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 2006

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Finland**
Reporting Year: **2006**
Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
Finnish Zoonosis Centre	Finnish Zoonosis Centre was established 1st January, 2007. The Centre forms a cooperation body between Finnish Food Safety Authority Evira and The National Public Health Institute (KTL). 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
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

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[1]. 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 2006. 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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[1] 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 2006.
Data on reindeers:
Statistics of the Reindeer Herders' Association
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 2006.
Data on reindeers:
Final data, 2005/ 2006, reindeer herding year: 1 June-31 May.
Data on slaughtered animals: All animals slaughtered in 2006

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

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 2006 only 42 per cent of farms reared livestock.
Despite the number of farms with livestock decreasing, animal production volumes remain at a high level. Indeed, the livestock production is concentrating into larger units.

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 2006, less than half of dairy farms had fewer than 15 cows, but these farms only had about one fifth of all milk cows in the country. Almost two thirds of all milk cows are on farms that have at least 20 head. Although the number of farms with over 50 dairy cows has more than doubled during this decade, their proportion of all dairy farms is about 3-4%. The concentration of production into larger units is even clearer in the case of pig and poultry production.

Table Susceptible animal populations

* Only if different than current reporting year

Animal species	Category of animals	Livestock numbers (live animals)	Year*	Number of slaughtered animals	Year*	Number of holdings	Year*	Number of herds or flocks	Year*
Cattle (bovine animals)	dairy cows and heifers	453090				16233			
	meat production animals (1)	178545				10078			
	calves (under 1 year)	317656				19038			
	in total	949291		293014		20098			
Deer	farmed - in total	195				6			
Ducks	in total	3464		6963		106			
Gallus gallus (fowl)	broilers	5366137		53727251		124			
	parent breeding flocks, unspecified - in total (2)	13410				223			
	breeding flocks, unspecified - in total (3)	844005				100			
	laying hens	3103333		410531		1402			
	parent breeding flocks for meat production line (4)	404542				43			
	in total	9731427		54554790		1711			
Geese	in total	939		4550		90			
Goats	in total	6670				483			
Pigs	breeding animals (5)	174931		61873		1989			
	fattening pigs (6)	1261539		2360717		2793			
	in total	1436470		2422590		2876			
Reindeers	farmed - in total	197797		89749		5037			
Sheep	animals under 1 year (lambs)	3654				188			
	animals over 1 year	57124				1861			
	meat production animals	55875				1581			
	in total (7)	116653		33692		1949			
Solipeds, domestic	horses - in total (8)	28638		1052		5270			
Turkeys	in total	492643		1521924		126			
Wild boars	farmed - in total			638					
Wild ducks	farmed			12807					
Pheasants	in total			1833					
Guinea fowl	in total			31					
Ratites (ostrich, emu, nandu)	in total			120					
Partridges	in total			209					

(1): Suckler cows, heifers for suckler cows, heifers for slaughter and bulls over 1 year
(2): Cockerels at least 20 weeks
(3): Chicks under 20 weeks
(4): Broiler hens at least 18 weeks
(5): Boars and sows over 50 kg
(6): Fattening pigs 50 kg and over, pigs 20 - 50 kg and piglets under 20 kg
(7): Number of slaughtered sheep includes also a small amount of slaughtered goats
(8): Number of holdings and livestock refer to horses on farms only

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.

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 sitation in domestic broiler meat has been favourable. Les than 1 % of the samples investigated has been positive for salmonella.

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

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

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 is favourable. Less than 1 % of the samples investigated has been salmonella positive.

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

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

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

Other: At slaughterhouses: detection of annual prevalence of 0,1 % by 95 % confidence levels, cutting plants: Cutting plant production over 100 000 kg in a week: one sample every day, production between 20 000 -100 000 kg in a week: 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

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

At meat processing plant

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

At retail

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 3.3.1.

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 (as a source of infection)

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

Other: At slaughterhouses: detection of annual prevalence of 0,1 % by 95 % confidence levels, cutting plants: Cutting plant production over 100 000 kg in week: one sample each day, production between 20 000 -100 000 kg in 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

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

At meat processing plant

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

At retail

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 (as a source of infection)

Domestic bovine meat is not considered to be an important source of human salmonelloisis 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								
- at cutting plant - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	single	25 g	752	0			
Meat from turkey								
fresh								
- at cutting plant - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	single	25 g	356	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	S. Infantis
Meat from pig									
fresh									
- at cutting plant - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	single	25 g	2311	0				
carcass									
- at slaughterhouse - animal sample - carcass swabs - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling (Fattening pigs)	Evira	single	1400 cm2	3322	0				
- at slaughterhouse - animal sample - carcass swabs - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling (Sows)	Evira	single	1400 cm2	3132	0				
Meat from bovine animals									
fresh									
- at cutting plant - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	single	25 g	2261	0				
carcass									

- at slaughterhouse - animal sample - carcass swabs - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	single	1400 cm2	3237	2				2

2.1.4. Salmonella in animals

A. Salmonella spp. in Gallus gallus - breeding flocks for egg production and flocks of laying hens

Monitoring system

Sampling strategy

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

The Finnish Salmonella Control Programme: all breeding flocks are sampled at a holding and at a hatchery. At holdings sampling is carried out by an official veterinarian once a year, otherwise sampling is carried out by a food business operator. If a sample taken by a food business operator is positive for salmonella spp, official veterinarian has to take confirmation samples. At hatcheries sampling is carried out by an official veterinarian every 8 weeks, otherwise sampling is carried out by a food business operator.

Laying hens flocks

The Finnish Salmonella Control Programme: all laying hens flocks are sampled at a holding. The rearing flocks are sampled two weeks before laying period. The production flocks are sampled three times during laying period. Sampling is carried out by an official veterinarian once a year, otherwise sampling is carried out by a food business operator. If a sample taken by a food business operator is positive for salmonella spp, official vetrinarian has to take confrimation samples.

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: every 2 months

Laying hens: Rearing period

Other: 2 weeks before laying period

Laying hens: Production period

Other: Three times during the laying period: at the age of 20-25 and 55-60 weeks, and 1-3 weeks before depopulation or slaughter

Type of specimen taken

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

Internal linings of delivery boxes

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

Faeces

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

Other: At hatchery: internal linings of hatching baskets, at holding: faeces

Laying hens: Rearing period

Faeces

Laying hens: Production period

Faeces

Methods of sampling (description of sampling techniques)

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

Ten internal lining papers are collected, five papers are pooled together.

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

60 faecal samples (1 g) are collected. All samples are pooled together.

Breeding flocks: Production period

At hatchery: five internal linings paper from hatching baskets or meconium from 250 chicks are collected and pooled together.
At holding: 60 faecal samples (1 g) are collected, all samples are pooled together.

Laying hens: Rearing period

60 faecal samples (1 g) are collected. All samples are pooled together.

Laying hens: Production period

60 faecal samples (1 g) are collected. All samples are pooled together.

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 a sample taken by official veterinarian.

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 a sample taken by official veterinarian.

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 a sample taken at the holding by official veterinarian.

Laying hens: Rearing period

Flock is considered to be positive when salmonella spp is isolated from a sample taken by official veterinarian.

Laying hens: Production period

Flock is considered to be positive when salmonella spp is isolated from a sample taken by official veterinarian.

Diagnostic/ analytical methods used

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

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

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

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

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

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

Laying hens: Rearing period

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

Laying hens: Production period

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

Vaccination policy

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

Vaccination against salmonella is not allowed in Finland.

Laying hens 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. Feedstuff control.

Laying hens flocks

Strict biosecurity and production hygiene in holdings. 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.

Laying hens flocks

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

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

In case of positive finding in holding: the flock is slaughtered and heat treated or destructed, hatching eggs are destructed. The holding is cleaned and disinfected, environmental samples are taken, negative results are required before restocking. Epidemiological investigation.
In case of positive finding at hatchery: the flock of origin is sampled at the holding by official veterinarian. Environmental samples are taken at the hatchery.

Laying hens flocks

In case of positive finding in holding: the flock is slaughtered and heat treated or destructed. Eggs are destructed (invasive serovars) or heat treated (other serovars). The holding is cleaned and disinfected, environmental samples are taken, negative results are required before

restocking.

Notification system in place

The laboratory has to notify positive results to competent authority and to food bussines operator.

Results of the investigation

See tables Salmonella in breeding flocks of gallus gallus and salmonella in other poultry.

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

Salmonella situation has been very favourable in Gallus Gallus breeding and egg laying flocks. 0-2 positive flocks has been found yearly.

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

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

B. Salmonella spp. in Gallus gallus - breeding flocks for meat production and broiler flocks

Monitoring system

Sampling strategy

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

The Finnish Salmonella Control Programme: all breeding flocks are sampled at holdings and at hatcheries. At holdings sampling is carried out by an official veterinarian once a year, otherwise sampling is carried out by a food business operator. If a sample taken by a food business operator is positive, official vetrinarian has to take confirmation samples. At hatcheries sampling is carried out by an official veterinarian every 8 weeks, otherwise sampling is carried out by a food business operator.

Broiler flocks

The Finnish Salmonella Control Programme: all broiler flocks are sampled at holdings within four weeks before slaughter. At the holding sampling is carried out by an official veterinarian once a year, otherwise sampling is carried out by a food business operator.

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: every 2 months

Broiler flocks: Before slaughter at farm

Every flock is sampled

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

Faeces

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

Other: at hatchery: internal linings of hatching baskets, at holding: faeces

Broiler flocks: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

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

Ten internal lining papers from delivery baskets are collected, five papers are pooled together.

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

60 faecal samples (each 1 g) are collected, ten samples are pooled together.

Breeding flocks: Production period

Holding: 60 faecal samples (each 1 g) are collected, ten samples are pooled together. Hatchery: 5 internal linings of hatching baskets or meconium from 250 chicks are collected and pooled together.

Broiler flocks: Before slaughter at farm

60 faecal samples (each 1 g) are collected, ten samples are pooled together.

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 a sample taken by official veterinarian.

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 a sample taken by official veterinarian.

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 a sample taken at the holding by official veterinarian.

Broiler flocks: Before slaughter at farm

Flock is considered to be positive when salmonella spp is isolated form any sample.

Diagnostic/ analytical methods used

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

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

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

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

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

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

Broiler flocks: Before slaughter at farm

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

Vaccination policy

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

Vaccination against salmonella is not allowed in Finland.

Broiler flocks

Vaccination against salmonella is not allowed in Finland.

Other preventive measures than vaccination in place

Broiler 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.

Broiler flocks

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

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

The flock is destructed. The holding is cleaned and dissinfected, environmental samples are taken, negative results are required before restocking. Epidemiological investigation is carried out.

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

The flock is slaughtered and heat treated or destructed. The holding is cleaned and dissinfected, environmental samples are taken, negative results are required before restocking. Epidemiological investigation is carried out.

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

Positive finding at holding: the flock is slaughtered and heat treated or destructed. Hatching eggs are destructed. The holding is cleaned and dissinfected, environmental samples are taken, negative results are required before restocking. Epidemiological investigation is carried out.
Positive finding in hatchery: the flock of origin is sampled at the holding by official veterinarian. Environmental samples are taken at the hatchery.

Broiler flocks: Before slaughter at farm

The flock is slaughtered and meat is heat treated or the flock is destructed. The holding is cleaned and dissinfected, environmental samples are taken, negative results are required before restocking. Epidemiological investigation is carried out.

Notification system in place

The laboratory has to notify the positive results to competent authority and food bussines operator.

Results of the investigation

See tables Salmonella in Gallus gallus breeders and Salmonella in other poultry.

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

Salmonella situation is favourable. Salmonella prevalence in flocks has bee less than 1 %.

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

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

C. 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: all breeding flocks are sampled at holdings and at hatcheries. At holdings sampling is carried out by an official veterinarian once a year, otherwise sampling is carried out by a food business operator. If a sample taken by a food business operator is positive for salmonella spp, official veterinarian has to take confirmation samples. At hatcheries sampling is carried out by an official veterinarian every 8 weeks, otherwise sampling is carried out by a food business operator.

Meat production flocks

The Finnish Salmonella Control Programme: all meat production flocks are sampled at holdings within four weeks before slaughter. At the holding sampling is carried out by an official veterinarian once a year, otherwise sampling is carried out by a food business operator.

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: every 2 months

Meat production flocks: Before slaughter at farm

Every flock is sampled

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

Faeces

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

Other: At hatchery: internal linings of hatching baskets, at holding: faeces

Meat production flocks: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

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

Ten internal lining papers from delivery baskets are collected, five papers are pooled together.

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

60 faecal samples (each 1 g) are collected, ten samples are pooled together.

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

necessary): Production period

At hatchery: five underlying paper from hatching baskets or meconium from 250 chicks are collected and pooled together.
At holding:60 faecal samples (each 1 g) are collected, ten samples are pooled together.

Meat production flocks: Before slaughter at farm

60 faecal samples (each 1 g) are collected, ten samples are pooled together.

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 a sample taken at the holding by an official veterinarian.

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 a sample taken at the holding by an official veterinarian.

Meat production flocks: Before slaughter at farm

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

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

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

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

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

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

Meat production flocks: Before slaughter at farm

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

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.

Measures in case of the positive findings or single cases

Positive finding at holding: the flock is slaughtered and heat treated or destructed. Hatching eggs are destroyed.The holding is cleaned and disisnfected, environmental samples sre taken, negative results are required before restocking. Epidemiological investigation is carried out.
Positive finding at hatchery: the flock of origin is sampled at the holding by an official veterinarian. Environmental sampling at the hatchery.

Notification system in place

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

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.

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

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

D. 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.
- The herds of origin of AI-boars and AI-boars are sampled before transfer.
- 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) 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) 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) 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

Other: Slaughterhouses: detection of annual prevalence of 0,1 % by 95 % confidence levels. Holdings (nucleus herds): once a year

Fattening herds at slaughterhouse (herd based approach)

Other: Detection of annual prevalence of 0,1 % by 95 % cofidence levels

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: Individual faecal samples are taken from 30 animals of age over one year. From younger animals pooled samples are taken.
At slaughterhouse: From each carcass five ileo-caecal lymphnodes are taken and pooled together.

Fattening herds at farm

From pens pooled faecal samples of at least 50 g (10 g from each of at least 5 animals/ pen) is collected.

Fattening herds at slaughterhouse (herd based approach)

From each carcass five ileo-caecal lymphnodes are taken and pooled together.

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

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

Multiplying herds

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

Fattening herds at farm

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

Fattening herds at slaughterhouse (herd based approach)

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

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.

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

Situation is very favourable.

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

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

E. 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) are sampled at farm by an official veterinarian
- Herds of origin of AI-bulls are sampled at farm before transfer.

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

Frequency of the sampling

Animals at slaughter (herd based approach)

Detection of annual prevalence of Detection of annual prevalence of 0,1 % by 95% confidence levels by Detection of annual prevalence of 0,1 % by 95% confidence levels% confidence level and Detection of annual prevalence of 0,1 % by 95% confidence levels% accuracy

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

Adult animals: individual faecal samples (at least 10 g) are colected from 30 animals (or from all animals, if herd is smaller than 30 animal)
Young animals: pooled faecal samples of at least 50 g (10 g from each of at least 5 animals/ pen).

Animals at slaughter (herd based approach)

From each carcass five ileo-caecal lymphnodes are taken and pooled together.

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

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

Animals at slaughter (herd based approach)

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

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.

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 is very favourable.

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

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

Table Salmonella in breeding flocks of Gallus gallus

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl)							
grandparent breeding flocks for egg production line							
day-old chicks							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	1	0			
during rearing period							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	1	0			
during production period							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling (1)	Evira	flock	3	0			
parent breeding flocks for egg production line							
day-old chicks							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	3	0			

during rearing period							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	14	0			
during production period							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling (2)	Evira	flock	22	0			
grandparent breeding flocks for meat production line							
day-old chicks							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	3	0			
during rearing period							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	3	0			
during production period							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling (3)	Evira	flock	5	0			
parent breeding flocks for meat production line							
day-old chicks							
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	71	0			
during rearing period							

- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	93	0			
during production period - at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling (4)	Evira	flock	105	0			

(1) : All the flocks were also sampled at the hatcheries
(2) : All the flocks were also sampled at the hatcheries
(3) : All the flocks were also sampled at the hatcheries
(4) : All the flocks were also sampled at the hatcheries

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Livingstone	S. Infantis	S. Tennessee
Gallus gallus (fowl)										
laying hens										
during rearing period - at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	203	0						
during production period - at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling (1)	Evira	flock	1639	0						
broilers										
before slaughter										
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	3020	9				5	3	1
sampling in the framework of the broiler baseline study (2)	Evira	flock	360	1				1		
Turkeys										
meat production flocks										
before slaughter										

- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	1026	2	1	1				
parent breeding flocks										
day-old chicks										
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	15	0						
during rearing period										
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official and industry sampling - census sampling	Evira	flock	16	0						
during production period										
- at farm - animal sample - faeces - Control or eradication programmes - co-financed by Community (Dec. 90/ 424/ EEC) - official and industry sampling - census sampling (3)	Evira	flock	16	0						

(1) : Exact number of flocks is not known. Figure is number of sampling times; all flocks are sampled three times during production period
(2) : October 2005 - September 2006. The positive flock (S. Livingstone) was also positive by the samples from the Finnish salmonella control programme.
(3) : All the flocks were also sampled at the hatcheries

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Infantis	S. Konstanz	S. Muenchen
Cattle (bovine animals)										
unspecified										
- at slaughterhouse - animal sample - lymph nodes - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	animal	3022	2		2				
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official sampling - suspect sampling	Evira	herd	39	9		6		1	1	1
breeding bulls										
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - census sampling (Testing of herds of origin of AI-bulls)	Evira	herd	205	0						
Pigs										
breeding animals										
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - census sampling (Nucleus herds in the national swine health control scheme)	Evira	herd	68	0						

- at AI station - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - census sampling	Evira	animal	220	0						
- at slaughterhouse - animal sample - lymph nodes - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling		animal	3070	4	1	3				
fattening pigs										
- at slaughterhouse - animal sample - lymph nodes - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	animal	3262	1		1				
- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official sampling - suspect sampling	Evira	herd	6	0						

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 Decision of the Ministry of Agriculture and Forestry on undesirable substances, products and organisms in animal feed (No 163/ 1998) includes requirements for hygienic quality of feedingstuffs. According to this decision, feeds should not contain salmonella. According to the Feedingstuff Act (No 396/ 1998), 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 nine 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	49	0			
meat and bone meal	Evira	single	25 g	52	0			
offal	Evira	single	25 g	7	0			
Feed material of marine animal origin								
fish meal	Evira	batch	25 g	36	0			
other fish products	Evira	single	25 g	3	0			

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Mbandaka	S. Thompson	S. Agona	S. Derby	S. Tennessee	S. Emek	S. Havana	S. Senftenberg	S. Lexington	S. Cerro	S. Stanleyville
Feed material of cereal grain origin																			
barley derived	Evira	single	25 g	8	0														
wheat derived	Evira	single	25 g	13	0														
- at feed mill - imported	Evira	batch	25 g	67	1										1				
maize derived	Evira	batch	25 g	1	0														
	Evira	batch	25 g	14	0														
other cereal grain derived	Evira	single	25 g	18	0														
by-products of brewing and distilling	Evira	single	25 g	23	0														
- at feed mill - imported	Evira	batch	25 g	72	0														
Feed material of oil seed or fruit origin																			
groundnut derived	Evira	batch	25 g	5	0														
rape seed derived	Evira	single	25 g	102	0														
- at feed mill - imported (1)	Evira	batch	25 g	79	9			1			3	1	1		2	1	2		1

palm kernel derived	Evira	batch	25 g	4	1										1							
soya (bean) derived	Evira	single	25 g	22	0																	
- at feed mill - imported	Evira	batch	25 g	72	2					1										1		
sunflower seed derived	Evira	single	25 g	38	1						1											
linseed derived	Evira	batch	25 g	30	0																	
Other feed material																						
tubers, roots and similar products	Evira	single	25 g	17	0																	
- at feed mill - imported	Evira	batch	25 g	18	0																	
other seeds and fruits	Evira	single	25 g	1	0																	
forages and roughages	Evira	batch	25 g	6	0																	
yeast	Evira	single	25 g	9	0																	

(1) : In three positive batches more than one serotype isolated.

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Mbandaka	S. Bredeney	S. Give	S. Chester	S. Infantis	S. Havana	S. Oranienburg	S. 4,12:i:-	S. Matopeni	S. Rissen
Compound feedingstuffs for cattle																		
final product	Evira	single	25 g	452	1	1												
Compound feedingstuffs for pigs																		
final product	Evira	single	25 g	338	0													
Compound feedingstuffs for poultry (non specified)																		
final product	Evira	single	25 g	86	0													
Compund feedingstuffs for poultry - broilers																		
final product	Evira	single	25 g	55	1				1									
Pet food																		
dog snacks (pig ears, chewing bones) (1)	Evira	single	25 g	138	6	2				1	1	1	1	1	1	1	1	1
final product	Evira	single	25 g	89	0													
Compound feedingstuffs for horses																		

final product	Evira	single	25 g	16	0													
Compound feedingstuffs for sheep																		
final product	Evira	single	25 g	7	0													
Compound feedingstuffs for reindeers																		
final product	Evira	single	25 g	13	0													
Compound feedingstuffs for fur animal																		
final product	Evira	single	25 g	54	0													
Compound feedingstuffs, not specified																		
final product	Evira	single	25 g	67	0													
Complementary feedingstuffs																		
final product (2)	Evira	single	25 g	174	0													

(1) : In one positive unit two different serotypes and in two positive units three different serotypes.
(2) : Mixed mineral feeds (30 units tested) and feed additive products (144 units tested)

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	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	173		6		20		2	
Number of isolates serotyped	N=	173	0	6	0	20	0	2	0
Number of isolates per type									
S. Enteritidis (1)				1				1	
S. Infantis (2)		24				3			
S. Konstanz		1							
S. Livingstone (3)						11			
S. Muenchen (4)		56							
S. Tennessee (5)						6			
S. Typhimurium (6)		92		5				1	

(1) : Pig isolate is from lymph node sample. Other poultry isolate is from one turkey flock.
(2) : Cattle isolates are from faecal samples of one herd. Gallus gallus isolates are from three broiler flocks. Birds of one of the flocks are imported from Denmark as one day old chicks.
(3) : Gallus gallus isolates are from five broiler flocks. One of the flocks was positive in the samples from the national salmonella control programmme and in the samples from EU:s baseline survey at the same time.
(4) : Cattle isolates are from faecal samples of one herd.
(5) : Gallus gallus isolates are from one broiler flock.
(6) : Cattle isolates are from faecal samples of six herd and from two lymph node samples. Pig isolates are from five lymp node samples (four fom national salmonella control programme, one from EU:s baseline survey). Other poultry isolate is from one turkey flock.

Footnote

(*) M : Monitoring, C : Clinical

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 (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	2		0		0		0		0	
Number of isolates serotyped	N=	2	0	0	0	0	0	0	0	0	0
Number of isolates per type											
S. Infantis (1)		2									

(1) : Isolates are from two carcass swab samples.

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Enteritidis phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=			1				1	
Number of isolates phagetyped	N=	0	0	1	0	0	0	1	0
Number of isolates per type									
PT 4 (1)								1	
PT 20				1					

(1) : Other poultry isolate is from turkey flock.

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Enteritidis 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 (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	0		0		0		0		0	
Number of isolates phagetyped	N=	0	0	0	0	0	0	0	0	0	0

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Enteritidis phagetypes in humans

Phagetype		humans	
Sources of isolates (*)		M	C
Number of isolates in the laboratory	N=		
Number of isolates phagetyped	N=	0	0

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	8		5				1	
Number of isolates phagetyped	N=	8	0	5	0	0	0	1	0
Number of isolates per type									
DT 40				4					
DT 41		1							
DT RDNC		2							
U 277 (1)		1		1				1	
DT 1		2							
DT 2		1							
DT 9 var.		1							

(1) : Other poultry isolate is from turkey flock.

Footnote

(*) M : Monitoring, C : Clinical

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 (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	0		0		0		0		0	
Number of isolates phagetyped	N=	0	0	0	0	0	0	0	0	0	0

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium phagetypes in humans

Phagetype		humans	
Sources of isolates (*)		M	C
Number of isolates in the laboratory	N=		
Number of isolates phagetyped	N=	0	0

Footnote

(*) M : Monitoring, C : Clinical

2.1.7. Antimicrobial resistance in Salmonella isolates

Antimicrobial resistance is the ability of certain microorganisms to survive or grow in the presence of a given concentration of antimicrobial agent that usually would kill or inhibit the microorganism species in question. Antimicrobial resistant Salmonella strains may be transferred from animals or foodstuffs to humans.

A. Antimicrobial resistance in Salmonella in cattle

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 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

One isolate from each herd 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 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, May 2002. 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, based on MIC distributions, were used.

Control program/ mechanisms

The control program/ strategies in place

The susceptibility testing of salmonella from production animals is a part of the FINRES-Vet programme (Finnish Veterinary Antimicrobial Resistance Monitoring and Consumption of Antimicrobial Agents).

Results of the investigation

No resistance was detected in bovine Salmonella isolates (n=11).

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

The overall antimicrobial resistance situation in Salmonella isolates from cattle is very favourable.

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

One isolate from each herd 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 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, May 2002. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as a quality control strain.
Microbiology Reserach Unit is accredited according to standard SFS-EN ISO/ IEC 17025 to perform the antimicrobial susceptibility testing. The department participates regularly in proficiency tests.

Breakpoints used in testing

Epidemiological cut-off values, based on MIC distributions, were used.

Control program/ mechanisms

The control program/ strategies in place

The susceptibility testing of salmonella from production animals is a part of the FINRES-Vet programme (Finnish Veterinary Antimicrobial Resistance Monitoring and Consumption of Antimicrobial Agents).

Results of the investigation

No resistance was detected in the isolates tested (N=6).

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

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

C. Antimicrobial resistance in Salmonella in poultry

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 texts Salmonella spp in Gallus gallus and turkey.

Methods of sampling (description of sampling techniques)

Methods of sampling are described in the texts Salmonella spp in Gallus gallus and turkey.

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, May 2002. 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.

Breakpoints used in testing

Epidemiological cut-off values, based on MIC distributions, were used.

Control program/ mechanisms

The control program/ strategies in place

The susceptibility testing of salmonella from production animals is a part of the FINRES-Vet programme (Finnish Veterinary Antimicrobial Resistance Monitoring and Consumption of Antimicrobial Agents).

Results of the investigation

Ciprofloxacin resistance was detected in two S. Livingstone isolates from broilers, and in one S. Typhimurium from a turkey.

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

The overall antimicrobial resistance situation in salmonella isolates from poultry is favourable.

D. Antimicrobial resistance in Salmonella in foodstuff derived from cattle

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 bovine meat and products thereof.

Methods of sampling (description of sampling techniques)

Methods of sampling are described in the text Salmonella spp in bovine meat and products thereof.

Procedures for the selection of isolates for antimicrobial testing

One isolate from each positive 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 text Salmonella spp in bovine meat and products thereof.

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, May 2002. 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.
Details of sampling are described in the text Salmonella spp. in bovine meat and products thereof.

Breakpoints used in testing

Epidemiological cut-off values, based on microbiological distributions, were used.

Control program/ mechanisms

The control program/ strategies in place

The susceptibility testing of salmonella from domestic food is a part of the FINRES-Vet programme (Finnish Veterinary Antimicrobial Resistance Monitoring and Consumption of Antimicrobial Agents).

Results of the investigation

No resistance was detected in the isolates tested.

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

The overall antimicrobial resistance situation in salmonella isolated from foodstuffs derived from cattle is very favourable.

E. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Sampling strategy used in monitoring

Frequency of the sampling

Table Antimicrobial susceptibility testing of S.Enteritidis in animals

n = Number of resistant isolates	S. Enteritidis							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme			yes				yes	
Number of isolates available in the laboratory			1				1	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin			1	0			1	0
Amphenicols								
Chloramphenicol			1	0			1	0
Florfenicol			1	0			1	0
Cephalosporins								
3rd generation cephalosporins			1	0			1	0
Fluoroquinolones								
Ciprofloxacin			1	0			1	0
Quinolones								
Nalidixic acid			1	0			1	0
Sulfonamides								
Sulfonamide			1	0			1	0
Trimethoprim			1	0			1	0
Aminoglycosides								
Streptomycin			1	0			1	0
Gentamicin			1	0			1	0
Kanamycin			1	0			1	0
Penicillins								
Ampicillin			1	0			1	0
Fully sensitive			1	1			1	1

Table Antimicrobial susceptibility testing of S. Enteritidis in Turkeys - at farm - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	S. Enteritidis																					
	Turkeys - at farm - Monitoring																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	1																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	1	0							1													
Amphenicols																						
Chloramphenicol	1	0								1												
Florfenicol	1	0								1												
Cephalosporins																						
3rd generation cephalosporins	1	0			1																	
Fluoroquinolones																						
Ciprofloxacin	1	0		1																		
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	1	0								1												
Sulfonamides																						
Sulfonamide	1	0											1									
Trimethoprim	1	0					1															
Aminoglycosides																						
Streptomycin	1	0								1												
Gentamicin	1	0						1														
Neomycin	0	0																				
Kanamycin	1	0							1													
Penicillins																						
Ampicillin	1	0					1															
Trimethoprim + sulfonamides	0	0																				

Table Antimicrobial susceptibility testing of S. Infantis - qualitative data

n = Number of resistant isolates	S. Infantis			
	Cattle (bovine animals) - at farm - Monitoring		**Gallus gallus (fowl) - broilers - at farm - animal sample - Monitoring**	
Isolates out of a monitoring programme	yes		yes	
Number of isolates available in the laboratory	2		3	
Antimicrobials:	**N**	**n**	**N**	**n**
Tetracyclines				
Tetracyclin	2	0	3	0
Amphenicols				
Chloramphenicol	2	0	3	0
Florfenicol	2	0	3	0
Cephalosporins				
3rd generation cephalosporins	2	0	3	0
Fluoroquinolones				
Ciprofloxacin	2	0	3	0
Quinolones				
Nalidixic acid	2	0	3	0
Sulfonamides				
Sulfonamide	2	0	3	0
Trimethoprim	2	0	3	0
Aminoglycosides				
Streptomycin	2	0	3	0
Gentamicin	2	0	3	0
Kanamycin	2	0	3	0
Penicillins				
Ampicillin	2	0	3	0

Table Antimicrobial susceptibility testing of S. Infantis in Meat from bovine animals - at slaughterhouse - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to

S. Infantis

Meat from bovine animals - at slaughterhouse - Monitoring

Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	2	0							2													
Amphenicols																						
Chloramphenicol	2	0									2											
Florfenicol	2	0									2											
Cephalosporins																						
3rd generation cephalosporins	2	0			2																	
Fluoroquinolones																						
Ciprofloxacin	2	0		2																		
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	2	0							1	1												
Sulfonamides																						
Sulfonamide	2	0										2										
Trimethoprim	2	0				2																
Aminoglycosides																						
Streptomycin	2	0										2										
Gentamicin	2	0						1	1													
Neomycin	0	0																				
Kanamycin	2	0								2												
Penicillins																						
Ampicillin	2	0						2														
Trimethoprim + sulfonamides	0	0																				

Table Antimicrobial susceptibility testing of S. Infantis - qualitative data

n = Number of resistant isolates		
	S. Infantis	
	Meat from bovine animals - at slaughterhouse - Monitoring	
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		2
Antimicrobials:	**N**	**n**
Tetracyclines		
Tetracyclin	2	0
Amphenicols		
Chloramphenicol	2	0
Florfenicol	2	0
Cephalosporins		
3rd generation cephalosporins	2	0
Fluoroquinolones		
Ciprofloxacin	2	0
Quinolones		
Nalidixic acid	2	0
Sulfonamides		
Sulfonamide	2	0
Trimethoprim	2	0
Aminoglycosides		
Streptomycin	2	0
Gentamicin	2	0
Kanamycin	2	0
Penicillins		
Ampicillin	2	0

Table Antimicrobial susceptibility testing of S. Konstanz - qualitative data

n = Number of resistant isolates	S. Konstanz	
	Cattle (bovine animals) - at farm - Monitoring	
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Tetracyclines		
Tetracyclin	1	0
Amphenicols		
Chloramphenicol	1	0
Florfenicol	1	0
Cephalosporins		
3rd generation cephalosporins	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfonamide	1	0
Trimethoprim	1	0
Aminoglycosides		
Streptomycin	1	0
Gentamicin	1	0
Kanamycin	1	0
Penicillins		
Ampicillin	1	0

Table Antimicrobial susceptibility testing of S. Livingstone - qualitative data

n = Number of resistant isolates		
	S. Livingstone	
	Gallus gallus (fowl) - broilers - at farm - Monitoring	
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		5
Antimicrobials:	**N**	**n**
Tetracyclines		
Tetracyclin	5	0
Amphenicols		
Chloramphenicol	5	0
Florfenicol	5	0
Cephalosporins		
3rd generation cephalosporins	5	0
Fluoroquinolones		
Ciprofloxacin	5	2
Quinolones		
Nalidixic acid	5	0
Sulfonamides		
Sulfonamide	5	0
Trimethoprim	5	0
Aminoglycosides		
Streptomycin	5	0
Gentamicin	5	0
Kanamycin	5	0
Penicillins		
Ampicillin	5	0

Table Antimicrobial susceptibility testing of S. Muenchen - qualitative data

n = Number of resistant isolates		
	S. Muenchen	
	Cattle (bovine animals) - at farm - Monitoring	
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Tetracyclines		
Tetracyclin	1	0
Amphenicols		
Chloramphenicol	1	0
Florfenicol	1	0
Cephalosporins		
3rd generation cephalosporins	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfonamide	1	0
Trimethoprim	1	0
Aminoglycosides		
Streptomycin	1	0
Gentamicin	1	0
Kanamycin	1	0
Penicillins		
Ampicillin	1	0

Table Antimicrobial susceptibility testing of S. Tennessee - qualitative data

n = Number of resistant isolates		
	S. Tennessee	
	Gallus gallus (fowl) - broilers - at farm - Monitoring	
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Tetracyclines		
Tetracyclin	1	0
Amphenicols		
Chloramphenicol	1	0
Florfenicol	1	0
Cephalosporins		
3rd generation cephalosporins	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfonamide	1	0
Trimethoprim	1	0
Aminoglycosides		
Streptomycin	1	0
Gentamicin	1	0
Kanamycin	1	0
Penicillins		
Ampicillin	1	0

Table Antimicrobial susceptibility testing of S. Typhimurium in Pigs - at slaughterhouse - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	S. Typhimurium																					
	Pigs - at slaughterhouse - Monitoring																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	5																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	5	0							4	1												
Amphenicols																						
Chloramphenicol	5	0								5												
Florfenicol	5	0								3	2											
Cephalosporins																						
3rd generation cephalosporins	5	0			5																	
Fluoroquinolones																						
Ciprofloxacin	5	0		5																		
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	5	0								3	2											
Sulfonamides																						
Sulfonamide	5	0										2	2	1								
Trimethoprim	5	0					5															
Aminoglycosides																						
Streptomycin	5	0										5										
Gentamicin	5	0					3	2														
Neomycin	0	0																				
Kanamycin	5	0							4	1												
Penicillins																						
Ampicillin	5	0					2	3														
Trimethoprim + sulfonamides	0	0																				

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	S. Typhimurium																					
	Cattle (bovine animals) - Monitoring																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	7																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	7	0							6	1												
Amphenicols																						
Chloramphenicol	7	0								7												
Florfenicol	7	0								7												
Cephalosporins																						
3rd generation cephalosporins	7	0		2	5																	
Fluoroquinolones																						
Ciprofloxacin	7	0		7																		
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	7	0								5	2											
Sulfonamides																						
Sulfonamide	7	0										3	3	1								
Trimethoprim	7	0				3	4															
Aminoglycosides																						
Streptomycin	7	0									1	6										
Gentamicin	7	0					1	6														
Neomycin	0	0																				
Kanamycin	7	0							1	6												
Penicillins																						
Ampicillin	7	0					4	3														
Trimethoprim + sulfonamides	0	0																				

Table Antimicrobial susceptibility testing of S.Typhimurium in animals

n = Number of resistant isolates	S. Typhimurium							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	yes		yes		yes		yes	
Number of isolates available in the laboratory	7		5		0		1	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	7	0	5	0			1	0
Amphenicols								
Chloramphenicol	7	0	5	0			1	0
Florfenicol	7	0	5	0			1	0
Cephalosporins								
3rd generation cephalosporins	7	0	5	0			1	0
Fluoroquinolones								
Ciprofloxacin	7	0	5	0			1	1
Quinolones								
Nalidixic acid	7	0	5	0			1	0
Sulfonamides								
Sulfonamide	7	0	5	0			1	0
Trimethoprim	7	0	5	0			1	0
Aminoglycosides								
Streptomycin	7	0	5	0			1	0
Gentamicin	7	0	5	0			1	0
Kanamycin	7	0	5	0			1	0
Penicillins								
Ampicillin	7	0	5	0			1	0
Fully sensitive	7	7	5	5				
Resistant to 1 antimicrobial							1	1

Table Antimicrobial susceptibility testing of S. Typhimurium in Turkeys - at farm - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	S. Typhimurium																					
	Turkeys - at farm - Monitoring																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	1																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	1	0							1													
Amphenicols																						
Chloramphenicol	1	0								1												
Florfenicol	1	0								1												
Cephalosporins																						
3rd generation cephalosporins	1	0			1																	
Fluoroquinolones																						
Ciprofloxacin	1	1			1																	
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	1	0								1												
Sulfonamides																						
Sulfonamide	1	0											1									
Trimethoprim	1	0					1															
Aminoglycosides																						
Streptomycin	1	0										1										
Gentamicin	1	0						1														
Neomycin	0	0																				
Kanamycin	1	0								1												
Penicillins																						
Ampicillin	1	0					1															
Trimethoprim + sulfonamides	0	0																				

Table Antimicrobial susceptibility testing of Salmonella spp. in All animals - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to	Salmonella spp.
	All animals - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	13

Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	13	0							11	2												
Amphenicols																						
Chloramphenicol	13	0								8	3	2										
Florfenicol	13	1								5	6	1	1									
Cephalosporins																						
3rd generation cephalosporins	13	0			10	3																
Fluoroquinolones																						
Ciprofloxacin	13	2		11	2																	
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	13	0								8	5											
Sulfonamides																						
Sulfonamide	13	0										10	3									
Trimethoprim	13	0				5	8															
Aminoglycosides																						
Streptomycin	13	0									2	10	1									
Gentamicin	13	0					1	8	4													
Neomycin	0	0																				
Kanamycin	13	0							5	7	1											
Penicillins																						
Ampicillin	13	0					7	6														
Trimethoprim + sulfonamides	0	0																				

Table Breakpoints for antibiotic resistance testing in Animals

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol		16		16	1	128				
Florfenicol		16		16	4	32				
Tetracyclines										
Tetracyclin		8		8	0.5	64				
Fluoroquinolones										
Ciprofloxacin		0.06		0.06	0.008	1				
Enrofloxacin										
Quinolones										
Nalidixic acid		16		16	1	128				
Trimethoprim		2		2	0.25	32				
Sulfonamides										
Sulfonamide		256		256	16	2048				
Aminoglycosides										
Streptomycin		32		32	2	256				
Gentamicin		2		2	0.5	64				
Neomycin										
Kanamycin		8		8	2	16				
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins		0.5		0.5	0.06	2				
Penicillins										
Ampicillin		4		4	0.25	32				

Table Breakpoints for antibiotic resistance testing in Food

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol		16		16	1	128				
Florfenicol		16		16	4	32				
Tetracyclines										
Tetracyclin		8		8	0.5	64				
Fluoroquinolones										
Ciprofloxacin		0.06		0.06	0.008	1				
Enrofloxacin										
Quinolones										
Nalidixic acid		16		16	1	128				
Trimethoprim		2		2	0.25	32				
Sulfonamides										
Sulfonamide		256		256	16	2048				
Aminoglycosides										
Streptomycin		32		32	2	256				
Gentamicin		2		2	0.5	64				
Neomycin										
Kanamycin		8		8	2	16				
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins		0.5		0.5	0.06	2				
Penicillins										
Ampicillin		4		4	0.25	32				

Table Breakpoints for antibiotic resistance testing in Humans

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol										
Florfenicol										
Tetracyclines										
Tetracyclin										
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin										
Quinolones										
Nalidixic acid										
Trimethoprim										
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin										
Gentamicin										
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins										
Penicillins										
Ampicillin										

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, and increased again in 2004 and 2005, but decreased in 2006. 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.

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. Approximately 40% of the cases are of domestic origin.
There is a clear seasonal trend: both the number of human cases and the campylobacter prevalence in broiler flocks peak in July-August. 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 (as a source of infection)

In late summer thermophilic campylobacters are detected in 20 to 30% of retail poultry meat of domestic origin. Poultry meat is considered as source of campylobacters in part of the sporadic cases. Contaminated drinking water caused five large outbreaks in the years 1999 - 2005. 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 control 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

2.2.4. Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

A compulsory control 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. The number of batches sampled is calculated with the following criteria: expected prevalence 5 %, accuracy 5 %, 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 control 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 1333 slaughter batches were examined for thermophilic campylobacters between June and October 2006. Campylobacters were detected in 78 (5.8%) of these slaughter batches. In January-May and November-December 123 slaughter batches were sampled with no batches being Campylobacter positive.

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

The results of the campylobacter control programme in 2006 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 (as a source of infection)

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. jejuni	C. coli	C. lari	C. upsaliensis	thermophilic Campylobacter spp., unspecified
Gallus gallus (fowl)									
broilers									
- at slaughterhouse - animal sample - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling (January-May and November-December)	Evira	slaughter batch	123	0					
- at slaughterhouse - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - census sampling (June-October)	Evira	slaughter batch	1333	78	66	12			

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 isolates of Campylobacter included were collected in connection to the Finnish Campylobacter control programme.

Type of specimen taken

Details of sampling are described in Thermophilic Campylobacter in Gallus gallus.

Methods of sampling (description of sampling techniques)

Details of sampling are described in Thermophilic Campylobacter in Gallus gallus.

Procedures for the selection of isolates for antimicrobial testing

One isolate from each slaughter batch was included. A total of 66 C. jejuni strains were obtained for sensitivity testing, and the result was obtained from 66 strains.

Methods used for collecting data

Isolates were collected from slaughterhouse laboratories, and sent for confirmation and antimicrobial susceptibility testing to Evira.

Laboratory methodology used for identification of the microbial isolates

Details of the laboratory methodology are described in Thermophilic Campylobacter in Gallus gallus.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

VetMICTM Camp for antimicrobial susceptibility testing of Campylobacter jejuni and hippurate-negative thermofilic Campylobacter spp. SVA, Dept. of Antibiotics, SE – 75189 Uppsala, Sweden. Product information.
Resistensbestamning av Campylobacter jejuni och hippuratnegativa termofila Campylobacter spp. Analysnr ANT/ M/ 003, SVA-metoder, Avdelning for antibiotika, 24.3.2003, modified.
The inoculum density in the panels was approximately 10^6 CFU ml^-1. The panels were incubated in a microaerophilic atmosphere at +37.0 (+/ -1.0) Celsius degrees for 40-48 h.
Control strain: Campylobacter jejuni ATCC 33560. The department participates in proficiency tests.
The antimicrobials included are listed in the tables.

Breakpoints used in testing

Epidemiological cut-off values, based on MIC distributions, were used.

Control program/ mechanisms

The control program/ strategies in place

The susceptibility testing of C. jejuni from broilers is a part of the FINRES-Vet programme (Finnish Veterinary Antimicrobial Resistance Monitoring and Consumption of Antimicrobial Agents).

Results of the investigation

Resistance among C. jejuni from broilers was rare. Rare resistance was detected to oxytetracycline (3.0%).

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

Resistance among C. jejuni from broilers was rare.

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to	C. jejuni Gallus gallus (fowl) - at slaughterhouse - animal sample - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	66

Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Oxytetracyclin	66	2				58	3	2	1				1	1								
Tetracyclin	0	0																				
Fluoroquinolones																						
Ciprofloxacin	0	0																				
Enrofloxacin	66	0		3	49	13	1															
Quinolones																						
Nalidixic acid	66	0							1	39	26											
Aminoglycosides																						
Gentamicin	66	0				1	43	22														
Macrolides																						
Erythromycin	66	0				3	7	39	17													
Penicillins																						
Ampicillin	66	0					2	4	23	32	3	2										

Footnote

Broth dilution

Table Antimicrobial susceptibility testing of Campylobacter in animals

n = Number of resistant isolates	Campylobacter spp., unspecified					
	Gallus gallus (fowl)		**Cattle (bovine animals)**		**Pigs**	
Isolates out of a monitoring programme	yes					
Number of isolates available in the laboratory	66					
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines						
Oxytetracyclin	66	2				
Fluoroquinolones						
Enrofloxacin	66	0				
Quinolones						
Nalidixic acid	66	0				
Aminoglycosides						
Gentamicin	66	0				
Macrolides						
Erythromycin	66	0				
Penicillins						
Ampicillin	66	0				
Fully sensitive	66	64				
Resistant to 1 antimicrobial	66	2				
Resistant to 2 antimicrobials	66	0				
Resistant to 3 antimicrobials	66	0				
Resistant to 4 antimicrobials	66	0				
Resistant to >4 antimicrobials	66	0				

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

Disc diffusion

Agar dilution

Broth dilution

E-test

Standards used for testing

NCCLS

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Oxytetracyclin		2		2	0.25	32				
Tetracyclin										
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin		0.5		0.5	0.03	4				
Quinolones										
Nalidixic acid		16		16	1	128				
Aminoglycosides										
Gentamicin		1		1	0.25	8				
Macrolides										
Erythromycin		4		4	0.12	16				
Penicillins										
Ampicillin		16		16	0.5	64				

Footnote

Microbiological cut-off values

Table Breakpoints used for antimicrobial susceptibility testing in Humans

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Oxytetracyclin										
Tetracyclin										
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin										
Quinolones										
Nalidixic acid										
Aminoglycosides										
Gentamicin										
Macrolides										
Erythromycin										
Penicillins										
Ampicillin										

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. However, at the moment there is no system in place in the national level to collect data on Listeria analyses from food business operators and local food control authorities. 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 - Vegetables - non-precut - at farm - Surveillance - surveillance survey - selective sampling

Monitoring system

Sampling strategy

The occurrence of L. monocytogenes in carrots was investigated in a project on quality of domestic vegetables. Seventy-six samples from three farms were taken.

Frequency of the sampling

At the production plant

Other: samples taken at harvest time

Type of specimen taken

At the production plant

Unwashed carrots.

Methods of sampling (description of sampling techniques)

At the production plant

Twenty-five grams of peels from unwashed carrots were analysed from each sample.

At retail

Twenty-five grams of peels from washed carrots were analysed from each sample.

Definition of positive finding

At the production plant

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

At retail

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

Diagnostic/ analytical methods used

At the production plant

Bacteriological method: ISO 11290- modified: LMBA used as obligatory solid

selective plating medium for qualitative analyses and also for quantitative analyses:1996, 1998

Results of the investigation

L. monocytogenes was not detected in any of the samples (N=76).

B. L. monocytogenes in food - Vegetables - non-precut - at retail - domestic production - Surveillance - surveillance survey - selective sampling

Monitoring system

Sampling strategy

The occurrence of L. monocytogenes in carrots was investigated in a project on quality of domestic vegetables. Altogether thirty retail samples were taken, fifteen in Helsinki and fifteen in Turku area, respectively.

Frequency of the sampling

At retail

Other: samples taken in April and December

Type of specimen taken

At retail

Washed and unwashed carrots.

Methods of sampling (description of sampling techniques)

At retail

Washed or unwashed carrots were taken from retail shops or market place. The retail sample size was between two and five kilograms. Twenty-five grams of peels from washed or unwashed carrots were analysed by qualitative method and 10 g by quantitative method.

Definition of positive finding

At retail

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

Diagnostic/ analytical methods used

At retail

Bacteriological method: ISO 11290- modified: LMBA used as obligatory solid selective plating medium for qualitative analyses and also for quantitative analyses:1996, 1998

Results of the investigation

L. monocytogenes was not detected in any of the samples (N=30)

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g	> detection limit but =< 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Vegetables								
non-precut								
- at farm - Surveillance	Evira	batch	25 g	76	0	0		
- at retail - Surveillance	Evira	batch	25 g	30	0	0		

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

Altogether 40 cases of L. monocytogenes infection were diagnosed in 7 different animal species in 2006. Listeriosis was diagnosed in 11 bovine animals, in 12 sheep, in 1 horse, in 1 cat, in 9 reindeer, in 2 moose and in 4 hare. In addition, L. innocua -infection was diagnosed in two pigs.

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

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
Cattle (bovine animals) (1)	Evira	animal		11	11	
Sheep	Evira	animal		12	12	
Pigs	Evira	animal		2		2
Hares						
wild	Evira	animal		4	4	
Reindeers						
semi-domesticated	Evira	animal		9	9	
Moose						
wild	Evira	animal		2	2	
Solipeds, domestic						
horses	Evira	animal		1	1	
Cats						
pet animals	Evira	animal		1	1	

(1) : The number includes all bovine animals unspecified.

Footnote

The numbers of tested animals are not given because listeriosis diagnosis can be made histopathologically (brain tissue) or by general bacteriological 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 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 1998-2006. A majority of the cases have been caused by non-O157 serotypes since 1998. Most human cases are sporadic. Family outbreaks or sporadic cases have been associated with consumption of unpasteurised milk or contact with a cattle farm. In 2001, an outbreak involving four persons was caused by serotypes O157:H7 and O26:H11 and traced to eating kebab meat.
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 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.

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 (as a source of infection)

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 foodstuffs

2.4.4. 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) or other VTEC-strain wich has been connected to human cases is isolated from a a sample.

Animals at slaughter (herd based approach)

Animal is considered to be positive when E.coli O157 strain with the capacity of producing shigatoxin (stx I and/ or stx II) 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

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)

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 (as a source of infection)

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	Units tested	Total units positive for Escherichia coli, pathogenic	E.coli, pathogenic, unspecified	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Cattle (bovine animals)								
- at slaughterhouse - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling (1)	Evira	animal	1586	10		10	10	

Footnote

1) The samples were analysed only for E.coli O157, not for other pathogenic E.coli types.

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 the Art. 3 § 14 of 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 (as a source of infection)

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 2006.
293 014 bovine animals were slaughtered and subject to a routine post mortem examination. Samples were collected from 11 suspicious animals and sent to the Finnish Food Safety Authority Evira for examination. All results were negative.
A total of 954 intradermal tuberculin tests were performed at 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 (as a source of infection)

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 2006.
Samples of 22 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 (as a source of infection)

The relevance seems to be negligible.

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium spp.	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Sheep	Evira	animal	0	0	0	0	0
Goats	Evira	animal	0	0	0	0	0
Pigs	Evira	animal	24	14	0	0	14
Badgers	Evira	animal	0	0	0	0	0
Reindeers							
semi-domesticated	Evira	animal	2	0	0	0	0
Moose							
wild	Evira	animal	3	0	0	0	0
Deer							
wild	Evira	animal	1	0	0	0	0
roe deer	Evira	animal	1	0	0	0	0
Gallus gallus (fowl)	Evira	animal	1	0	0	0	0
Ducks	Evira	animal	1	0	0	0	0
Dogs							
pet animals	Evira	animal	1	0	0	0	0
Cats							
pet animals	Evira	animal	1	0	0	0	0
Pigeons							
wild	Evira	animal	1	1	0	0	1
Solipeds, domestic							
horses	Evira	animal	1	0	0	0	0
Swans							
wild	Evira	animal	1	1	0	0	1
Turtles							
pet animals	Evira	animal	1	0	0	0	0
Reptiles							
pet animals	Evira	animal	1	0	0	0	0
Marine mammals							
zoo animals	Evira	animal	1	0	0	0	0
Birds							

wild (1)	Evira	animal	1	0	0	0	0
pet animals (2)	Evira	animal	1	0	0	0	0
Rabbits							
wild	Evira	animal	1	0	0	0	0
Wild animals							
(wolverine)	Evira	animal	1	0	0	0	0

(1) : A magpie
(2) : a budgerigar

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	20098	949291	20098	100	0	0	0			11	0
Total	20098	949291	20098	100	0	0		0	0	11	0

Footnote

In addition 954 intradermal tuberculin tests were done on bulls standing at the A.I. bull stations or new bulls introduced to the A.I. bull stations.
The 11 animals with suspicious lesions were examined histopathologically and by Ziehl-Neelsen-stain for tuberculosis.

(*) Legend:

In column "Interval between routine tuberculin tests" use the following numeric codes: (0) no routine tests; (1) tests once a year; (2) tests each two years; (3) tests each three years concerning 24 month-old animals; (4) tests each 4 years; (5) others (please give details).

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	195	6	100	0	0				22	0
Total	6	195	6	100	0	0		0	0	22	0

(*) Legend:

In column "Interval between routine tuberculin tests" use the following numeric codes: (0) no routine tests; (1) tests once a year; (2) tests each two years; (3) tests each three years concerning 24 month-old animals; (4) tests each 4 years; (5) others (please give details).

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 (as a source of infection)

Brucellosis has no relevance to public health in Finland.

2.6.2. Brucellosis in humans

2.6.3. Brucella in foodstuffs

2.6.4. 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 the Art. 3 § 13 of 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.Dairy herds: bulk milk samples are collected from all herds by industry personnel. Out of them a minimum of 10 % of the samples are chosen randomly for brucella testing.
2. Suckler cows, meat production: Serum samples are taken at slaughter. The number of samples cover a minimum of 10
% of the herds.
3. Breeding animals: samples are taken at the AI station and from the herds of the origin sending bulls to the AI stations
4. Suspicious animals due to several abortions.

Frequency of the sampling

1. Once a year
2.-3. Continuous
4. On suspicion

Type of specimen taken

Other: 1. tank milk,2.-3. blood, 4. blood and samples from afterbirth and fetus

Methods of sampling (description of sampling techniques)

1. Samples are collected at the dairy by the personnel that receive the milk.
2. Samples are taken from individual animals at slaughter
3. 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: iELISA, Confirmation: CF

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 2006.
Altogether 2757 bulk milk samples, 4570 blood samples from suckler cows at slaughter and 1301 blood samples from AI bulls were tested for brucellosis. In addition, 101 microbiological examinations and 5 serological tests 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 (as a source of infection)

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: CF

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 2006.
3546 random blood samples from healthy animals (sheep) were tested. In addition 5 (sheep + goats) 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 (as a source of infection)

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 2006.
1186 random blood samples from healthy animals (goats) were tested. In addition 5 (sheep + goats) 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 (as a source of infection)

There is no relevance to human cases.

D. B. suis in animal - Pigs

Monitoring system

Sampling strategy

All sows that are slaughtered during April and May each year and all boars slaughtered throughout the year are sampled for B. suis. The aim is to sample 5 - 10 % of all slaughtered sows per year. Furthermore, each slaughterhouse is asked to take 300 blood samples from fattening pigs every year.
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.

Frequency of the sampling

Annual sampling at AI stations. Periodical or continuous sampling at slaughterhouses.

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 CF or cELISA is positive.

Diagnostic/ analytical methods used

Screening: Rose Bengal test, Confirmation:cElisa, CF

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 12 832 samples were tested fro Brucella suis in 2006, all with negative results. Of these samples, 10149 samples were collected at slaughterhouses, 2134 samples were collected from pigs originating from pig breeding herds and 549 samples were collected from A.I.boars.

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

The situation remains favourable.

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

The relevance seems to be negligible.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella spp.	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Pigs	Evira	animal	12832	0	0	0	0	0

Footnote

The 12832 samples include 10149 samples collected at slaughterhouses, 2134 samples collected from pigs originating from pig breeding herds and 549 samples collected from A.I. boars.

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 samples			Information about abortions			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds tested	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 microbio logically	Number of animals positive microbio logically
																		Serologically	BST		
FINLAND	20098	949291	20098	100	0	0		4570	0	2757		0		0	0	5	0	0	0	101	0
Total	20098	949291	20098	100	0	0	0	4570	0	2757	0	0	0	0	0	5	0	0	0	101	0

Footnote

The number of bovine herds tested serologically for surveillance is not available.

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

Region	Total number of existing ovine / caprine		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 microbiologically	Number of animals positive microbiologically	Number of suspended herds
FINLAND	2432	123323	2432	100	0	0	320	4732	0	0	0	5	0	0
Total	2432	123323	2432	100	0	0	320	4732	0	0	0	5	0	0

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- 2006 the number of reported cases of human yersiniosis has been on average ca. 700, most of which are caused by Yersinia enterocolitica.
An increased prevalence of pathogenic Yersinia enterocolitica bio/ serotype 4/ O:3 was detected in pigs, when 37 % and 92 % of porcine tonsillar samples and 4 % and 17 % of porcine faecal were Yersinia enterocolitica bio/ serotype 4/ O:3 positive in 1995 and 2006, respectively.

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 number of domestic salmonella infections. A decreasing trend in numbers of yersiniosis can be seen from 1995 to 2003.

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

In Finland the most common bio/ serotype is 4/ O:3, which is found in human cases as well as in pigs and pork. Pathogenic Y. enterocolitica biotypes have also been detected in faeces of cats and dogs in Finland.

2.7.2. Yersiniosis in humans

2.7.3. Yersinia in foodstuffs

A. Y. pseudotuberculosis in food - Vegetables - non-precut - at retail - domestic production - Surveillance - surveillance survey - selective sampling

Monitoring system

Sampling strategy

The occurrence of Yersinia pseudotuberculosis in carrots was investigated in a project on quality of domestic vegetables. Fifteen retail samples were taken both in Helsinki and in Turku area.

Frequency of the sampling

Fifteen samples were taken in April and fifteen samples in November.

Methods of sampling (description of sampling techniques)

Washed or unwashed carrots were taken from retail shops or market place. The retail sample size was between two and five kilograms. Twenty-five grams of peels from washed or unwashed carrots were analysed from each retail sample.

Definition of positive finding

A sample is positive, when Y. pseudotuberculosis is detected in the sample.

Diagnostic/ analytical methods used

Analysis was carried out using an in-house method: The samples were enriched in phosphate-mannitol-peptone broth at 4°C and subcultured after one and two weeks after potassium hydroxide (0.25% in saline) treatment onto cefsulodin-irgasan-novobiocin (CIN) agar and MacConkey agar. Plates were incubated at 30°C for 48 hours. The isolates were identified by Gram staining, production of oxidase, urease and ornithine decarboxylase and fermentation of lactose, sucrose, rhamnose and melibiose.

Results of the investigation

Y. pseudotuberculosis was not detected in the samples.

B. Y. enterocolitica in food - Vegetables - non-precut - at retail - domestic production - Surveillance - surveillance survey - selective sampling

Monitoring system

Sampling strategy

The occurrence of Yersinia enterocolitica in carrots was investigated from fifteen retail samples

in a project on quality of domestic vegetables.

Frequency of the sampling

Fifteen samples were taken in April 2006.

Methods of sampling (description of sampling techniques)

Washed or unwashed carrots were taken from retail shops or market place. The retail sample size was between two and five kilograms. Twenty-five grams of peels from washed or unwashed carrots were analysed from each retail sample.

Definition of positive finding

A sample is positive, when Y. enterocolitica is detected in the sample.

Diagnostic/ analytical methods used

ISO 10273:2003, modified. Modifications: PSB culture is only plated after KOH treatment onto SSDC and CIN agar after enrichment. ITC culture is plated onto CIN and SSDC agar.

Results of the investigation

Yersinia enterocolitica was detected in 14 (93%) out of 15 samples. All isolates represented the non-pathogenic biotype 1A.

C. Y. pseudotuberculosis in food - Vegetables - non-precut - at farm - Surveillance - surveillance survey - selective sampling

Monitoring system

Sampling strategy

The occurrence of Yersinia pseudotuberculosis in carrots was investigated in a project on quality of domestic vegetables. Twenty-six samples from eighteen farms taken at harvest time were examined during storage and at the end of the storage period. New samples (n=24) from seventeen farms were examined at harvest.

Frequency of the sampling

Samples taken at harvest in 2005 were examined during storage in January 2006 and at the end of the storage period in March 2006.

Type of specimen taken

Other: carrots

Methods of sampling (description of sampling techniques)

Twenty-five grams of peels from washed or unwashed carrots were analysed from each retail sample.

Definition of positive finding

A sample is positive, when Y. pseudotuberculosis is detected in the sample.

Diagnostic/ analytical methods used

Analysis was carried out using an in-house method: The samples were enriched in phosphate-mannitol-peptone broth at 4°C and subcultured after one and two weeks after potassium hydroxide (0.25% in saline) treatment onto cefsulodin-irgasan-novobiocin (CIN) agar and MacConkey agar. Plates were incubated at 30°C for 48 hours. The isolates were identified by Gram staining, production of oxidase, urease and ornithine decarboxylase and fermentation of lactose, sucrose, rhamnose and melibiose.

Results of the investigation

Y. pseudotuberculosis was not detected in any of the samples.

D. Y. enterocolitica in food - Vegetables - non-precut - at farm - Surveillance - surveillance survey - selective sampling

Monitoring system

Sampling strategy

The occurrence of Yersinia enterocolitica in carrots was investigated in a project on quality of domestic vegetables. Twenty-six samples from eighteen farms taken at harvest time were examined during storage and at the end of the storage period.

Frequency of the sampling

Twenty-six samples were taken in January and March 2006.

Type of specimen taken

Other: unwashed carrots

Methods of sampling (description of sampling techniques)

Twenty-five grams of peels from unwashed carrots were analysed from each sample.

Definition of positive finding

A sample is positive, when Y. enterocolitica is detected in the sample.

Diagnostic/ analytical methods used

ISO 10273:2003, modified. Modifications: PSB culture is only plated after KOH treatment onto SSDC and CIN agar after enrichment. ITC culture is plated onto CIN and SSDC agar.

Results of the investigation

Yersinia enterocolitica was detected in 26 (50%) out of 52 samples. All isolates represented the

non-pathogenic biotype 1A.

E. Y. pseudotuberculosis in food - Vegetables - pre-cut - at processing plant - domestic production - Monitoring - official sampling

Monitoring system

Sampling strategy

The occurrence of Yersinia pseudotuberculosis in domestic, stored root and vegetables (carrots, beetroot, swede turnip, cabbage) samples was investigated in monitoring program according National Food Control Plan 2006. Altogether 162 samples from 19 processing plants were taken. Samples were taken randomly by local authorities (municipal healt inspectors).

Frequency of the sampling

Samples were taken in spring from February to May after six to ten months storage.

Type of specimen taken

Other: Other: pre-cut, packed or unpacked salad (iceberg salad and Chinese cabbage) samples.

Methods of sampling (description of sampling techniques)

Samples were taken at processing plants. The sample size was between 200-500 grams. Twenty-five grams were analysed from each sample.

Definition of positive finding

A sample is positive, when Yersinia pseudotuberculosis is detected in the sample.

Diagnostic/ analytical methods used

Analysis was carried out using an in-house method: The samples were enriched in phosphate-mannitol-peptone broth at 4°C and subcultured after 14 days after potassium hydroxide (0.25% in saline) treatment (KOH) onto cefsulodin-irgasan-novobiocin (CIN) agar.

Control program/ mechanisms

Recent actions taken to control the zoonoses

Improve the hygiene practices on farming, storage and handling of raw carrots and voluntary microbiological quality testing of fresh produce on farms storing carrots.

Results of the investigation

Y. pseudotuberculosis was not detected in the samples.

F. Y. enterocolitica in food - Vegetables - pre-cut - at processing plant - domestic production - Monitoring - official sampling - selective sampling

Monitoring system

Sampling strategy

The occurrence of Yersinia enterocolitica in domestic, stored root and vegetables (carrots, beetroot, swede turnip, cabbage) samples was investigated in monitoring program according National Food Control Plan 2006. Altogether 162 samples from 19 processing plants were taken. Samples were taken randomly by local authorities (municipal healt inspectors).

Frequency of the sampling

Samples were taken in spring from February to May after six to ten months storage.

Type of specimen taken

Other: pre-cut, packed or unpacked salad (iceberg salad and Chinese cabbage) samples.

Methods of sampling (description of sampling techniques)

Samples were taken at processing plants. The sample size was between 200-500 grams. Twenty-five grams were analysed from each sample.

Definition of positive finding

A sample is positive, when Yersinia enterocolitica is detected in the sample.

Diagnostic/ analytical methods used

ISO 10273:2003, modified. Modifications: PSB culture is plated onto CIN agar after enrichment 2-3 days with and without KOH treatment. ITC culture is enriched 48 hours and plated onto CIN agar only.

Results of the investigation

Yersinia enterocolitica was detected in 53 (33 %) out of 162 samples. All isolates represented the non-pathogenic biotype 1A.

Table Yersinia in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Yersinia spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified
Vegetables										
non-precut										
- at farm - Surveillance - surveillance survey	Evira	batch	25 g	52	26	26		0	0	26
pre-cut										
- at retail - domestic production - Surveillance	Evira	batch	25 g	15	14	14		0	0	14
- at processing plant - domestic production - Monitoring - official sampling - selective sampling	Evira	single	25 g	162	110	53	57	0	0	53

Footnote

All Yersinia enterocolitica isolates represented the non-pathogenic biotype 1A.

2.7.4. Yersinia in animals

A. Yersinia enterocolitica in pigs

Monitoring system

Sampling strategy

Animals at farm

There are no monitoring programmes for animals at farm.

Animals at slaughter (herd based approach)

There are no monitoring programmes for animals at slaughter.
In a research project a survey on Yersinia enterocolitica in pigs at slaughter started in September 2006. Eight random porcine tonsilla and intestinal samples from large intestine were taken in each of the four participating slaughterhouses once a month.

Frequency of the sampling

Animals at slaughter (herd based approach)

Once a month

Type of specimen taken

Animals at slaughter (herd based approach)

Other: tonsilla and intestinal contents from large intestine

Methods of sampling (description of sampling techniques)

Animals at slaughter (herd based approach)

Tonsillas and 50 g of intestinal contents of the same animals is taken by meat inspection veterinarians at the slaughterhouse

Case definition

Animals at slaughter (herd based approach)

A sample is positive, when Y. enterocolitica is detected in the sample.

Diagnostic/ analytical methods used

Animals at slaughter (herd based approach)

Other: ISO 10273:2003, modified

Control program/ mechanisms

The control program/ strategies in place

There are no control programmes for Y. enterocolitica.

Results of the investigation

Yersinia enterocolitica bio/ serotype 4/ O:3 was detected in 27 (21%)out of 128 intestinal samples. Non-pathogenic Y. enterocolitica biotype 1A was detected in 22 (17%)intestinal samples.
Yersinia enterocolitica bio/ serotype 4/ O:3 was detected in 77 (92%)out of 84 tonsilla samples. Non-pathogenic Y. enterocolitica biotype 1A was detected in 4 (5%)tonsilla samples.

Table Yersinia in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. pseudotuberculosis	Y. enterocolitica - O:9	Y. enterocolitica - O:3	Y. enterocolitica - unspecified
Pigs										
- at slaughterhouse - animal sample - Monitoring - monitoring survey - objective sampling (1)	Evira	animal	128	96	96				87	24

(1) : Some animals were postive both for 0:3 and for non-pathogenic biotype 1A.

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 1860's. 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 1950's, but since the 1980's 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 (still yet alleged) 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 (as a source of infection)

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 verification of the Trichinella species

No positive cases were found in 2006.

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 have 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 (as a source of infection)

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 accordant with 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.

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. spiralis	Trichinella spp., unspecified
Pigs						
fattening pigs	Evira	animal	2360717	0		
breeding animals						
unspecified						
sows and boars	Evira	animal	61873	0		
Solipeds, domestic						
horses	Evira	animal	1052	0		
Wild boars						
wild	Evira	animal	2	0		
farmed	Evira	animal	638	0		
Foxes	Evira	animal	215	45		45
Bears	Evira	animal	59	3		3
Raccoon dogs						
wild						
- Monitoring	Evira	animal	212	55		55
Badgers						
wild						
- Monitoring	Evira	animal	12	2		2
Lynx						
wild						
- Monitoring	Evira	animal	100	47		47
Wolves						
wild						
- Monitoring	Evira	animal	37	7		7
Marten						
wild						
- Monitoring (Martes martes)	Evira	animal	16	4		4
Otter						
(Animals found dead in the nature)	Evira	animal	5	2		2

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 2006, about 2100 small mammals were studied. These materials are mostly 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 (as a source of infection)

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

Organs/ tissues: Intestines of definitive hosts and lungs and visceral organs of intermediate hosts

Case definition

Definitive host: finding of an adult parasite in sedimentation and microscopic examination.
Intermediate host: positive protoscolex finding in microscopic examination of a hydatid cyst.

Diagnostic/ analytical methods used

Other: copro-ELISA, PCR, visual examination of organs at meat inspection of intermediate hosts, microscopic examination of cysts and adult parasites

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.

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)	Evira	animal	293014	0			
Sheep (1)	Evira	animal	33692	0			
Pigs	Evira	animal	2422590	0			
Solipeds, domestic	Evira	animal	1052	0			
Reindeers	Evira	animal	89749	9	9		
Dogs	Evira	animal	21	0			
Cats	Evira	animal	1	0			
Foxes	Evira	animal	209	0			
Raccoon dogs	Evira	animal	189	0			
Wolves	Evira	animal	33	2	2		
Moose	Evira	animal	1466	0			
Voles							
wild	Metla	animal	2100	0			

(1) : The number of sheep includes also some goats because they are not compiled in statistics separately.

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

Between 1995 and 2006, from 31 to 48 human cases per year were reported (annual incidence 0.5-0.9 per 100,000).

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 IN ANIMALS
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 gondii
Cattle (bovine animals)	Evira	animal	468	0
Sheep	Evira	animal	132	1
Goats	Evira	animal	7	0
Pigs	Evira	animal	1010	0
Solipeds, domestic	Evira	animal	93	0
Dogs	Evira	animal	493	0
Cats	Evira	animal	254	0
Hares	Evira	animal	77	7

Footnote

All results are from diagnostic examinations.

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 one imported case in a horse in 2003). However, the infection pressure in wild carnivores species in Russia and Estonia is high and it poses a continuous risk for the reintroduction of the disease.

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

As no 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. Lyssavirus (rabies) in animals

A. Rabies in dogs

Monitoring system

Sampling strategy

Monitoring of rabies is based on detection of clinical signs.

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 2006 eight dogs were investigated, all with negative results.

Investigations of the human contacts with positive cases

No positive cases in dogs since 1988.

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

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 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.

Vaccination policy

An annual programme for the immunisation of wild carnivores is carried out since 1989 in the south eastern border area. In 2006, 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 study. 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 2006 a total of 534 wild animals were examined for rabies, all with negative results.

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

No rabies cases have been found after February 1989. The infection pressure in wild carnivores in Russia and in Estonia 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	European Bat Lyssavirus - unspecified	classical rabies virus (genotype 1)
Cattle (bovine animals)	Evira	animal	2	0			
Sheep	Evira	animal	0	0			
Goats	Evira	animal	0	0			
Pigs	Evira	animal	0	0			
Solipeds, domestic							
horses	Evira	animal	1	0			
Dogs	Evira	animal	8	0			
Cats	Evira	animal	9	0			
Bats							
wild	Evira	animal	1	0			
Foxes							
wild	Evira	animal	230	0			
Raccoon dogs							
wild	Evira	animal	225	0			
Wolves							
wild	Evira	animal	4	0			
Badgers							
wild	Evira	animal	12	0			
Marten							
wild	Evira	animal	22	0			
Other carnivores							
wild	Evira	animal	40	0			

2.12. Q-FEVER

2.12.1. General evaluation of the national situation

2.12.2. Coxiella (Q-fever) in animals

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ESCHERICHIA COLI, NON-PATHOGENIC

3.1.1. General evaluation of the national situation

3.1.2. Antimicrobial resistance in Escherichia coli, non-pathogenic isolates

A. Antimicrobial resistance of E. coli in animal - Cattle (bovine animals) - mixed herds - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling

Sampling strategy used in monitoring

Frequency of the sampling

Samples originate from the FINRES-Vet-Programme (Finnish Veterinary Antimicrobial Resistance Monitoring and Consumption of Antimicrobial Agents). In 2006, E. coli isolates from healthy cattle was included.

Type of specimen taken

cattle faeces

Methods of sampling (description of sampling techniques)

The samples were collected from nine slaughterhouses, which accounted for 95 % of the total slaughter volume of cattle in Finland. The number of randomly taken samples was proportioned to the annual number of slaughtered animals. One isolate per herd was included.

Procedures for the selection of isolates for antimicrobial testing

One isolate from each sample was tested for antimicrobial susceptibility.

Methods used for collecting data

The samples were sent to Finnish Food Safety Authority Evira (until 30.4.2006 National Veterinary and Food Research Institute EELA), where the bacteria were isolated and their antimicrobial susceptibility was tested.

Laboratory methodology used for identification of the microbial isolates

Intestinal content was diluted in peptone saline broth. After mixing, 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. The isolation procedure was validated against the method used previously (see later) and, during the validation process, the isolates were confirmed biochemical to E. coli.
Previous method (in use 2002-2005): Sample was diluted in peptone saline broth. After mixing, the suspension was spread on MacConkey agar (Difco, Le Pont de Claix, France) and incubated overnight at 44±0.5oC. A typical lactose-positive colony was subcultivated on blood agar and incubated overnight at 37±1oC. Oxidase-negative and indole positive colonies were further cultivated in lactose tryptone lauryl sulphate broth (Oxoid), in motility and urea agars, and incubated at 37±1oC overnight.

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, May 2002. Quality control according to the NCCLS standards; Escherichia coli ATCC 25922 was used as a quality control strain.
Microbiology Department 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.

Control program/ mechanisms

The control program/ strategies in place

The susceptibility testing of indicator E. coli is a part of the FINRES-Vet programme (Finnish Veterinary Antimicrobial Resistance Monitoring and Consumption of Antimicrobial Agents).

Results of the investigation

Resistance percentages were low for all antimicrobials tested.

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

In an international perspective, resistance was rare.

Table Antimicrobial susceptibility testing of E. coli in Cattle (bovine animals) - mixed herds - at slaughterhouse - Monitoring - official sampling - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	E. coli																					
	Cattle (bovine animals) - mixed herds - at slaughterhouse - Monitoring - official sampling																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	185																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	185	1						21	151	12					1						1	128
Amphenicols																						
Chloramphenicol	185	0							7	69	107	2									2	16
Florfenicol	185	0							1	34	128	22									2	16
Cephalosporins																						
3rd generation cephalosporins	185	0	1	114	66	4															0.03	0.25
Fluoroquinolones																						
Ciprofloxacin	185	0	71	112	2																0.008	0.125
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	185	0						4	50	121	10										1	8
Sulfonamides																						
Sulfonamide	185	0										185									16	16
Trimethoprim	185	0				47	70	62	6												0.25	2
Aminoglycosides																						
Streptomycin	185	5								8	142	30		2	3						64	128
Gentamicin	185	0					8	129	42	6											0.5	4
Neomycin	0	0																				
Kanamycin	155	5							5	108	37	3	2								2	32
Penicillins																						
Ampicillin	185	1				2	3	38	120	20	1			1							0.25	64
Trimethoprim + sulfonamides	0	0																				

Footnote

For kanamycin, the number of isolates is 155

Table Antimicrobial susceptibility testing of E. coli in animals

n = Number of resistant isolates	E. coli							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	yes							
Number of isolates available in the laboratory	185							
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	185	1						
Amphenicols								
Chloramphenicol	185	0						
Florfenicol	185	0						
Cephalosporins								
3rd generation cephalosporins	185	0						
Fluoroquinolones								
Ciprofloxacin	185	0						
Quinolones								
Nalidixic acid	185	0						
Sulfonamides								
Sulfonamide	185	0						
Trimethoprim	185	0						
Aminoglycosides								
Streptomycin	185	5						
Gentamicin	185	0						
Kanamycin	155	5						
Penicillins								
Ampicillin	185	1						
Resistant to 1 antimicrobial	185	8						
Resistant to 2 antimicrobials	185	2						
Resistant to 3 antimicrobials	185	0						
Resistant to 4 antimicrobials	185	0						
Resistant to >4 antimicrobials	185	0						

Footnote

Kanamycin: tested 155 isolates

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	epidemiological cut-off value	16		16	1	128				
Florfenicol	epidemiological cut-off value	16		16	4	32				
Tetracyclines										
Tetracyclin	microbiological cut-off value	8		8	0.5	64				
Fluoroquinolones										
Ciprofloxacin	microbiological cut-off value	0.12		0.12	0.008	1				
Enrofloxacin										
Quinolones										
Nalidixic acid	microbiological cut-off value	16		16	1	128				
Trimethoprim	microbiological cut-off value	4		4	0.25	32				
Sulfonamides										
Sulfonamide	microbioligical cut-off value	256		256	16	2048				
Aminoglycosides										
Streptomycin	microbiological cut-off value	16		16	2	256				
Gentamicin	microbiological cut-off value	4		4	0.5	64				
Neomycin										
Kanamycin	microbiological cut-off value	8		8	2	16				
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins	microbiological cut-off value	0.5		0.5	0.06	2				
Penicillins										
Ampicillin	microbiological cut-off value	8		8	0.25	32				

Table Breakpoints used for antimicrobial susceptibility testing in Humans

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol										
Florfenicol										
Tetracyclines										
Tetracyclin										
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin										
Quinolones										
Nalidixic acid										
Trimethoprim										
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin										
Gentamicin										
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins										
Penicillins										
Ampicillin										

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 OUTBREAKS

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 foodborne outbreaks

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 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 Public Health Institute (KTL). The National Food Safety Authority, in co-operation with the National Public Health Institute 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 three 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 2006, the municipal food control authorities notified 46 food poisoning outbreaks, of which 42 were associated with food and four with drinking water. The number of outbreaks decreased 16 % 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. Majority of the reported outbreaks are food-borne (91 % in 2006). 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 and 6445 persons became ill in outbreaks in 1989, 1998 and 2000, respectively.

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

During the last few 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 2006 norovirus caused 12 (29%) food-borne outbreaks. The most common vehicle (42%) reported was food contaminated by infected food handler at restaurant or catering. Only one Salmonella outbreak was reported to the food poisoning register in 2006. The vehicle of the outbreak remained unknown. One foodborne outbreak caused by Campylobacter jejuni from unknown source was notified in 2006. Only a few food-borne outbreaks caused by Campylobacter sp. have been reported (1% in 1995-2006). The reported vehicles have been poultry meat and unpasteurized milk.

New consumption habits, like increased use of mussels, fresh tuna, beans and vacuum packed and ready-to-eat fish and vegetables have led to significant outbreaks and new causative agents. In 2006 these comprised three foodborne outbreaks from seafood (tuna, crab and mussels), Clostridium botulinum outbreak trough vacuum packed white fish, and an outbreak of lectin from uncooked beans. Yersinia pseudotuberculosis from grated carrots, norovirus from salad and B. licineformis from grated, raw beetroot caused large foodborne outbreaks through ready-to-eat vegetables in schools and restaurants in 2006.

Traditional causes of food poisoning (Bacillus cereus, Clostridium perfringens and Staphylococcus aureus) did not increase the outbreaks. B. cereus caused three outbreaks (7%) but the significance of outbreaks caused by these bacteria has decreased during the last 10 years. Meat and meat products are the major vehicles for C. perfringens and meat products or vegetables of B. cereus and S. aureus outbreaks.

In 2006 altogether 16 (38 %) foodborne outbreaks the causative agent and the vehicle remained unknown. In these cases however, the investigations showed an epidemiological association between eating certain meal and becoming ill. The investigations revealed a certain food to be the vehicle in 29 (70 %) outbreaks. In 2006 vegetables and vegetables products first time was the most common vehicle (38%)in foodborne outbreaks, whereas the second most common vehicle was meat and meat products and fish and fish products (both 12 %).

A total of four outbreaks spread by drinking water were reported in 2006. During the last years Campylobacter spp. and norovirus have been the most common causative agents as regards waterborne outbreaks. However, Campylobacter outbreaks were not reported in 2006, whereas norovirus caused one medium size outbreak. Two of the waterborne outbreaks were caused

through well water contaminated with seepage of sewage or surface water.

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

Substandard kitchen and poor hand hygiene in restaurants were responsible for major proportion of food-borne outbreaks (40 %) in 2006. The most common single reason of food-borne outbreaks (14 %) was an infected food handler (norovirus), who transferred virus via contaminated hands to the served food. The proportion and significance of infected food handlers has been increased during the last years. The most generally substantiated contributing factors in the handling of food were connected with temperature (26 %) including inadequate cooling, inadequate heating or reheating and improper storage temperature of food at restaurants and catering service. Raw materials were suspected being the cause of infection in four(10%)outbreaks. The latter including two Y. pseudotuberculosis outbreaks traced to domestic, grated carrots, B. licineformis outbreak from grated, raw beetroot, a norovirus outbreak trough ready-to-eat salad and vegetables, and an Aeromonas outbreak from contaminated imported mussels. A wastewater contamination of private well and excess supply of lye in water purification plant caused the two largest waterborne outbreaks in 2006.

Descriptions of single outbreaks of special interest

Clostridium botulinum outbreak

On June 2006, one person fell ill with vomiting and diarrhoea and next day muscular weakness, and was admitted to hospital. She developed difficulty in breathing and required mechanical ventilation in an intensive care unit for one week. The patient's husband also had diarrhoea and later had some difficulties in swallowing, but no other neurological symptoms were observed. Serum samples from the female patient were positive for botulinum neurotoxin type E. An interview revealed that the couple had eaten smoked vacuum-packed whitefish on previous day. The whitefish had been imported from Canada, but smoked and packed in Finland. There was no leftover fish for microbiological examination. Flush samples were taken from the fish's plastic packaging, but they were negative for C. botulinum by PCR and culture.

The suspected fish product was recalled by the manufacturer, and production was suspended. The food control authorities inspected the production plant and the distribution centre. The entire manufacturing process and storage temperatures throughout the cold chain, including the retail outlet, were investigated. The inspections did not reveal any factors that could have created an increased risk of botulinum neurotoxin production. Microbiological analysis of vacuum-packed fish made from the same raw fish batch that was used to make the product eaten by the patient, were all negative for C. botulinum. The investigators have therefore hypothesised that there may have been storage temperature abuse at a later stage, such as in the retail outlet or the home. Human botulism is a very rare disease; the most recent case to be reported in Finland before the case mentioned here occurred in 1999.

Two Yersinia pseudotuberculosis outbreaks

Two large food borne outbreaks caused by Y. pseudotuberculosis serotype O:1 were reported in 2006. Stored, domestic grated carrots from previous summer (2005) distributed and served in schools and institutes was implicated as a vehicles of both outbreaks. The first outbreak occurred among students in Eastern Finland on the May -June and the second in Southern Finland on August. From May to end of August a total of 600 cases Y. pseudotuberculosis O:1 infection were estimated. Among patients, fever and abdominal pain were predominant

symptoms. Several children underwent unnecessary appendectomies.
In both outbreaks carrots were traced back to the farm and to the vegetable processing plant. Samples were taken from carrots, storeges, 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. The isolates genotyped from carrots and environmental samples were indistinguishable from the patient isolates.
Y. pseudotuberculosis serotype O:1 has first time been associated with eating of domestic, grated carrots in spring 2003 and 2004. In both of these cases carrots have been harvested previous summer or autumn, and stored from six to ten months before eating. To prevent outbreaks in the future instructions to improve the hygiene practices on farming, storage and handling of raw carrots have been given.

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 Public Health Institute, 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.

Table Foodborne outbreaks in humans

Causative agent	General outbreak	Household outbreak	Total Number of persons			Food implicated			Type of evidence for implication of the food	Place where food was consumed	Contributing factors
			ill (in total)	died	in hospital	Food (sub)category	Suspected as a source	Confirmed as a source			
1	2	3	4	5	6	7			8	9	10
Aeromonas - Aeromonas spp., unspecified	x		5			mussels	x		microbiologically confirmed in food, epidemiology (descriptive)	restaurant	contamineted raw product, inadequate heating
Bacillus - B. cereus	x		2			duck		x	microbiologically confirmed in food, epidemiology (descriptive)	restaurant	improper storage, inadequate heating
Bacillus - B. cereus	x		6			gravy with mushrooms		x	microbiologically confirmed in food, epidemiology (descriptive)	restaurant	improper storage
Bacillus - B. licheniformis	x		23			grated, raw beetroot		x	microbiologically confirmed in food, epidemiology (descriptive)	canteen	contamineted raw product, improperi storage and handling hygiene
Campylobacter - C. jejuni	x		28			prepared dishes (chicken)	x		microbiologically confirmed in patients, epidemiology (descriptive)	field practice	unknown
Clostridium - C. botulinum		x	2		2	smoked white fish (vacuum packed)	x		laboratory confirmed in patients, epidemiology (descriptive)	home	unknown

Escherichia coli, non-pathogenic - E. coli	x		11			water		x	increased level of indicator bacteria in water, epidemiology (descriptive)	sport camp	water source not for human consumption
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		6			salad	x		microbiologically confirmed in patients, epidemiology (descriptive)	restaurant	unknown
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		11			salad		x	microbiologically confirmed in patients, epidemiology (descriptive)	home made salad served at restaurant	unknown
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		14	1		salad		x	microbiologically confirmed in patients, epidemiology (cohort study)	canteen	infected food handler
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		14	1		unripened cheese			microbiologically confirmed in patients, epidemiology (cohort study)	canteen	infected food handler
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		20			layer cake		x	microbiologically confirmed in patients, epidemiology (cohort study)	canteen	unknown
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		30			prepared dishes	x		microbiologically confirmed in patients, epidemiology (descripitive)	catering, wedding feast	unknown
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		33			crab salad		x	microbiologically confirmed in patients, epidemiology (cohort study)	restaurant	infected food handler
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		37			layer cake		x	microbiologically confirmed in patients and surface samples, epidemiology (cohort study)	several canteens and restaurants	infected food handler, cross contamination, poor hygiene
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		51			prepared dishes		x	microbiologically confirmed in patients, epidemiology (cohort study)	catering	infected food handler

Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		84		drinking water (well water)		x	microbiologically confirmed in water and patients, epidemiology (descripitive)	catering	seepage of sewage
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		94		salad		x	microbiologically confirmed in patients, epidemiology (cohort study)	school	unknown
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		100		chicken nugget	x		microbiologically confirmed in patient, epidemiology (descriptive)	school	unknown
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		450		ready-to-eat salads		x	microbiologically confirmed in patients, epidemiology (cohort study)	several canteens and restaurants	unknown (contaminated raw material)
Histamine	x		3	1	tuna pizza		x	symptoms, laboratory confirmed in food	work place	inadeguate cooling, improper storage
Listeria - L. monocytogenes - L. monocytogenes, unspecified		x	11	3	potted mushrooms	x		microbiologically confirmed in food, epidemiology (descriptive)	home	improperi storage and handling hygiene
Salmonella - S. Typhimurium	x		16	2	dressing flovoured with basil	x		microbiologically confirmed in patients, epidemiology (descriptive)	restaurant	unknown
Toxins - B. cereus enterotoxins	x		3		rice		x	laboratory confirmed in food, epidemiology (descriptive)	restaurant	inadeguate cooling, improper storage temperature
Toxins - Staphylococcal enterotoxins	x		2		vegetarian side dish		x	laboratory confirmed in food, epidemiology (descriptive)	restaurant	inadeguate cooling, improper storage temperature, inadeguate food handling
Toxins - chemical agents (1)	x		14		drinking water, community supply		x	epidemiology (descriptive)	municipal	excess supply of lye
Toxins - lectin	x		130		beans		x	symptoms, epidemiology (descriptive)	school	inadequate cooking

Unknown			x	8		1	barbecue	x		epidemiology (descriptive)	home	inadequate heating, cross contamination
Unknown			x	9			sandwich with smoked fish	x		epidemiology (descriptive)	home	unknown
Unknown			x	40			pasta salad	x		epidemiology (descriptive)	home	unknown
Unknown		x		4			casserole	x		epidemiology (descriptive)	retail	inadequate heating, improper storage temperature and time
Unknown		x		4			kebab	x		epidemiology (descriptive)	kebab restaurant	unknown
Unknown		x		4			prepared dishes	x		epidemiology (cohort study)	hotel restaurant	unknown
Unknown		x		4			prepared dishes	x		epidemiology (descriptive)	restaurant	unknown
Unknown		x		5			drinking water (well water)		x	increased level of indicator bacteria in water, epidemiology (descriptive)	private home	seepage of surface water
Unknown		x		5			hamburger	x		epidemiology (descriptive)	hamburger restaurant	unknown
Unknown		x		6			lunch	x		epidemiology (descriptive)	restaurant	unknown
Unknown		x		6		2	Christamas foods	x		epidemiology (descriptive)	restaurant	unknown
Unknown		x		10			mulled wine	x		epidemiology (descriptive)	educational institute	unknown
Unknown		x		12			prepared dishes	x		epidemiology (descriptive)	restaurant	unknown
Unknown		x		16			school lunch	x		epidemiology (descriptive)	school	unknown
Unknown		x		17			breakfast	x		epidemiology (descriptive)	catering	unknown
Unknown		x		17			mushroom salad	x		epidemiology (cohort study)	restaurant	improper storage temperature, poor hygiene
Unknown		x		38			school lunch	x		epidemiology (descriptive)	school	unknown

Yersinia - Y. pseudotuberculosis		x			8	carrots		x	microbiologically confirmed in food and environmmental samples (farm, storage, processing plant), epidemiology (case-control study)	schools	contamineted raw product
Yersinia - Y. pseudotuberculosis		x		>400	several	grated carrots		x	microbiologically confirmed in food and environmmental samples (farm, storage, processing plant), epidemiology (case-control study)	schools	contamineted raw product

(1) : lye