Commission Decision 2007/516/EC.

Type of specimen taken

Broiler caeca

Procedures for the selection of isolates for antimicrobial testing

One isolate from each sample, if available, was tested for antimicrobial susceptibility.

Methods used for collecting data

The samples were delivered to Finnish Food Safety Authority Evira, where the bacteria were isolated to pure culture and tested for their antimicrobial susceptibility.

Laboratory methodology used for identification of the microbial isolates

Contents of the caeca were diluted in peptone saline broth. After mixing, of the suspension was spread on Selective E. coli/Coliform Chromogenic medium (Oxoid, Basingstoke, UK) and incubated overnight at 37±1oC. Purple colonies were selected for susceptibility tests.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

VetMIC broth microdilution method (NVI, Sweden); testing performed according to CLSI Document M31-AM31-A2 Vol. 22 No. 6, 2002 until May and then Version M31-A3 Vol 22 No 8. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as a quality control strain.

Microbiology Unit is accredited according to standard SFS-EN ISO/IEC 17025 to perform the antimicrobial susceptibility testing. The antimicrobial resistance division participates regularly in proficiency tests.

The antimicrobials included are listed in the tables.

Breakpoints used in testing

Epidemiological cut-off values were used; primarily those recommended by the EUCAST, if available. For ciprofloxacin a higher cut-off value was used.

Preventive measures in place

No preventive measures are applied to indicator bacteria from healthy animals.

Results of the investigation

74% of the isolates were fully susceptible to the tested antibiotics and another 15% were resistant to only one antibiotic. The resistance figures can be attributed to carryover resistance from the laying hens since broilers are very seldom treated with any antibacterials.

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

According to the results of the FINRES-Vet programme the prevalence of antimicrobial resistance in indicator E. coli from broilers has been low or moderate. This trend continues in 2008.

Table Antimicrobial susceptibility testing of E. coli in animals

E. coli		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys	
Isolates out of a monitoring program (yes/no)						yes			
Number of isolates available in the laboratory						388			
Antimicrobials:		N	n	N	n	N	n	N	n
Aminoglycosides	Gentamicin					388	0		
	Streptomycin					388	54		
Amphenicols	Chloramphenicol					388	0		
Cephalosporins	Cefotaxim					388	5		
Fluoroquinolones	Ciprofloxacin					387	7		
Penicillins	Ampicillin					388	17		
Quinolones	Nalidixic acid					388	6		
Resistant to 1 antimicrobial	Resistant to 1 antimicrobial					388	66		
Resistant to 2 antimicrobials	Resistant to 2 antimicrobials					388	15		
Resistant to 3 antimicrobials	Resistant to 3 antimicrobials					388	13		
Resistant to 4 antimicrobials	Resistant to 4 antimicrobials					388	2		
Resistant to >4 antimicrobials	Resistant to >4 antimicrobials					388	3		
Sulfonamides	Sulfonamide					388	30		
Tetracyclines	Tetracyclin					388	25		
Trimethoprim	Trimethoprim					388	9		

Table Antimicrobial susceptibility testing of E. coli in Gallus gallus (fowl) - broilers - at slaughterhouse - Monitoring - quantitative data [Dilution method]

E. coli		Gallus gallus (fowl) - broilers - at slaughterhouse - Monitoring																								
Isolates out of a monitoring program (yes/no)		yes																								
Number of isolates available in the laboratory		388																								
Antimicrobials:		break points	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Aminoglycosides	Gentamicin	2	388	0							65	294	29												0.5	2
	Kanamycin		0	0																						
	Neomycin		0	0																						
	Streptomycin	16	388	54									2	112	200	20	23	25	3	3					2	256
Amphenicols	Chloramphenicol	16	388	0									6	202	175	5									2	16
	Florfenicol		0	0																						
Cephalosporins	3rd generation cephalosporins		0	0																						
	Cefotaxim	0.25	388	5			1	281	83	18	5														0.03	0.5
Fluoroquinolones	Ciprofloxacin	0.06	387	7		27	280	73	2	1	2	1	1												0.015	2
	Enrofloxacin		0	0																						
Penicillins	Ampicillin	8	388	17							8	79	239	44	1			17							0.5	64
Quinolones	Nalidixic acid	16	388	6								3	108	249	17	5	1		2	3					1	256
Sulfonamides	Sulfonamide	256	388	30												356	1	1				3	6	21	16	2048
Tetracyclines	Tetracyclin	8	388	25								73	282	8			1	10	14						1	128
Trimethoprim	Trimethoprim	2	388	9					1	35	230	107	6		2			7							1	64
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0																						

Table Breakpoints used for antimicrobial susceptibility testing

Test Method Used	
Disc diffusion	○
Agar dilution	○
Broth dilution	◉
E-test	○

Standards used for testing
NCCLS

			Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		Disk content	Breakpoint Zone diameter (mm)		
		Standard for breakpoint	Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Aminoglycosides	**Gentamicin**	EUCAST	2		2	0.5	64				
	Streptomycin	EUCAST	16		16	2	256				
Amphenicols	**Chloramphenicol**	EUCAST	16		16	1	128				
Cephalosporins	**Cefotaxim**	EUCAST	0.25		0.25	0.06	2				
Fluoroquinolones	**Ciprofloxacin**		0.06		0.06	0.008	1				
Penicillins	**Ampicillin**	EUCAST	8		8	0.25	32				
Quinolones	**Nalidixic acid**	EUCAST	16		16	1	128				
Sulfonamides	**Sulfonamide**		256		256	16	2048				
Tetracyclines	**Tetracyclin**	EUCAST	8		8	0.5	64				
Trimethoprim	**Trimethoprim**	EUCAST	2		2	0.25	32				

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1 HISTAMINE

4.1.1 General evaluation of the national situation

4.1.2 Histamine in foodstuffs

4.2 ENTEROBACTER SAKAZAKII

4.2.1 General evaluation of the national situation

4.2.2 Enterobacter sakazakii in foodstuffs

4.3 STAPHYLOCOCCAL ENTEROTOXINS

4.3.1 General evaluation of the national situation

4.3.2 Staphylococcal enterotoxins in foodstuffs

5. FOODBORNE

Foodborne outbreaks are incidences of two or more human cases of the same disease or infection where the cases are linked or are probably linked to the same food source. Situation, in which the observed human cases exceed the expected number of cases and where a same food source is suspected, is also indicative of a foodborne outbreak.

A. Foodborne outbreaks

System in place for identification, epidemological investigations and reporting of

Systematic collection of information about food-borne outbreaks in Finland began in 1975. The local food control and health officials are responsible for investigating and reporting food poisoning outbreaks in their area. Collection of the information takes place on the basis of the Food Act (23/2006), the Health Protection Act (763/1994), the Communicable Disease Act (583/86), the Decree (251/2007) concerning the follow-up and reporting of food poisoning and food-borne infections and the Communicable Diseases Decree (786/86). Physicians have to notify all cases of communicable diseases to the National Institute for Health and Welfare (THL from 1.1.2009 previously National Public Health Institute, KTL). The data is recorded in the National Infectious Diseases Record in Finland. The municipality local outbreak investigation groups are responsible for investigation of every suspected food- and water-borne outbreak and its reporting to the National Food Safety Authority (Evira). Final reports are sent immediately by the National Food Safety Authority (Evira) to the National Institute for Health and Welfare (THL). The National Food Safety Authority, in co-operation with the National Institute for Health and Welfare evaluates each final municipal report in order to classify the outbreaks as regards to the strength of evidence. The data is recorded in the National Food Poisoning Register and an annual report of outbreaks is published by the National Food Safety Authority.

Description of the types of outbreaks covered by the reporting:

All general domestic food and waterborne outbreaks are reported in Finland. Illness of more than two persons from single source is considered a cluster and a suspected outbreak. Sporadic cases and infections acquired abroad are not included in the food poisoning register, whereas they are included in the infectious disease register. Family outbreaks are reported if commercial foodstuffs are supposed to be a source of illness or several persons are at risk. Obligatory reporting involves definite communicable diseases and traditional food-borne agents such as those causing intoxications.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

In 2008, the municipal food control authorities notified 41 suspected or verified food and water borne outbreaks, of which 38 were associated with food and three with drinking water. The total number of outbreaks increased 28 % compared to the previous year.
The food poisoning notification and reporting system was revised in Finland in 1997. In 1997, twice the number of outbreaks was reported, and in 1998 three times the number, compared to previous years throughout the 1990s. The number of reported outbreaks in 1997 and 1998 was 68 and 95, respectively. This has improved food poisoning reporting, which has in effect caused an increase in the number of outbreaks recorded. However, when the criteria for classification have been developed based on the strength of

the evidence the number of the recorded outbreaks has constantly decreased beginning from 1999. In 2003 the number of outbreaks was 33, being almost 60% less than in 1998. In 2004 the number of outbreaks slightly increased first time in five years and the number still continued to increase in 2005. Since 2006 the number of outbreaks has slightly decreased. Most of the reported outbreaks are food-borne (93% in 2008). The number of human cases follows the number of outbreaks varying from 1000 to 2000 cases annually. About 50% of the reported outbreaks are small by number of cases per outbreak (<10 persons infected). A few large waterborne outbreaks with increased number of human cases have been reported. Due to contaminated drinking water a total of 5350, 6809, 6445, and >8000 persons became ill in outbreaks in 1989, 1998, 2000, and 2008, respectively.

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

During the last ten years the most common reported causative agent was norovirus. Before 1994 it was not commonly implicated as a food-borne disease agent in reports. However, improved analytical capacity to detect viruses has resulted norovirus being among the most commonly reported agent in both food and waterborne outbreaks. In investigations vehicles have been imported frozen raspberries, oysters, mussels, cold served salads and drinking water. In 2008 norovirus caused 12 (30%) food borne outbreaks. The most common vehicle (75%) reported was food contaminated by infected food handler at restaurant or catering. Only one salmonella outbreaks were notified in 2008. The vehicle was imported pre-cut iceberg lettuce. Two food borne outbreaks caused by Campylobacter spp. from duck (confirmed) and turkey (suspected) meat.

In 2008 one Cryptosporidium parvum -outbreak from imported ready-chopped lettuce (suspected vehicle) and two Yersinia pseudotuberculosis outbreaks from fresh produce was reported. The confirmed vehicle in one Y. pseudotuberculosis outbreak was domestic, cold storaged and grated carrot but in other Y. pseudotuberculosis -outbreak the vehicle was not confirmed. Traditional causes of food poisoning (Bacillus cereus and Staphylococcus aureus) caused four outbreaks (10%). Mixed and buffet meals and bakery products were vehicles in these outbreaks.

In almost half (43%) of the foodborne outbreaks the causative agent and the vehicle remained unknown in 2008 In these cases however, the investigations showed descriptive epidemiological association between eating certain meal and becoming ill. The investigations revealed a certain food to be the vehicle in 20 (50%) outbreaks. In 2008 vegetables and vegetables products was the most common vehicle in food borne outbreaks, whereas the second most common vehicle was meat and meat products.

A total of three outbreaks spread by drinking water were reported in 2008. All of the waterborne outbreaks were caused through drinking water contaminated with leakage of sewage.

Relevance of the different type of places of food production and preparation in outbreaks

In 18%, the factors causing food poisonings were connected with temperature including inadequate cooling, inadequate heating or reheating and improper storage temperature of food at restaurants and catering service. Substandard kitchen and poor hand hygiene in restaurants were suspected being the cause in 25% of the outbreaks. In norovirus outbreaks the most common reason (75%) was an infected food handler who transferred pathogens via contaminated hands to the served food. Raw materials were responsible for 18% of the food borne outbreaks in 2008 including one Campylobacter outbreak from duck, and one salmonella, one Cryptosporidium parvum and two Y. pseudotuberculosis -outbreaks from fresh produce.

Descriptions of single outbreaks of special interest

Two Yersinia pseudotuberculosis outbreaks

Two food borne outbreaks caused by Y. pseudotuberculosis serotype O:1 were reported in 2008. Stored, domestic grated carrots from previous summer (2007) distributed and served in schools, hospital, elderly home and work place canteens was implicated as a vehicles of the first outbreak in Northern Finland. The second outbreak was reported in a mass catering of festivals in the Central Finland. In this outbreak, the source of infection was not confirmed. Only exported fresh produce was served during the meals. Both outbreaks occurred in the beginning of June. In the first outbreak a total of 50 cases of Y. pseudotuberculosis O:1 infection were confirmed, and 4 persons in the second outbreak. Contaminated carrots in the first outbreaks were traced back to the farm and to the vegetable processing plant. Samples were taken from carrots, storages, and surfaceses of washing and peeling devices. Carrots were stored at 1-2°C temperature and washed, peeled and packaged prior to distribution. Y. pseudotuberculosis O:1 was recovered from carrots, and surface samples in cold storage and processing plant. The isolates genotyped from carrots and environmental samples were indistinguishable from the patient isolates.

Contamination of commercially distributed ready-to-eat fresh produce is increasingly causing food-borne outbreaks in Finland. Y. pseudotuberculosis serotype O:1 has first time been associated with eating of domestic, grated carrots in spring 2003 and 2004. In all of these cases carrots have been harvested previous summer or autumn, and stored from six to ten months before eating. The exact mechanism for contamination of carrots remains unknown, but it is likely to have resulted from soil contaminated with animal feces. Y. pseudotuberculosis can grow in cold and during the prolonged storage (from six

to nine months) the bacteria can multiply enough to cause an infection. To prevent outbreaks in the future instructions to improve the hygiene practices on farming, storage and handling of raw carrots have been given. The regular surface sampling for Y. pseudotuberculosis is now recommended (beginning 1st of January) when domestic, cold storaged carrots are processed.

Control measures or other actions taken to improve the situation

All food and waterborne outbreaks are investigated by local food control and health officials. In case of widespread epidemics central administrations are in charge of coordinating investigations. An investigation comprises an epidemiological investigation, detection of contributing factors, revision in-house control system and sampling. Information received about food-borne outbreaks, contributory factors and causative agents is analyzed and actively used in food handler education and training. Since at the beginning of January 2005 all food handlers whose work entails special risks related to food hygiene or who handle unpacked, perishable foodstuffs have to demonstrate their proficiency either by a hygiene proficiency certificate or a certificate of vocational qualification. Independent Proficiency Examiners accredited by the National Food Safety Authority (Evira) organise examinations in the different parts of the country. On the basis of identified causative agents, risk foods or raw material information and recommendations are distributed to the entrepreneurs, producers, and consumers. The network-like National Zoonoses Centre between the national organisations (National Food Safety Authority, National Institute for Health and Welfare, Ministry of Agriculture and Forestry and Ministry of Social Affairs and Health) started in spring 2007 to prevent and control the risks of most significant zoonoses in Finland in an efficient and cost-effective manner. New control programs are established and other measures taken in order to control epidemics caused by the most important zoonooses. Creating a national system for monitoring and surveillance of campylobacter, yersinia, listeria and the EHEC bacterium of production animals and foodstuffs are one of the key actions to be taken by the Finnish Strategy on Zoonoses. The Finnish Salmonella control program successfully ensures salmonella free foodstuffs to market and only a minor part of human salmonellosis are domestically acquired.

Foodborne Outbreaks: summarized data

	Total number of outbreaks	Outbreaks	Human cases	Hospitalized	Deaths	Number of verified outbreaks
Bacillus	3	2	14	0	0	1
Campylobacter	2	1	68	6	0	1
Clostridium	0	0	0	0	0	0
Escherichia coli, pathogenic	0	0	0	0	0	0
Foodborne viruses	12	10	249	0	0	2
Listeria	0	0	0	0	0	0
Other agents	0	0	0	0	0	0
Parasites	1	0	0	0	0	1
Salmonella	1	0	0	0	0	1
Staphylococcus	1	0	0	0	0	1
Unknown	19	19	341	3	0	0
Yersinia	2	1	4	0	0	1

Verified Foodborne Outbreaks: detailed data

S. Newport

	Value
Code	612008
Subagent Choice	Salmonella; S. Newport, Salmonella; S. Reading
Outbreak type	General
Human cases	86
Hospitalized	unknown
Deaths	0
Foodstuff implicated	Vegetables and juices and other products thereof
More Foodstuff	raw iprecut ceberg lettuce
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Hospital or medical care facility
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Intra community trade
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	

Verified Foodborne Outbreaks: detailed data

Campylobacter spp., unspecified

	Value
Code	582008
Subagent Choice	
Outbreak type	General
Human cases	2
Hospitalized	0
Deaths	0
Foodstuff implicated	Other or unspecified poultry meat and products thereof
More Foodstuff	roasted duck
Type of evidence	Laboratory detection in human cases, Laboratory characterization of food and human isolates, Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Inadequate heat treatment, Cross-contamination
Outbreaks	1
Comment	

Verified Foodborne Outbreaks: detailed data

Y. pseudotuberculosis

	Value
Code	382008
Subagent Choice	Yersinia; Y. pseudotuberculosis
Outbreak type	General
Human cases	50
Hospitalized	10
Deaths	0
Foodstuff implicated	Vegetables and juices and other products thereof
More Foodstuff	raw grated carrot
Type of evidence	Laboratory characterization of food and human isolates, Analytical epidemiological evidence, Laboratory detection in human cases, Laboratory detection in implicated food
Setting	School, kindergarten
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	

Verified Foodborne Outbreaks: detailed data

B. cereus

	Value
Code	0112008
Subagent Choice	Bacillus; B. cereus
Outbreak type	General
Human cases	5
Hospitalized	0
Deaths	0
Foodstuff implicated	Vegetables and juices and other products thereof
More Foodstuff	cooced, smashed potatoes
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Storage time/temperature abuse, Inadequate heat treatment, Inadequate chilling
Outbreaks	1
Comment	

Verified Foodborne Outbreaks: detailed data

S. aureus

	Value
Code	482008
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	General
Human cases	15
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	chicken salad
Type of evidence	Laboratory detection in implicated food
Setting	Unknown
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	

Verified Foodborne Outbreaks: detailed data

norovirus (Norwalk-like virus)

	Value
Code	142008
Subagent Choice	Foodborne viruses; Calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	39
Hospitalized	1
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Other setting
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Not relevant
Contributory factors	Infected food handler
Outbreaks	1
Comment	

norovirus (Norwalk-like virus)

	Value
Code	702008
Subagent Choice	Foodborne viruses; Calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	29
Hospitalized	0
Deaths	0
Foodstuff implicated	Fruit, berries and juices and other products thereof
More Foodstuff	cooked raspberry
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Not relevant
Contributory factors	Infected food handler
Outbreaks	1
Comment	

Verified Foodborne Outbreaks: detailed data

C. parvum

	Value
Code	692008
Subagent Choice	Parasites; Cryptosporidium; C. parvum
Outbreak type	General
Human cases	87
Hospitalized	4
Deaths	0
Foodstuff implicated	Vegetables and juices and other products thereof
More Foodstuff	pre-cut saladmix
Type of evidence	Analytical epidemiological evidence, Laboratory detection in human cases
Setting	Canteen or workplace catering
Place of origin of problem	Unknown
Origin of foodstuff	Intra community trade
Contributory factors	Unknown
Outbreaks	1
Comment	