



## FINLAND

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

### TRENDS AND SOURCES OF ZOONOSES AND ZOO NOTIC AGENTS IN HUMANS, FOODSTUFFS, ANIMALS AND FEEDINGSTUFFS

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

IN 2007

**INFORMATION ON THE REPORTING AND MONITORING SYSTEM**Country: **Finland**Reporting Year: **2007****Institutions and laboratories involved in reporting and monitoring:**

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

Finland 2007 Report on trends and sources of zoonoses

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)
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## **PREFACE**

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/EC<sup>1</sup>. 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 2007. 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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<sup>1</sup> 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 2007

Data on reindeers:

Statistics of the Reindeer Herders' Association

Data on farmed deer:

Provincial veterinary offices

Data on slaughtered animals:

Meat inspection statistics of Food Safety Authority of Finland, Evira

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

Data on holdings and live animals:

Final data, situation as of 1 April 2007.

Data on reindeers:

Final data, 2006/ 2007, reindeer herding year: 1 June-31 May.

Data on slaughtered animals: All animals slaughtered in 2007.

#### **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. Declining of livestock farms continued slightly in 2007, when 41 per cent of farms had livestock.

Indeed, the livestock production is concentrating into larger units. For example, the average size of dairy farms grew with one cow. Also, the average size of farms with fattening pigs grew by 17 pigs.

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

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

In 2007, farms with dairy cows have 20.6 dairy cows per farm on average. Slightly over 40% of all milk farms have at least 30 heads. Although the number of farms with over 50 dairy cows has more than doubled during this decade, their proportion of all dairy farms is still only about 5 %. The concentration of production into larger units is even clearer in the case of pig production. Every third fattening pig farm has more than 200 fattening pigs.

On the other hand, the number of livestock on poultry farms declined during in 2007, with the exception of laying hens, which numbered almost 2,500 per farm. The average size of broiler farms

fell by about 5,000 broilers on the previous year. Proportionally the greatest fall, almost a third, was with turkey farm numbers. The sheep numbers rose by a couple of percent and goat numbers fell by about 7 percent. The number of horses on farms was about 4 per cent higher than the year before.



## Table Susceptible animal populations

\* Only if different than current reporting year

Animal species	Category of animals	Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
			Year*		Year*		Year*		Year*
Cattle (bovine animals)	dairy cows and heifers					434173		14389	
	meat production animals					181423		11186	
	calves (under 1 year)					311098		17722	
	in total			291085		926694		18624	
Deer	farmed - in total							6	
Ducks	mixed flocks/holdings					763872		95	
Gallus gallus (fowl)	parent breeding flocks for egg production line	32				763872		95	
	grandparent breeding flocks for egg production line	4				12904		191	
	parent breeding flocks, unspecified - in total					350938		40	
	grandparent breeding flocks for meat production line	12							
	parent breeding flocks for meat production line	281							
	breeding flocks for meat production line - in total	293							
	laying hens	626		283573		3134434		1261	
	broilers	3278		54079569		5074091		138	
	in total	4526		54626757		9336239		1734	
	Geese	in total			4779		718		74
Goats	in total					6181		461	
Pigs	breeding animals			61587		178669		1876	
	fattening pigs			2390641		1269372		2442	
	in total			2452219		1448041		2744	
Reindeers	farmed - in total			82600		193342		4901	
Sheep	animals over 1 year					58525		1798	
	animals under 1 year (lambs)					3642		201	
	meat production animals					57085		1508	
	in total (1)			34476		119252		1885	
Solipeds, domestic	horses - in total			975		29716		5460	
Turkeys	meat production flocks	711							
	parent breeding flocks	47							
	in total	758		1339697		430505		98	
Wild boars	farmed - in total			382					
Ostriches	in total			24					
Pheasants	in total			829					

(1): Total number of slaughtered sheep includes also some slaughtered goats. They are not registered separately at the meat inspection.

## **2. INFORMATION ON SPECIFIC ZOOSES AND ZOO NOTIC 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 abroad.

##### **Recent actions taken to control the zoonoses**

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

## **2.1.2. 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 supervision of official 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 week: one sample every week,  
production less than 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: 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 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 positive result to the competent authority and to the food business operator.

#### **Results of the investigation**

See table Salmonella in poultry meat.

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

Salmonella situation in domestic broiler meat has been favourable. Less 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 supervision of official 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 than 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 refrigeration. A total area of 1400 cm<sup>2</sup> is swabbed. Sampling sites: the upper inner part of hind legs

including the pelvic entrance; the cut surface area of the abdomen and the chest; and the cheek.

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

### **Definition of positive finding**

#### **At slaughterhouse and cutting plant**

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

### **Diagnostic/ analytical methods used**

#### **At slaughterhouse and cutting plant**

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

### **Control program/ mechanisms**

#### **The control program/ strategies in place**

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

### **Measures in case of the positive findings or single cases**

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

### **Notification system in place**

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

### **Results of the investigation**

See table Salmonella in red meat and products thereof

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

Salmonella situation in Finnish pig meat is very favourable.

### **Relevance of the findings in animals to findings in foodstuffs and to human cases (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 supervision of official 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 week: one sample every week, production less than 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 refrigeration. A total area of 1400 cm<sup>2</sup> is swabbed. Sampling sites: the upper inner part of hind legs including the pelvic entrance and the cut surface area of the abdomen and the chest.

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

## **Definition of positive finding**

### **At slaughterhouse and cutting plant**

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

## **Diagnostic/ analytical methods used**

### **At slaughterhouse and cutting plant**

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

## **Control program/ mechanisms**

### **The control program/ strategies in place**

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

### **Measures in case of the positive findings or single cases**

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

### **Notification system in place**

Laboratory has to notify the positive 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 salmonellosis cases in Finland.

**Table Salmonella in poultry meat and products thereof**

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
<b>Meat from broilers (Gallus gallus)</b> <b>fresh</b> - at cutting plant - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling								
	Evira	single	25 g	757	0			
<b>Meat from turkey</b> <b>fresh</b> - at cutting plant - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling								
	Evira	single	25 g	517	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. Tennessee
<b>Meat from pig</b>									
<b>fresh</b>									
- at cutting plant - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	single	25 g	2329	1				1
<b>carcass</b>									
- at slaughterhouse - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling (Fattening pigs)	Evira	single	1400 cm2	3227	0				
- at slaughterhouse - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling (Sows)	Evira	single	1400 cm2	3136	0				
<b>Meat from bovine animals</b>									
<b>fresh</b>									
- at cutting plant - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	single	25 g	2062	0				
<b>carcass</b>									
- at slaughterhouse - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling	Evira	single	1400 cm2	3133	0				

### 2.1.3. 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:

Day-old chicks are sampled by the food business operator after arrived to the holding.

Rearing flocks are sampled at the holding by the food business operator at four weeks old and two weeks before moving to laying unit or phase. Once a year samples are taken by the official veterinarian in each holding.

Adult breeding flocks are sampled at the hatchery every two weeks by food business operators and every 16 weeks by official veterinarians. Every flock is sampled twice during the production cycle at the holding by the official veterinarian. In addition, official sampling is carried out at the holding if Salmonella spp. is detected from the sampling at the hatchery.

##### **Laying hens flocks**

The Finnish Salmonella Control Programme:

Rearing flocks are sampled at the holding two weeks before laying period by the food business operator.

Production flocks are sampled at the holding every 15 weeks by the food business operator.

Sampling is carried out by the official veterinarian once a year at each holding.

##### Frequency of the sampling

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

Every flock is sampled

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

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

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

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

##### **Laying hens: Rearing period**

Other: 2 weeks before laying period

**Laying hens: Production period**

Other: Every 15 weeks

**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**

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

**Breeding flocks: Production period**

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

**Laying hens: Rearing period**

Two pairs of boot swabs/ sock samples are taken and pooled to one.

In cage flocks: two samples of 150 g of naturally mixed faeces are collected and pooled to one.

**Laying hens: Production period**

Two pairs of boot swabs/ sock samples are taken and pooled to one.

In cage flocks: two samples of 150 g of naturally mixed faeces are collected and pooled to one.

**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.

**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.

**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.

**Laying hens: Rearing period**

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

**Laying hens: Production period**

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

**Diagnostic/ analytical methods used**

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

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

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

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

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

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

**Laying hens: Rearing period**

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

**Laying hens: Production period**

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

**Vaccination policy**

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

Vaccination against salmonella is not allowed in Finland.

**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 2007/ 849/ EC.

**Laying hens flocks**

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

**Recent actions taken to control the zoonoses**

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

**Measures in case of the positive findings or single cases**

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

In case of positive finding at holding: the flock is slaughtered and heat treated or destructed, hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by



the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out.

In case of positive finding at hatchery: the flock of origin is sampled at the holding by the official veterinarian. Environmental samples are taken at the hatchery.

### **Laying hens flocks**

In case of positive finding at holding: the flock is slaughtered and heat treated or destructed, hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out.

### **Notification system in place**

The laboratory has to notify positive results to competent authority and to food business 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 detected 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:

Day-old chicks are sampled by the food business operator after arrived to the holding.

Rearing flocks are sampled at the holding by the food business operator at four weeks old and two weeks before moving to laying unit or phase. Once a year samples are taken by the official veterinarian in each holding.

Adult breeding flocks are sampled at the hatchery every two weeks by food business operators and every 16 weeks by official veterinarians. Every flock is sampled twice during the production cycle at the holding by the official veterinarian. In addition,

official sampling is carried out at the holding if *Salmonella* spp. is detected from the sampling at the hatchery.

### **Broiler flocks**

The Finnish Salmonella Control Programme: all broiler flocks are sampled at holdings within three 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: twice

#### **Broiler flocks: Before slaughter at farm**

Other: Every flock is sampled within three weeks before slaughter

### **Type of specimen taken**

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

Internal linings of delivery boxes

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

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**

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

**Breeding flocks: Production period**

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

At holding: five pairs of boot swabs/ sock samples are taken and pooled to two.

**Broiler flocks: Before slaughter at farm**

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

**Case definition**

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

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

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

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

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

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

**Broiler flocks: Before slaughter at farm**

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

**Diagnostic/ analytical methods used**

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

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

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

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

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

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

**Broiler flocks: Before slaughter at farm**

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

**Vaccination policy**

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

Vaccination against salmonella is not allowed in Finland.

**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 2007/849/ EC.

**Broiler flocks**

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

**Recent actions taken to control the zoonoses**

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

**Measures in case of the positive findings or single cases**

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

The flock is destructed. All the other flocks at the holding are sampled by the official veterinariaan. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official 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. All the other flocks at the holding are sampled by the official veterinariaan. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out.

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

In case of positive finding at holding: the flock is slaughtered and heat treated or destructed, hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinariaan. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out.

**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 disinfected, official environmental samples are taken, negative results are required before restocking. Official 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 been 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 salmonellosis 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:

Day-old chicks are sampled by the food business operator after arrived to the holding. Rearing flocks are sampled at the holding by the food business operator at four weeks old and two weeks before moving to laying unit or phase. Once a year samples are taken by the official veterinarian in each holding.

Adult breeding flocks are sampled at the hatchery every two weeks by food business operators and every 16 weeks by official veterinarians. Every flock is sampled twice during the production cycle at the holding by the official veterinarian. In addition, official sampling is carried out at the holding if Salmonella spp. is detected from the sampling at the hatchery.

**Meat production flocks**

The Finnish Salmonella Control Programme: all meat production flocks are sampled at holdings within three 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: twice

**Meat production flocks: Before slaughter at farm**

Other: Every flock is sampled within three weeks before slaughter

**Type of specimen taken**

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

Internal linings of delivery boxes

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

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**

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

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

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

**Meat production flocks: Before slaughter at farm**

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

**Case definition**

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

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

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

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

**Meat production flocks: Before slaughter at farm**

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

**Diagnostic/ analytical methods used**

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

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

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

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

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

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

**Meat production flocks: Before slaughter at farm**

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

**Vaccination policy**

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

Vaccination against salmonella is not allowed in Finland.

**Meat production flocks**

Vaccination against salmonella is not allowed in Finland.

**Other preventive measures than vaccination in place**

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

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

**Meat production flocks**

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

**Control program/ mechanisms**

**The control program/ strategies in place**

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

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

**Meat production flocks**

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



### **Recent actions taken to control the zoonoses**

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

### **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 disinfected, official environmental samples are taken, negative results are required before restocking. Official 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 business 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.
- 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)**

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**

### **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 lymph 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 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 collected 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 lymph 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 pasteurisation. 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	S. Hadar	S. Infantis	S. Virchow	Salmonella spp., unspecified	S. Heidelberg
<b>Gallus gallus (fowl)</b>											
<b>grandparent breeding flocks for egg production line</b>											
day-old chicks (1)	Evira	flock	2	1							1
during rearing period	Evira	flock	1	0							
during production period	Evira	flock	2	0							
<b>parent breeding flocks for egg production line</b>											
day-old chicks	Evira	flock	4	0							
during rearing period	Evira	flock	7	0							
during production period	Evira	flock	21	0							
<b>grandparent breeding flocks for meat production line</b>											
day-old chicks	Evira	flock	3	0							
during rearing period	Evira	flock	4	0							
during production period	Evira	flock	5	0							
<b>parent breeding flocks for meat production line</b>											
day-old chicks	Evira	flock	62	0							
during rearing period	Evira	flock	77	0							
during production period	Evira	flock	142	0							

(1) : This positive flock was imported from a third country.

**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. Anatum	S. Infantis	S. Livingstone
<b>Gallus gallus (fowl)</b>										
laying hens										
during rearing period	Evira	flock	216	0						
during production period	Evira	flock	626	2		1		1		
broilers										
during rearing period	Evira	flock	3278	8					2	6
<b>Turkeys</b>										
meat production flocks	Evira	flock	711	1		1				
<b>parent breeding flocks</b>										
day-old chicks	Evira	flock	17	0						
during rearing period	Evira	flock	14	0						
during production period	Evira	flock	16	1		1				



**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. Livingstone	S. IIIb 50:z10:z	S. Minnesota	S. Derby	S. Konstanz	S. Rissen
<b>Cattle (bovine animals)</b> unspecified - at slaughterhouse - animal sample - lymph nodes - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling - at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official sampling - suspect sampling (1)	Evira	2930	2	1	1				1			
	Evira	27	14	12	1							
<b>breeding bulls</b>												

<p>- 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)</p>	Evira	herd	281	1									1
<p><b>Pigs</b> breeding animals - at slaughterhouse - animal sample - lymph nodes - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling</p>	Evira	animal	3066	3	1						1	1	
<p>fattening pigs - at slaughterhouse - animal sample - lymph nodes - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling</p>	Evira	herd	66	0									
	Evira	animal	3166	2		2							

- at farm - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - official sampling - suspect sampling	Evira	herd	11	1			1		
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(1) : 6 of 12 S. Typhimurium positive cattle herds have contacts with each other and the Typhimurium strains have the same rare resistance profile in Finland (sulfa and tetracycline resistant) and same phage- and PFGE -type. Calves from the original farm had transported to 3 herd. One of the owner had 2 herd near each other and both became positive. Near of these 2 herd was a third herd owned by other farmer and this herd became also positive. All the 6 herd were detected positive during October to December.

## 2.1.4. 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 request 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
<b>Feed material of land animal origin</b>								
dairy products	Evira	single	25 g	57	0			
meat and bone meal	Evira	single	25 g	43	0			
offal	Evira	single	25 g	11	0			
<b>Feed material of marine animal origin</b>								
fish meal	Evira	batch	25 g	22	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. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Senftenberg	S. Tennessee	S. Paratyphi B var. Java	S. Agona	S. Mbandaka
<b>Feed material of cereal grain origin</b>	barley derived	single	25 g	17	0								
	wheat derived	single	25 g	15	0								
	(imported)	batch	25 g	67	0								
	maize	batch	25 g	1	0								
	derived	batch	25 g	28	0								
	other cereal grain derived	single	25 g	20	0								
	(imported)	batch	25 g	1	0								
	by-products of brewing and distilling	single	25 g	23	0								
	(imported)	batch	25 g	80	0								
<b>Feed material of oil seed or fruit origin</b>	groundnut derived	single	25 g	2	0								
	rape seed derived	single	25 g	115	0								

	Evira	batch	25 g	82	12				8	2		1	8
(imported) (1)													
palm kernel derived	Evira	batch	25 g	3	0								
soya (bean) derived	Evira	single	25 g	17	0								
(imported)	Evira	batch	25 g	79	0								
sunflower seed derived	Evira	single	25 g	31	1						1		
linseed derived	Evira	batch	25 g	34	0								
<b>Other feed material</b>													
tubers, roots and similar products	Evira	single	25 g	7	0								
(imported)	Evira	batch	25 g	39	0								
other seeds and fruits	Evira	single	25 g	3	0								
(imported)	Evira	batch	25 g	1	0								
forages and roughages	Evira	single	25 g	3	0								
(imported)	Evira	batch	25 g	6	0								
yeast	Evira	single	25 g	2	0								

(1) : In seven 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. Derby	S. Reading	S. Livingstone	S. Senftenberg	S. Agona	S. Mbandaka	S. Schwarzengrund	S. Newport
<b>Compound feedingstuffs for cattle</b>	Evira	single	25 g	374	0											
		final product														
<b>Compound feedingstuffs for pigs</b>	Evira	single	25 g	274	0											
		final product														
<b>Compound feedingstuffs for poultry (non specified)</b>	Evira	single	25 g	51	0											
		final product														
<b>Compound feedingstuffs for poultry - broilers</b>	Evira	single	25 g	41	0											
		final product														
<b>Pet food</b>	Evira	single	25 g	240	8	2			3		1	1				2
		dog snacks (pig ears, chewing bones) (1)														
<b>Compound feedingstuffs for reindeers</b>	Evira	single	25 g	177	5	1				1		1		1		1
		- in total (4)														
	Evira	single	25 g	15	0											

<b>Compound feedingsuffs for horses</b>	Evira	single	25 g	17	0															
<b>Compound feedingsuffs for sheep</b>	Evira	single	25 g	4	0															
<b>Compound feedingsuffs for fur animal (2)</b>	Evira	single	25 g	78	1															1
<b>Compound feedingsuffs, not specified</b>	Evira	single	25 g	65	0															
<b>Complementary feedingsuffs (3)</b>	Evira	single	25 g	181	0															

(1) : In one positive sample two serotypes isolated.

(2) : Two serotypes isolated.

(3) : Mixed mineral feeds (32 units tested) and feed additive products (149 units tested).

(4) : Other pet food than dog snacks.

### **2.1.5. Salmonella serovars and phagetype distribution**

**Table Salmonella serovars in animals**

Serovars	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
	M	C	M	C	M	C	M	C
Sources of isolates (*)								
Number of isolates in the laboratory	N= 161		18		35		8	
Number of isolates serotyped	N= 161	0	18	0	35	0	8	0
<b>Number of isolates per type</b>								
S. Anatum					2			
S. Derby (1)			14					
S. Heidelberg (2)					24			
S. Infantis (3)					2			
S. Konstanz			1					
S. Livingstone (4)	2				6			
S. Minnesota (5)	1							
S. Rissen	1							
S. Typhimurium (6)	155		3		1		8	
S. IIIb 50:z:10:z	2							

(1) : The isolates are from the animals of one farm, one from lymph node sample and 13 from faeces.

(2) : All of the isolates are from one grand parent breeding flock imported from a third country.

(3) : Gallus gallus isolates are from two broiler flocks.

(4) : Gallus gallus isolates are from 6 broiler flocks, bovine isolates from one herd.

(5) : Minnesota was isolated from one lymph node sample.

(6) : Bovine isolates are from faecal samples of 12 herds and one lymph node sample, pig isolates are from three lymph node samples and other poultry isolates from one turkey production flock and one turkey breeding 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	
	M	C	M	C	M	C	M	C	M	C
Sources of isolates (*)										
Number of isolates in the laboratory	N=0		1		0		0		0	
Number of isolates serotyped	0	0	1	0	0	0	0	0	0	0
<b>Number of isolates per type</b>										
S. Tennessee			1							

**Footnote**

(\*) M : Monitoring, C : Clinical

**Table Salmonella serovars in feed**

Serovars	M	C
Compound feedingsstuffs for pigs		
Sources of isolates (*)		
Number of isolates in the laboratory	N=	
Number of isolates serotyped	N=	0
Number of isolates per type		
Salmonella spp., unspecified		

**Footnote**

(\*) M : Monitoring, C : Clinical

**Table Salmonella Enteritidis phagetypes in animals**

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

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

**Footnote**

(\*) M : Monitoring, C : Clinical

**Table Salmonella Typhimurium phage types in animals**

Phage type	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
	M	C	M	C	M	C	M	C
Sources of isolates (*)								
Number of isolates in the laboratory	N= 14		3		1		2	
Number of isolates phagetyped	N= 14	0	3	0	1	0	2	0
<b>Number of isolates per type</b>								
DT 12	1							
DT 40	1		2				1	
DT RDNC	8							
DT 195					1			
U 277	1		1				1	
DT 1 (1)	1							
DT 2	1							
DT 9 var.	1							

(1) : From one bovine herd were detected both DT 1 and DT 2.

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

**Footnote**

(\*) M : Monitoring, C : Clinical

## **2.1.6. Antimicrobial resistance in Salmonella isolates**

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.

### **A. Antimicrobial resistance in Salmonella in cattle**

#### **Sampling strategy used in monitoring**

##### **Frequency of the sampling**

See Salmonella spp. in bovine animals.

##### **Type of specimen taken**

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

##### **Methods of sampling (description of sampling techniques)**

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

##### **Procedures for the selection of isolates for antimicrobial testing**

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

##### **Breakpoints used in testing**

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

available.

### **Preventive measures in place**

See Salmonella spp. in bovine animals.

### **Control program/ mechanisms**

#### **The control program/ strategies in place**

See Salmonella spp. in bovine animals.

### **Results of the investigation**

Multiresistance was detected in six *S. Typhimurium* isolates; resistance was detected to streptomycin, sulfamethoxazole and tetracycline. Resistance was also detected in one *S. Rissen* isolate; the isolate was resistant to ampicillin, chloramphenicol, tetracycline and trimethoprim. Other bovine isolates were susceptible to the antimicrobials tested.

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

The resistance situation in bovine Salmonella in Finland has been favourable for years. In 2007, resistance was detected in a few isolates.

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

The antimicrobials included are listed in the tables.

### **Breakpoints used in testing**

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

### **Preventive measures in place**

See *Salmonella* spp. in pigs.

### **Control program/ mechanisms**

#### **The control program/ strategies in place**

See *Salmonella* spp. in pigs.

### **Results of the investigation**

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**

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

#### **Type of specimen taken**

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

#### **Methods of sampling (description of sampling techniques)**

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

breeding flocks and meat production flocks

### **Procedures for the selection of isolates for antimicrobial testing**

One isolate from each production batch was included.

### **Methods used for collecting data**

Isolates were collected from local laboratories and tested in Evira.

### **Laboratory methodology used for identification of the microbial isolates**

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

### **Laboratory used for detection for resistance**

#### **Antimicrobials included in monitoring**

VetMIC broth microdilution method (NVI, Sweden); testing performed according to CLSI Document M31-A2 Vol. 22 No. 6, 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 were used; primarily those recommended by the EUCAST, if available.

### **Control program/ mechanisms**

#### **The control program/ strategies in place**

See *Salmonella* spp. in *Gallus gallus* and turkeys.

### **Results of the investigation**

Of the poultry isolates (n=14), one *S. Livingstone* isolate was resistant to ciprofloxacin, and one to ampicillin.

### **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 pigs**

### **Sampling strategy used in monitoring**

#### **Frequency of the sampling**

See Salmonella spp. in pig meat and products thereof.

### **Type of specimen taken**

See Salmonella spp. in pig meat and products thereof.

### **Methods of sampling (description of sampling techniques)**

See Salmonella spp. in pig meat and products thereof.

### **Procedures for the selection of isolates for antimicrobial testing**

The isolate originated from the national salmonella control programme.

### **Methods used for collecting data**

Isolates were collected from local laboratories and tested in Evira.

## **Laboratory methodology used for identification of the microbial isolates**

See Salmonella spp. in pig meat and products thereof.

## **Laboratory used for detection for resistance**

### **Antimicrobials included in monitoring**

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

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

### **Breakpoints used in testing**

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

## **Preventive measures in place**

See Salmonella spp. in pig meat and products thereof.

## **Control program/ mechanisms**

### **The control program/ strategies in place**

See Salmonella spp. in pig meat and products thereof.

## **Results of the investigation**

No resistance was detected in the isolate.

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



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

**Table Antimicrobial susceptibility testing in S. Anatum**

n = Number of resistant isolates													
S. Anatum													
	Gallus gallus (fowl) - laying hens		Gallus gallus (fowl)		Cattle (bovine animals)		Pigs		Turkeys		Gallus gallus (fowl) - broilers		
Isolates out of a monitoring programme	yes												
Number of isolates available in the laboratory	1												
<b>Antimicrobials:</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	
<b>Aminoglycosides</b>													
Gentamicin	1	0											
Streptomycin	1	0											
<b>Amphenicols</b>													
Chloramphenicol	1	0											
<b>Cephalosporins</b>													
Cefotaxim	1	0											
<b>Fluoroquinolones</b>													
Ciprofloxacin	1	0											
Fully sensitive	1	1											
<b>Penicillins</b>													
Ampicillin	1	0											
<b>Quinolones</b>													
Nalidixic acid	1	0											
<b>Sulfonamides</b>													
Sulfamethoxazol	1	0											
<b>Tetracyclines</b>													
Tetracyclin	1	0											
Trimethoprim	1	0											



**Table Antimicrobial susceptibility testing in S. Derby**

n = Number of resistant isolates													
S. Derby													
	Pigs		Gallus gallus (fowl)		Cattle (bovine animals)		Turkeys		Gallus gallus (fowl) - broilers		Gallus gallus (fowl) - laying hens		
Isolates out of a monitoring programme	yes												
Number of isolates available in the laboratory	2												
<b>Antimicrobials:</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	
<b>Aminoglycosides</b>													
Gentamicin	2	0											
Streptomycin	2	0											
<b>Amphenicols</b>													
Chloramphenicol	2	0											
<b>Cephalosporins</b>													
Cefotaxim	2	0											
<b>Fluoroquinolones</b>													
Ciprofloxacin	2	0											
Fully sensitive	2	2											
<b>Penicillins</b>													
Ampicillin	2	0											
<b>Quinolones</b>													
Nalidixic acid	2	0											
<b>Sulfonamides</b>													
Sulfamethoxazol	2	0											
<b>Tetracyclines</b>													
Tetracyclin	2	0											
Trimethoprim	2	0											

**Table Antimicrobial susceptibility testing in *S. Infantis***

n = Number of resistant isolates													
<i>S. Infantis</i>													
	Gallus gallus (fowl) - broilers		Gallus gallus (fowl)		Cattle (bovine animals)		Pigs		Turkeys		Gallus gallus (fowl) - laying hens		
Isolates out of a monitoring programme	yes												
Number of isolates available in the laboratory	2												
<b>Antimicrobials:</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	
<b>Aminoglycosides</b>													
Gentamicin	2	0											
Streptomycin	2	0											
<b>Amphenicols</b>													
Chloramphenicol	2	0											
<b>Cephalosporins</b>													
Cefotaxim	2	0											
<b>Fluoroquinolones</b>													
Ciprofloxacin	2	0											
Fully sensitive	2	2											
<b>Penicillins</b>													
Ampicillin	2	0											
<b>Quinolones</b>													
Nalidixic acid	2	0											
<b>Sulfonamides</b>													
Sulfamethoxazol	2	0											
<b>Tetracyclines</b>													
Tetracyclin	2	0											
Trimethoprim	2	0											

**Table Antimicrobial susceptibility testing in S. Livingstone**

n = Number of resistant isolates													
S. Livingstone													
	Cattle (bovine animals)		Gallus gallus (fowl) - broilers		Gallus gallus (fowl)		Pigs		Turkeys		Gallus gallus (fowl) - laying hens		
Isolates out of a monitoring programme	yes		yes										
Number of isolates available in the laboratory	1		6										
Antimicrobials:	N	n	N	n	N	n	N	n	N	n	N	n	
<b>Aminoglycosides</b>													
Gentamicin	1	0	6	0									
Streptomycin	1	0	6	0									
<b>Amphenicols</b>													
Chloramphenicol	1	0	6	0									
<b>Cephalosporins</b>													
Cefotaxim	1	0	6	0									
<b>Fluoroquinolones</b>													
Ciprofloxacin	1	0	6	1									
Fully sensitive	1	1	6	4									
<b>Penicillins</b>													
Ampicillin	1	0	6	1									
<b>Quinolones</b>													
Nalidixic acid	1	0	6	0									
Resistant to 1 antimicrobial			6	2									
<b>Sulfonamides</b>													
Sulfamethoxazol	1	0	6	0									
<b>Tetracyclines</b>													
Tetracyclin	1	0	6	0									
Trimethoprim	1	0	6	0									

**Table Antimicrobial susceptibility testing in S. Rissen**

n = Number of resistant isolates													
S. Rissen													
	Cattle (bovine animals)		Gallus gallus (fowl)		Pigs		Turkeys		Gallus gallus (fowl) - broilers		Gallus gallus (fowl) - laying hens		
Isolates out of a monitoring programme	yes												
Number of isolates available in the laboratory	1												
<b>Antimicrobials:</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	
<b>Aminoglycosides</b>													
Gentamicin	1	0											
Streptomycin	1	0											
<b>Amphenicols</b>													
Chloramphenicol	1	1											
<b>Cephalosporins</b>													
Cefotaxim	1	0											
<b>Fluoroquinolones</b>													
Ciprofloxacin	1	0											
Number of multiresistant isolates	1	1											
<b>Penicillins</b>													
Ampicillin	1	1											
<b>Quinolones</b>													
Nalidixic acid	1	0											
Resistant to 4 antimicrobials	1	1											
<b>Sulfonamides</b>													
Sulfamethoxazol	1	0											
<b>Tetracyclines</b>													
Tetracyclin	1	1											
Trimethoprim	1	1											

**Table Antimicrobial susceptibility testing of S. Tennessee in Meat from pig - Control or eradication programmes - quantitative data [Dilution method]**

S. Tennessee		Meat from pig - Control or eradication programmes																						
Isolates out of a monitoring programme	yes																							
	1																							
Number of isolates available in the laboratory	1																							
		Number of resistant isolates (n) and number of isolates with the concentration (u/ml) or zone (mm) of inhibition equal to																						
Antimicrobials:	Break point	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	
<b>Aminoglycosides</b>																								
Gentamicin	2	1	0					1															0.5	64
Streptomycin	32	1	0										1										2	256
<b>Amphenicols</b>																								
Chloramphenicol	16	1	0									1											1	128
<b>Cephalosporins</b>																								
Cefotaxim	0.5	1	0			1																	0.06	2
<b>Fluoroquinolones</b>																								
Ciprofloxacin	0.06	1	0		1																		0.008	1
<b>Penicillins</b>																								
Ampicillin	4	1	0						1														0.25	32
<b>Quinolones</b>																								
Nalidixic acid	16	1	0								1												1	128
<b>Sulfonamides</b>																								
Sulfamethoxazol	256	1	0						1														16	2048
<b>Tetracyclines</b>																								
Tetracyclin	8	1	0							1													0.5	64
Trimethoprim	2	1	0						1														0.25	32



**Table Antimicrobial susceptibility testing in S. Tennessee**

n = Number of resistant isolates		
S. Tennessee		
Meat from pig - Control or eradication programmes		
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		1
<b>Antimicrobials:</b>		
	<b>N</b>	<b>n</b>
<b>Aminoglycosides</b>		
Gentamicin	1	0
Streptomycin	1	0
<b>Amphenicols</b>		
Chloramphenicol	1	0
<b>Cephalosporins</b>		
Cefotaxim	1	0
<b>Fluoroquinolones</b>		
Ciprofloxacin	1	0
Fully sensitive	1	1
<b>Penicillins</b>		
Ampicillin	1	0
<b>Quinolones</b>		
Nalidixic acid	1	0
<b>Sulfonamides</b>		
Sulfamethoxazol	1	0
<b>Tetracyclines</b>		
Tetracyclin	1	0
Trimethoprim	1	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		Gallus gallus (fowl) - laying hens		Gallus gallus (fowl) - broilers	
Isolates out of a monitoring programme	yes		yes				yes		yes			
Number of isolates available in the laboratory	14		3				3		1			
Antimicrobials:	N	n	N	n	N	n	N	n	N	n	N	n
<b>Aminoglycosides</b>												
Gentamicin	14	0	3	0			3	0	1	0		
Streptomycin	14	6	3	0			3	0	1	0		
<b>Amphenicols</b>												
Chloramphenicol	14	0	3	0			3	0	1	0		
<b>Cephalosporins</b>												
Cefotaxim	14	0	3	0			3	0	1	0		
<b>Fluoroquinolones</b>												
Ciprofloxacin	14	0	3	0			3	0	1	0		
Fully sensitive	14	8	3	3			3	3	1	1		
Number of multiresistant isolates	14	6										
<b>Penicillins</b>												
Ampicillin	14	0	3	0			3	0	1	0		
<b>Quinolones</b>												
Nalidixic acid	14	0	3	0			3	0	1	0		
Resistant to 3 antimicrobials	14	6										
<b>Sulfonamides</b>												
Sulfamethoxazol	14	6	3	0			3	0	1	0		
<b>Tetracyclines</b>												
Tetracyclin	14	6	3	0			3	0	1	0		
Trimethoprim	14	0	3	0			3	0	1	0		

**Table Antimicrobial susceptibility testing of *S. Typhimurium* in *Gallus gallus* (fowl) and turkeys - at farm - animal sample - Control or eradication programmes - quantitative data [Dilution method]**

		S. Typhimurium																						
		Gallus gallus (fowl) and turkeys - at farm - animal sample - Control or eradication programmes																						
Isolates out of a monitoring programme	yes																							
	Number of isolates available in the laboratory	4																						
		Number of resistant isolates (n) and number of isolates with the concentration (u/ml) or zone (mm) of inhibition equal to																						
Antimicrobials:	Break point	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	
<b>Aminoglycosides</b>																								
Gentamicin	2	4	0					1	3														0.5	64
Streptomycin	32	4	0							1	1	1	1	1									2	256
<b>Amphenicols</b>																								
Chloramphenicol	16	4	0								3		1										1	128
<b>Cephalosporins</b>																								
Cefotaxim	0.5	4	0		1	2	1																0.06	2
<b>Fluoroquinolones</b>																								
Ciprofloxacin	0.06	4	0	1	3																		0.008	1
<b>Penicillins</b>																								
Ampicillin	4	4	0					1	2	1													0.25	32
<b>Quinolones</b>																								
Nalidixic acid	16	4	0							3			1										1	128
<b>Sulfonamides</b>																								
Sulfamethoxazol	256	4	0										2	1	1								16	2048
<b>Tetracyclines</b>																								
Tetracyclin	8	4	0						1	2	1												0.5	64
Trimethoprim	2	4	0					4															0.25	32

**Table Antimicrobial susceptibility testing of Other serotypes in Pigs - Control or eradication programmes - quantitative data [Dilution method]**

Other serotypes		Pigs - Control or eradication programmes																						
Isolates out of a monitoring programme	Number of isolates available in the laboratory	Number of resistant isolates (n) and number of isolates with the concentration (u/ml) or zone (mm) of inhibition equal to														lowest	highest							
		Break point	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
		yes																						
	4																							
<b>Antimicrobials:</b>																								
<b>Aminoglycosides</b>																								
Gentamicin	4	0	2	2																			0.5	64
Streptomycin	4	0	4	1	3																		2	256
<b>Amphenicols</b>																								
Chloramphenicol	4	0	1	3																			1	128
<b>Cephalosporins</b>																								
Cefotaxim	4	0	2	2																			0.06	2
<b>Fluoroquinolones</b>																								
Ciprofloxacin	4	0	4																				0.008	1
<b>Penicillins</b>																								
Ampicillin	4	0	2	2																			0.25	32
<b>Quinolones</b>																								
Nalidixic acid	4	0	4																				1	128
<b>Sulfonamides</b>																								
Sulfamethoxazol	4	0	3	1																			16	2048
<b>Tetracyclines</b>																								
Tetracyclin	4	0	2	2																			0.5	64
Trimethoprim	4	0	1	3																			0.25	32

### Footnote

The table contains data on one S. Konstanz and three S. Typhimurium isolates

**Table Antimicrobial susceptibility testing of Other serotypes in Gallus gallus (fowl) - Control or eradication programmes - quantitative data [Dilution method]**

Other serotypes		Gallus gallus (fowl) - Control or eradication programmes																						
Isolates out of a monitoring programme	yes																							
	10																							
Number of isolates available in the laboratory																								
		Number of resistant isolates (n) and number of isolates with the concentration (u/ml) or zone (mm) of inhibition equal to																						
Antimicrobials:	Break point	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	
<b>Aminoglycosides</b>																								
Gentamicin	2	10	0					2	7	1													0.5	64
Streptomycin	32	10	0							2	5	3											2	256
<b>Amphenicols</b>																								
Chloramphenicol	16	10	0								7	2	1										1	128
<b>Cephalosporins</b>																								
Cefotaxim	0.5	10	0		1	7	2																0.06	2
<b>Fluoroquinolones</b>																								
Ciprofloxacin	0.06	10	1	1	8	1																	0.008	1
<b>Penicillins</b>																								
Ampicillin	4	10	1					2	4	3					1								0.25	32
<b>Quinolones</b>																								
Nalidixic acid	16	10	0								9	1											1	128
<b>Sulfonamides</b>																								
Sulfamethoxazol	256	10	0										9		1								16	2048
<b>Tetracyclines</b>																								
Tetracyclin	8	10	0						2	6	2												0.5	64
Trimethoprim	2	10	0				5	5															0.25	32

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

Other serotypes		Cattle (bovine animals) - Control or eradication programmes																							
Isolates out of a monitoring programme	yes																								
	4																								
Number of isolates available in the laboratory	4																								
Antimicrobials:		Break point	N	n	Number of resistant isolates (n) and number of isolates with the concentration (u/ml) or zone (mm) of inhibition equal to																				
					<=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	
<b>Aminoglycosides</b>																									
	Gentamicin	2	4	0					4															0.5	64
	Streptomycin	32	4	0						2														2	256
<b>Amphenicols</b>																									
	Chloramphenicol	16	4	1						1	2						1							1	128
<b>Cephalosporins</b>																									
	Cefotaxim	0.5	4	0	2	2																		0.06	2
<b>Fluoroquinolones</b>																									
	Ciprofloxacin	0.06	4	0	1	3																		0.008	1
<b>Penicillins</b>																									
	Ampicillin	4	4	1					2	1						1								0.25	32
<b>Quinolones</b>																									
	Nalidixic acid	16	4	0							4													1	128
<b>Sulfonamides</b>																									
	Sulfamethoxazol	256	4	0										4										16	2048
<b>Tetracyclines</b>																									
	Tetracyclin	8	4	1						1	2						1							0.5	64
	Trimethoprim	2	4	1					1	2														0.25	32

## Table Breakpoints for antibiotic resistance testing in Animals

### Test Method Used

Broth dilution

### Standards used for testing

NCCLS

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



## Table Breakpoints for antibiotic resistance testing in Food

**Test Method Used**

Broth dilution

**Standards used for testing**

NCCLS

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

## **2.2. CAMPYLOBACTERIOSIS**

### **2.2.1. General evaluation of the national situation**

#### **A. Thermophilic Campylobacter general evaluation**

##### **History of the disease and/ or infection in the country**

The number of reported cases of campylobacteriosis in Finland increased from the beginning of the 1990's to the year 2001. From 2002 to 2003 the number of cases decreased, but after that the trend has been increasing again. Since 1998 campylobacters have been more commonly reported cause of enteritis than salmonellas.

All Finnish broiler slaughterhouses have voluntarily monitored the prevalence of campylobacter in broilers at slaughter as a part of the own-check programme since the 1990's. From 1999 to 2002 the flock prevalence was on average 7.9% between June and September and 1.1% during the other months.

Since 2004, when the campylobacter control programme was implemented, the prevalence of campylobacters in broiler slaughterbatches has been between 6.2 and 7.3% during June-October and below 1% during the rest of the year.

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

Thermophilic campylobacters are the most common bacterial cause of human enteric infections in Finland. Approximately 20-30% 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 six large outbreaks in the years 1999 - 2007. Unpasteurized milk, imported turkey meat, chicken and strawberries have been suspected as source of few small outbreaks.

##### **Recent actions taken to control the zoonoses**

A campylobacter 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. Campylobacter in foodstuffs**

## **2.2.3. 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 1440 slaughter batches were examined for thermophilic campylobacters between June and October 2007. Campylobacters were detected in 102 (7.1%) of these slaughter batches. In January-May and November-December 98 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 2007 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
<b>Gallus gallus (fowl)</b> <b>broilers</b> - at slaughterhouse - animal sample - faeces - Control or eradication programmes - national programmes (no Community co-financing) - sampling by industry - objective sampling (January-May, November-December) - 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	98	0					
	Evira	slaughter batch	1440	102	95	7			

## **2.2.4. 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 the Finnish Campylobacter control programme. Details of sampling are described in Thermophilic Campylobacter in Gallus gallus.

##### **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 95 C. jejuni strains were obtained for susceptibility testing, and the result was obtained from 94 strains.

##### **Methods used for collecting data**

Isolates were sent from slaughterhouse laboratories to Evira. Microbiological confirmation of the isolates and antimicrobial susceptibility testing was performed in Evira.

#### **Laboratory methodology used for identification of the microbial isolates**

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

#### **Laboratory used for detection for resistance**

##### **Antimicrobials included in monitoring**

Antimicrobial susceptibility testing was performed in the Microbiology Unit in Evira using the microdilution method (VetMIC, SVA, Sweden).

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

##### **Breakpoints used in testing**

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

#### **Control program/ mechanisms**

##### **The control program/ strategies in place**

The susceptibility testing of C. jejuni from broilers is one part of the Finnish Campylobacter

control programme. The antimicrobial susceptibility of isolates obtained in the control programme is tested yearly.

### **Results of the investigation**

Resistance among *C. jejuni* from broilers was rare. Rare resistance was detected to tetracycline (3 %) and gentamicin (5 %). MIC values of gentamicin resistant strains were only one dilution higher than the cut-off limit and might be explained with the accuracy (+/ - 1 dilution) of the microdilution method.

### **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]**

<i>C. jejuni</i>																								
Gallus gallus (fowl) - at slaughterhouse - animal sample - Monitoring																								
Isolates out of a monitoring programme	yes																							
Number of isolates available in the laboratory	95																							
Antimicrobials:	Break point	N	n	Number of resistant isolates (n) and number of isolates with the concentration (u/ml) or zone (mm) of inhibition equal to																				
				<=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	
<b>Aminoglycosides</b>																								
Gentamicin	1	94	5			2	25	62	5															
<b>Fluoroquinolones</b>																								
Ciprofloxacin	1	94	0	1	12	56	25																	
<b>Macrolides</b>																								
Erythromycin	4	94	0				8	40	42	4														
<b>Tetracyclines</b>																								
Tetracyclin	2	94	3		51	38	2				2	1												



**Table Antimicrobial susceptibility testing in *C. jejuni***

n = Number of resistant isolates		
<i>C. jejuni</i>		
<b>Gallus gallus (fowl)</b>		
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		95
<b>Antimicrobials:</b>		
	<b>N</b>	<b>n</b>
<b>Aminoglycosides</b>		
Gentamicin	94	5
<b>Fluoroquinolones</b>		
Ciprofloxacin	94	0
Fully sensitive	94	86
<b>Macrolides</b>		
Erythromycin	94	0
Resistant to 1 antimicrobial	94	8
Resistant to 2 antimicrobials	94	0
Resistant to 3 antimicrobials	94	0
Resistant to 4 antimicrobials	94	0
<b>Tetracyclines</b>		
Tetracyclin	94	3

## Table Breakpoints used for antimicrobial susceptibility testing in Animals

### Test Method Used

Broth dilution

### Standards used for testing

NCCLS

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

### Footnote

Applies to Campylobacter jejuni

## **2.3. LISTERIOSIS**

### **2.3.1. General evaluation of the national situation**

#### **A. Listeriosis general evaluation**

##### **History of the disease and/ or infection in the country**

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

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

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

### **2.3.3. 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**

Histopathology and/ or cultivation.

##### **Notification system in place**

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

##### **Results of the investigation**

Listeria monocytogenes bacteria were isolated from 25 cases in 6 different animal species in 2007. Listeriosis was diagnosed in 11 cattle and 6 of the isolations were from eye infection. These eye infections were detected from two farms. Also of the 9 sheep listeriosis 2 isolations were from eye infection and from one farm. The other cases were in alpaca (1), horses (2), zoo animal (1) and hare (1).

##### **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
<b>Cattle (bovine animals)</b>		animal		11	11	
<b>Sheep</b>		animal		9	9	
<b>Alpacas</b>						
<b>farmed</b>						
- at farm - animal sample - organ/ tissue - Clinical investigations - suspect sampling		animal		1	1	
<b>Solipeds, domestic</b>						
<b>horses</b>						
- at farm - animal sample - organ/ tissue - Clinical investigations - suspect sampling		animal		2	2	
<b>Zoo animals, all</b>						
- at zoo - Clinical investigations - suspect sampling		animal		1	1	
<b>Hares</b>						
wild		animal		1	1	

**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 (brain samples) and/ or by cultivation on blood agar or on selective media should be counted. For the same reason only the data of the species from which listeriosis diagnosis is made is reported.

## **2.4. E. COLI INFECTIONS**

### **2.4.1. General evaluation of the national situation**

#### **A. Verotoxigenic Escherichia coli infections general evaluation**

##### **History of the disease and/ or infection in the country**

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

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

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

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

The number of cases has been quite stable during the recent years although under-reporting might exist. Non-O157 serotypes have increased partly due to the development of laboratory methods. Cattle contact remains a risk of infection, especially 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 detected 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. Escherichia coli, pathogenic in foodstuffs**

## **2.4.3. Escherichia coli, pathogenic in animals**

### **A. Verotoxigenic Escherichia coli in cattle (bovine animals)**

#### **Monitoring system**

##### **Sampling strategy**

A compulsory control programme for all bovine slaughterhouses started in January 2004. Samples are taken from slaughtered bovines by the industry. The total number of bovines sampled in a year is calculated with the following criteria: expected prevalence 1 %, accuracy 0,5 %, confidence level 95 %. The total number is divided between the different slaughterhouses depending on their slaughter capacity. The sampling is evenly distributed throughout the year.

Note! Sampling at slaughter has an animal based approach, not herd based.

##### **Frequency of the sampling**

###### **Animals at slaughter (herd based approach)**

Sampling distributed evenly throughout the year

##### **Type of specimen taken**

###### **Animals at farm**

Faeces

###### **Animals at slaughter (herd based approach)**

Faeces

##### **Methods of sampling (description of sampling techniques)**

###### **Animals at farm**

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

###### **Animals at slaughter (herd based approach)**

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

##### **Case definition**



### **Animals at farm**

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

### **Animals at slaughter (herd based approach)**

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

## **Diagnostic/ analytical methods used**

### **Animals at farm**

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

### **Animals at slaughter (herd based approach)**

Bacteriological method: NMKL 164:2005

## **Other preventive measures than vaccination in place**

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

## **Control program/ mechanisms**

### **The control program/ strategies in place**

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

### **Recent actions taken to control the zoonoses**

In 2003, common guidelines were established by the authorities and by the industry. The guidelines were updated in 2006. They give recommendations of how to prevent spreading of VTEC in bovine holdings and slaughterhouses. According to the recommendations a special risk management plan is planned by the official municipal veterinarian and health care veterinarian for the holding where VTEC is detected 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 management 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	Sample weight	Units tested	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
<b>Cattle (bovine animals)</b>	Evira	animal	10 g	1534	19	19		

## **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. 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 tuberculous 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 tuberculous 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 tuberculous 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 2007.

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

A total of 898 intradermal tuberculin tests were performed on AI bulls.

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

The situation remains favourable.

## **Relevance of the findings in animals to findings in foodstuffs and to human cases (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 2007.

Samples of 23 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 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(1)(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	18624	926694	18624	100	0	0	0	0	0	4	0
Total	18624	926694	18624	100	0	0	0	0	0	4	0

**Footnote**

In addition 898 intradermal tuberculin tests were done on bulls standing at the A.I. bull stations or new bulls introduced to the A.I. bull stations.

**(\*) 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		6	100	0	0			0	23	0
Total	6	0	6	100	0	0		0	0	23	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. Brucella in foodstuffs**

## **2.6.3. Brucella in animals**

### **A. Brucella abortus in bovine animals**

#### **Status as officially free of bovine brucellosis during the reporting year**

##### **The entire country free**

Finland has been granted the officially brucellosis free status of bovine herds according to 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, RBT, Confirmation: CFT

## **Vaccination policy**

Vaccination against brucellosis is prohibited.

## **Control program/ mechanisms**

### **The control program/ strategies in place**

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

## **Measures in case of the positive findings or single cases**

Measures include notification measures, investigation of all suspected cases by veterinary authorities by serological testing on blood samples and microbiological testing in case of abortions, isolation of suspect cases and herd restrictions, killing of positive herds and disinfection of the shed.

## **Notification system in place**

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

## **Results of the investigation**

No cases of brucellosis were recorded in 2007.

Altogether 2044 bulk milk samples, 3200 blood samples from suckler cows at slaughter and 1175 blood samples from AI bulls were tested for brucellosis. In addition, 47 microbiological examinations and 3 serological tests from one herds were performed due to abortion or neonatal death. All of these tests have been negative.

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

The situation remains favourable.

## **Relevance of the findings in animals to findings in foodstuffs and to human cases (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: CFT

### **Vaccination policy**

Vaccination is prohibited.

### **Control program/ mechanisms**

#### **The control program/ strategies in place**

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

### **Measures in case of the positive findings or single cases**

Notification procedures, investigation of all suspected cases by veterinary authorities, isolation 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 2007.

3069 random blood samples from healthy sheep were tested. In addition 12 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 authorities, 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 2007.

1508 random blood samples from healthy animals were tested. In addition one clinical suspect case due to abortion was 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 boars are sampled at the AI quarantine station before transfer to AI station. All boars at the AI station are sampled annually and at the time of slaughter.

All suspected animals are tested for brucellosis.

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

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

#### **Frequency of the sampling**

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

#### **Type of specimen taken**

Blood

#### **Methods of sampling (description of sampling techniques)**

Blood samples are collected for prevalence studies and in suspect cases. In suspect cases



placental tissue and vaginal mucus is collected from sows that have aborted. Also whole piglets with skeletal or joint problems should be sent for laboratory examination if possible.

### **Case definition**

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

### **Diagnostic/ analytical methods used**

Screening: Rose Bengal test, Confirmation: CFT

### **Vaccination policy**

Vaccination against brucellosis is prohibited in Finland.

### **Measures in case of the positive findings or single cases**

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

### **Notification system in place**

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

### **Results of the investigation**

Altogether 3428 samples were tested for *Brucella suis* in 2007, all with negative results.

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

The situation remains favourable.

### **Relevance of the findings in animals to findings in foodstuffs and to human cases (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
<b>Pigs</b>	Evira	animal	3428	0	0	0	0	0

**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									
	Herds	Animals	Number of herds	%	Number of herds	%	Serological tests		Examination of bulk milk samples		Information about abortions			Epidemiological investigation						
							Number of bovine herds tested	Number of animals tested	Number of bovine herds tested	Number of animals or pools tested	Number of notified abortions wherever cause whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella infection	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals Serologically	Number of positive animals BIST	Number of animals examined serologically	Number of animals post-mortem inspected serologically	
FINLAND	18624	926694	18624	100	0	0	3200	0	2044	2044	0	47	0	0	3	0	0	0	47	0
Total	18624	926694	18624	100	0	0	3200	0	2044	2044	0	47	0	0	3	0	0	0	47	0

**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 animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbio logically	Number of animals positive microbio logically	Number of unpenitenti herds	
FINLAND	2346	125433	2346	100	0	0	272	4577	0	0	13	0	0	
Total	2346	125433	2346	100	0	0	272	4577	0	0	13	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- 2007 the number of reported cases of human yersiniosis has been on average ca. 700, most of which are caused by Yersinia enterocolitica.

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

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

##### **Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (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. Yersinia in foodstuffs**

## **2.7.3. 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. Samples from eight animals in each of the four participating slaughterhouses were taken once a month. During January - March 2007 tonsilla and intestinal samples from large intestine from each animal were examined. During April - August only tonsilla samples were examined.

##### **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 11 (11%)out of 104 intestinal samples and in 133 (52%)out of 256 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. enterocolitica - O:9	Y. enterocolitica - O:3	Y. enterocolitica - unspecified
<b>Pigs</b>									
- at slaughterhouse - Survey	Evira	animal	256	133	133			133	



## **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 apparent change in swine may be due to the pig production becoming more intensive with bigger industrialized units. In wildlife, a big proportion of infections are caused by *T. nativa*, the arctic species, which does not readily infect swine.

##### **Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (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. 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 2007.

### **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 the magnetic stirrer method for pooled sample digestion and mechanically assisted pooled sample digestion method, accordant with regulation 2075/ 2005.

**Results of the investigation including the origin of the positive animals**

Equine trichinellosis has never been found in Finland.

**Control program/ mechanisms**

**The control program/ strategies in place**

Trichinella examination at meat inspection is mandatory.

**Notification system in place**

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

**Table Trichinella in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. spiralis	Trichinella spp., unspecified	T. nativa
<b>Pigs</b>	Evira	animal	2452219	0			
<b>fattening pigs</b>							
unspecified	Evira	animal	2390641	0			
<b>breeding animals</b>							
unspecified							
sows and boars	Evira	animal	61587	0			
<b>Solipeds, domestic</b>	Evira	animal	975	0			
<b>Wild boars</b>							
wild	Evira	animal	21	1			1
farmed	Evira	animal	382	0			
<b>Foxes</b>	Evira	animal	264	35		35	
<b>Bears</b>	Evira	animal	62	2			2
<b>Raccoon dogs</b>							
<b>wild</b>							
- Monitoring	Evira	animal	216	43		43	
<b>Lynx</b>							
<b>wild</b>							
- Monitoring (1)	Evira	animal	86	31		31	
<b>Wolves</b>							
<b>wild</b>							
- Monitoring	Evira	animal	29	11		11	
<b>Marine mammals</b>							
(Seals)	Evira	animal	4	0			
<b>Badgers</b>							
wild		animal	5	0			
<b>Otter</b>		animal	6	0			
<b>Minks</b>		animal	3	0			
<b>Marten</b>							
(Pine marten)		animal	3	0			

(1) : 1 animal was tested at meat inspection.

## **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 2007, about 2200 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. 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: 1) positive reaction in copro-ELISA test, 2) taeniid eggs in faeces (faecal flotation) and 3) eggs positive in Echinococcus PCR.

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.

#### **Results of the investigation**

In 2007, hydatid cysts of echinococci were found in three slaughtered reindeer. Three wolves were

copro-ELISA positive, but confirmation tests (faecal flotation, PCR) were negative. In previous years, monitoring has detected about two positive wolves a year.



**Table Echinococcus in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
<b>Cattle (bovine animals)</b>	Evira	animal	291085	0			
<b>Sheep (1)</b>	Evira	animal	34476	0			
<b>Pigs</b>	Evira	animal	2452219	0			
<b>Solipeds, domestic</b>	Evira	animal	975	0			
<b>Reindeers</b>	Evira	animal	82600	3	3		
<b>Dogs</b>	Evira	animal	1	0			
<b>Foxes</b>	Evira	animal	264	0			
<b>Moose</b>	Evira	animal	681	0			
<b>Bison</b>	Evira	animal	11	0			
<b>Raccoon dogs</b>	Evira	animal	217	0			
<b>Wolves</b>	Evira	animal	29	0			
<b>Voles</b>	Metla	animal	2200	0			

(1) : The number of examined sheep includes also some examined goats.

## **2.10. TOXOPLASMOSIS**

### **2.10.1. General evaluation of the national situation**

#### **A. Toxoplasmosis general evaluation**

##### **History of the disease and/ or infection in the country**

From 30 to 50 human cases have been reported yearly.

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

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

##### **Additional information**

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

## **2.10.2. Toxoplasma in animals**

### **A. T. gondii in animal**

#### **Monitoring system**

##### **Sampling strategy**

Toxoplasma gondii is a notifiable disease in all animals except, hares, rabbits and rodents. The occurrence of toxoplasmosis is based on diagnosis at necropsy on animals sent to the Finnish Food Safety Authority Evira for determination of cause of death.

There is no monitoring programme at present.

##### **Case definition**

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

##### **Diagnostic/ analytical methods used**

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

#### **Measures in case of the positive findings or single cases**

None

#### **Notification system in place**

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

**Table Toxoplasma in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii
<b>Cattle (bovine animals)</b>		animal	355	0	0
<b>Sheep</b>		animal	80	0	0
<b>Goats</b>		animal	7	0	0
<b>Pigs</b>		animal	750	0	0
<b>Solipeds, domestic</b>		animal	73	0	0
<b>Dogs</b>		animal	550	0	0
<b>Cats</b>		animal	301	11	11
<b>Hares</b>					
<b>wild</b>					
- in total - Monitoring		animal	59	5	5
<b>Squirrels</b>					
- in total - Monitoring		animal	8	1	1
<b>Birds</b>					
- in total - Monitoring (Wood grouse)		animal	14	2	2

## **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 km<sup>2</sup>. As a first measure the local dog population in the area, some 8 000 animals, were vaccinated against rabies at the expense of the state. At the same time it was also highly recommended to vaccinate all the other dogs. In co-operation with the WHO surveillance centre in Tübingen, Germany, a field campaign of oral vaccination of raccoon dogs and foxes was started in September 1988. During four distribution operations, the last one in the autumn 1990, a total of 200 000 Tübingen baits were distributed. In accordance with the WHO standards, Finland was declared rabies free in March 1991 after two years with no cases of rabies.

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

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

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

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

##### **Recent actions taken to control the zoonoses**

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

##### **Suggestions to the Community for the actions to be taken**

Oral vaccination campaigns should be continued annually.

## **2.11.2. Lyssavirus (rabies) in animals**

### **A. Rabies in dogs**

#### **Monitoring system**

##### **Sampling strategy**

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

##### **Frequency of the sampling**

On clinical suspicion

##### **Type of specimen taken**

Organs/ tissues: brains

##### **Methods of sampling (description of sampling techniques)**

Thalamus, pons and medulla

##### **Case definition**

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

##### **Diagnostic/ analytical methods used**

Other: FAT, cell culture and RT-PCR

#### **Vaccination policy**

Vaccination against rabies is recommended for all dogs and cats. Dogs that are used in hunting, guide dogs, sniffer dogs, and dogs that are used by the police, the frontier guard and the army must be vaccinated against rabies (Decision No 9/ EEO/ 1999, 12.5.1999). Dogs, cats and ferrets entering Finland shall be vaccinated against rabies in accordance with the Regulation (EC) No 998/ 2003 of the European Parliament and of the Council.

#### **Other preventive measures than vaccination in place**

Infected animals will be destroyed.

#### **Control program/ mechanisms**

##### **The control program/ strategies in place**

The measures for control of rabies are in the Decision No 9/ EEO/ 1999 of the Veterinary and Food Department (12 May 1999) including investigation of all suspected cases by the veterinary authorities, notification procedures and vaccination. In case of suspicion the animal must be isolated for two weeks or killed and sent to Evira for laboratory analysis.

### **Measures in case of the positive findings or single cases**

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

### **Notification system in place**

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

### **Results of the investigation**

In 2007 fourteen dogs were investigated, all with negative results, except one positive dog imported from India.

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

Indigenous rabies has not been detected in dogs since 1988. In 2007, an imported dog from India infected with rabies was recorded. 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 sent 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 2007, 80 000 bait vaccines were distributed aerially in May and in September over a 20-25 km wide and 300 km long zone along the south eastern border against Russia.

### **Control program/ mechanisms**

#### **The control program/ strategies in place**

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

#### **Recent actions taken to control the zoonoses**

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

### **Measures in case of the positive findings or single cases**

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

### **Notification system in place**

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

### **Results of the investigation**

In 2007 a total of 526 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 Baltic countries is however high and it poses a risk for the reintroduction of the disease.



**Table Rabies in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	Unspecified Lyssavirus	European Bat Lyssavirus - unspecified	Classical rabies virus (genotype 1)
<b>Cattle (bovine animals)</b>	Evira	animal	1	0			
<b>Sheep</b>	Evira	animal	1	0			
<b>Solipeds, domestic</b>	Evira	animal	2	0			
<b>Dogs</b>	Evira	animal	14	1			1
<b>Cats</b>	Evira	animal	8	0			
<b>Bats</b>							
wild	Evira	animal	3	0			
<b>Foxes</b>							
wild	Evira	animal	261	0			
<b>Raccoon dogs</b>							
wild	Evira	animal	222	0			
<b>Wolves</b>							
wild	Evira	animal	3	0			
<b>Badgers</b>							
wild	Evira	animal	5	0			
<b>Marten</b>							
wild	Evira	animal	5	0			
<b>Guinea pigs</b>							
<b>pet animals</b>							
- in total - Clinical investigations	Evira	animal	1	0			
<b>Polecats</b>							
- in total	Evira	animal	1	0			
<b>Minks</b>							
wild	Evira	animal	7	0			
<b>Lynx</b>	Evira	animal	18	0			

**Footnote**

The total number of animals examined is 552 animals, including one positive dog imported from India.

**2.12. Q-FEVER**

**2.12.1. General evaluation of the national situation**

**2.12.2. Coxiella (Q-fever) in animals**

**Table Coxiella burnetii (Q fever) in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii

### **3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE**

### **3.1. ENTEROCOCCUS, NON-PATHOGENIC**

#### **3.1.1. General evaluation of the national situation**

### **3.1.2. Antimicrobial resistance in Enterococcus, non-pathogenic isolates**

#### **A. Antimicrobial resistance of E. faecalis in animal - Pigs - at slaughterhouse**

##### **Sampling strategy used in monitoring**

###### **Frequency of the sampling**

The FINRES-Vet programme (Finnish Veterinary Antimicrobial Resistance Monitoring and Consumption of Antimicrobial Agents) includes susceptibility testing of indicator bacteria from healthy animals. In 2007, isolates from pigs were included.

###### **Type of specimen taken**

Intestinal content from healthy pigs.

###### **Methods of sampling (description of sampling techniques)**

The samples were collected from slaughterhouses, which accounted for 97% of the total production of these animals in Finland. The number of randomly taken samples from each production unit was proportioned to the annual slaughtering volume.

###### **Procedures for the selection of isolates for antimicrobial testing**

One isolate, if available, was tested from each sample.

###### **Methods used for collecting data**

The samples were sent to the National Food Agency (Evira). The bacteria were isolated and their antimicrobial susceptibility was tested at Evira.

##### **Laboratory methodology used for identification of the microbial isolates**

Dilution in peptone-saline broth. Slanetz-Bartley-agar  $37 \pm 1,0^{\circ}\text{C} / 48 \pm 4 \text{ h}$ , bile-esculine agar  $37,0 \pm 1,0^{\circ}\text{C} / 24$ , blood agar  $37,0 \pm 1,0^{\circ}\text{C} / 24 \pm 3 \text{ h}$ , motility agar  $37,0^{\circ}\text{C} \pm 1,0^{\circ}\text{C} / 24 \pm 3 \text{ h}$ , arginine dihydrolase  $37,0^{\circ}\text{C} \pm 1,0^{\circ}\text{C} / 24 \pm 3 \text{ h}$ , mannitol, arabinose, raffinose, sorbitol and ribose  $37,0^{\circ}\text{C} \pm 1,0^{\circ}\text{C} / 24 \pm 3 \text{ h}$  and 48 h.

##### **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; *Enterococcus faecalis* ATCC 29212 was used as a quality control strain.

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

The antimicrobials included are listed in the tables.

###### **Breakpoints used in testing**

Epidemiological cut-off values given by the EUCAST were used, if available.

**Preventive measures in place**

No preventive measures are in place regarding indicator bacteria from healthy animals.

**Measures in case of the positive findings or single cases**

No measures are taken in case of antimicrobial resistance in indicator bacteria.

**Results of the investigation**

Resistance percentages were low for most antimicrobials tested. Tetracycline resistance was most prevalent (82%).

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

In an international perspective, resistance was rare for most antimicrobials.

**Table Antimicrobial susceptibility testing in *E. faecalis***

n = Number of resistant isolates		
<i>E. faecalis</i>		
<b>Pigs - at slaughterhouse - animal sample - Monitoring</b>		
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		38
<b>Antimicrobials:</b>		
	<b>N</b>	<b>n</b>
<b>Aminoglycosides</b>		
Gentamicin	38	1
<b>Amphenicols</b>		
Chloramphenicol	38	0
Fully sensitive	38	7
<b>Glycopeptides (Cyclic peptides, Polypeptides)</b>		
Vancomycin	38	0
<b>Macrolides</b>		
Erythromycin	38	9
<b>Penicillins</b>		
Ampicillin	38	0
Resistant to 1 antimicrobial	38	22
Resistant to 2 antimicrobials	38	8
Resistant to 3 antimicrobials	38	1
<b>Tetracyclines</b>		
Tetracyclin	38	31





## Table Breakpoints for antibiotic resistance of *Enterococcus*, non-pathogenic in Animals

**Test Method Used**

Broth dilution

**Standards used for testing**

NCCLS

Enterococcus, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content microg	Breakpoint Zone diameter (mm)		
		Susceptible ≤	Intermediate	Resistant >	lowest	highest		Susceptible ≥	Intermediate	Resistant ≤
<b>Tetracyclines</b>	EUCAST	2		2	0.5	64				
<b>Amphenicols</b>										
Chloramphenicol	EUCAST	32		32	0.5	64				
<b>Aminoglycosides</b>										
Gentamicin	EUCAST	32		32	2	256				
<b>Macrolides</b>										
Erythromycin	EUCAST	4		4	0.5	64				
<b>Glycopeptides (Cyclic peptides, Polypeptides)</b>										
Vancomycin	EUCAST	4		4	1	128				
<b>Penicillins</b>										
Ampicillin		4		4	0.25	32				

## Table Breakpoints for antibiotic resistance of *Enterococcus*, non-pathogenic in Food

Test Method Used \_\_\_\_\_

Standards used for testing \_\_\_\_\_

Enterococcus, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content microg	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest		Susceptible >=	Intermediate	Resistant <=
<b>Tetracyclines</b>										
<b>Amphenicols</b>										
Chloramphenicol										
<b>Aminoglycosides</b>										
Gentamicin										
<b>Macrolides</b>										
Erythromycin										
<b>Glycopeptides (Cyclic peptides, Polypeptides)</b>										
Vancomycin										
<b>Penicillins</b>										
Ampicillin										

## Table Breakpoints for antibiotic resistance of *Enterococcus*, non-pathogenic in Feedingstuff

Test Method Used \_\_\_\_\_

Standards used for testing \_\_\_\_\_

Enterococcus, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content microg	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest		Susceptible >=	Intermediate	Resistant <=
<b>Tetracyclines</b>										
<b>Amphenicols</b>										
Chloramphenicol										
<b>Aminoglycosides</b>										
Gentamicin										
<b>Macrolides</b>										
Erythromycin										
<b>Glycopeptides (Cyclic peptides, Polypeptides)</b>										
Vancomycin										
<b>Penicillins</b>										
Ampicillin										

### **3.2. ESCHERICHIA COLI, NON-PATHOGENIC**

#### **3.2.1. General evaluation of the national situation**

##### **A. Escherichia coli general evaluation**

###### **History of the disease and/ or infection in the country**

Monitoring of antimicrobial resistance in indicator Escherichia coli from cattle, pigs and broilers is a part of the FINRES-Vet programme. One animal species per year is included in the programme.

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

According to the results of the FINRES-Vet programme prevalence of antimicrobial resistance in indicator E. coli from pigs has been low or moderate. The resistance figures can be explained by current or previous use of the respective antimicrobials in the antimicrobial treatment of pigs.

### **3.2.2. Antimicrobial resistance in Escherichia coli, non-pathogenic isolates**

#### **A. Antimicrobial resistance of E.coli in animal - Pigs - at slaughter - monitoring programme**

##### **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 2007, E. coli isolates from healthy pigs were included.

###### **Type of specimen taken**

Porcine faeces.

###### **Methods of sampling (description of sampling techniques)**

The samples were collected from seven slaughterhouses, which accounted for 97% of the total slaughter volume of pigs in Finland. The number of randomly taken samples was proportioned to the annual number of slaughtered animals. One sample per herd was included.

###### **Procedures for the selection of isolates for antimicrobial testing**

If obtained, 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, 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, of the suspension was spread on Selective E. coli/ Coliform Chromogenic medium (Oxoid, Basingstoke, UK) and incubated overnight at 37±1°C. Purple colonies were selected for susceptibility tests.

##### **Laboratory used for detection for resistance**

###### **Antimicrobials included in monitoring**

VetMIC broth microdilution method (NVI, Sweden); testing performed according to CLSI Document M31-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 Unit is accredited according to standard SFS-EN ISO/ IEC 17025 to perform the antimicrobial susceptibility testing. The department participates regularly in proficiency tests. The antimicrobials included are listed in the tables.

###### **Breakpoints used in testing**

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

### **Preventive measures in place**

No preventive measures are in place regarding indicator bacteria from healthy animals.

### **Measures in case of the positive findings or single cases**

No measures are taken in case of antimicrobial resistance in indicator bacteria.

### **Results of the investigation**

Resistance was between 10 and 20% for the following antimicrobials: streptomycin, sulfamethoxazole, tetracycline and trimethoprim. For ampicillin, resistance was detected in 7% of the isolates. For the other antimicrobials included, no resistance or resistance in <1% of the isolates was detected.

### **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 Pigs - at slaughterhouse - animal sample - faeces - faeces - Monitoring - quantitative data [Dilution method]**

E. coli		Pigs - at slaughterhouse - animal sample - faeces - Monitoring																						
Isolates out of a monitoring programme	yes																							
Number of isolates available in the laboratory	135																							
Antimicrobials:	Break point	N	n	Number of resistant isolates (n) and number of isolates with the concentration (u/ml) or zone (mm) of inhibition equal to																				
				<=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	
<b>Aminoglycosides</b>																								
Gentamicin	2	135	0					24	91	20													0.5	64
Streptomycin	16	135	20						1	34	76	4	4	5	4	6	1						2	256
<b>Amphenicols</b>																								
Chloramphenicol	16	135	1							5	86	42	1										1	128
<b>Cephalosporins</b>																								
Cefotaxim	0.25	135	0	90	37	8																	0.06	2
<b>Fluoroquinolones</b>																								
Ciprofloxacin	0.06	135	1	84	50	1																	0.008	1
<b>Penicillins</b>																								
Ampicillin	8	135	10					2	25	65	26	7											0.25	32
<b>Quinolones</b>																								
Nalidixic acid	16	135	1						2	58	68	5	1	1									1	128
<b>Sulfonamides</b>																								
Sulfonamide	256	135	16									119											16	2048
<b>Tetracyclines</b>																								
Tetracyclin	8	135	24						31	73	5	2		1	10	13							0.5	64
Trimethoprim	2	135	16				28	56	34	1	1			15									0.25	32

**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				135				
<b>Antimicrobials:</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>	<b>N</b>	<b>n</b>
<b>Aminoglycosides</b>								
Gentamicin			135	0				
Streptomycin			135	20				
<b>Amphenicols</b>								
Chloramphenicol			135	1				
<b>Cephalosporins</b>								
Cefotaxim			135	0				
<b>Fluoroquinolones</b>								
Ciprofloxacin			135	1				
Fully sensitive			135	96				
<b>Penicillins</b>								
Ampicillin			135	10				
<b>Quinolones</b>								
Nalidixic acid			135	1				
Resistant to 1 antimicrobial			135	18				
Resistant to 2 antimicrobials			135	4				
Resistant to 3 antimicrobials			135	7				
Resistant to 4 antimicrobials			135	8				
Resistant to >4 antimicrobials			135	2				
<b>Sulfonamides</b>								
Sulfonamide			135	16				
<b>Tetracyclines</b>								
Tetracyclin			135	24				
Trimethoprim			135	16				



## Table Breakpoints used for antimicrobial susceptibility testing in Animals

### Test Method Used

Broth dilution

### Standards used for testing

NCCLS

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

## Table Breakpoints used for antimicrobial susceptibility testing in Food

Test Method Used \_\_\_\_\_

Standards used for testing \_\_\_\_\_

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

## Table Breakpoints used for antimicrobial susceptibility testing in Feedingstuff

Test Method Used \_\_\_\_\_

Standards used for testing \_\_\_\_\_

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content microg	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest		Susceptible >=	Intermediate	Resistant <=
<b>Amphenicols</b>										
Chloramphenicol										
Florfenicol										
<b>Tetracyclines</b>										
Tetracyclin										
<b>Fluoroquinolones</b>										
Ciprofloxacin										
Enrofloxacin										
<b>Quinolones</b>										
Nalidixic acid										
<b>Trimethoprim</b>										
<b>Sulfonamides</b>										
Sulfonamide										
<b>Aminoglycosides</b>										
Streptomycin										
Gentamicin										
Neomycin										
Kanamycin										
<b>Trimethoprim + sulfonamides</b>										
<b>Cephalosporins</b>										
Cefotaxim										
3rd generation cephalosporins										
<b>Penicillins</b>										
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, epidemiological 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 2007, the municipal food control authorities notified 32 food poisoning outbreaks, of which 29 were associated with food and three with drinking water. The number of outbreaks decreased 30 % compared to the previous year. The food poisoning notification and reporting system was revised in Finland in 1997. In 1997, twice the number of outbreaks was reported, and in 1998 three times the number, compared to previous years throughout the 1990s. The number of reported outbreaks in 1997 and 1998 was 68 and 95, respectively. This has improved food poisoning reporting, which has in effect caused an increase in the number of outbreaks



recorded. However, when the criteria for classification have been developed based on the strength of the evidence the number of the recorded outbreaks has constantly decreased beginning from 1999. In 2003 the number of outbreaks was 33, being almost 60% less than in 1998. In 2004 the number of outbreaks slightly increased first time in five years and the number still continued to increase in 2005. Since 2006 the number of outbreaks has decreased 42% being the same as year 2003. Most of the reported outbreaks are food-borne (91 % in 2007). 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. In 2007 one of the largest waterborne outbreaks in Finland a total of 8000 infected persons was reported. Previous large outbreaks due to contaminated drinking water has been reported in 1989, 1998 and 2000 a total of 5350, 6809 and 6445 ill persons, respectively.

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

During the last ten years the most common reported causative agent was Norovirus. Before 1994 it was not commonly implicated as a food-borne disease agent in reports. However, improved analytical capacity to detect viruses has resulted Norovirus being among the most commonly reported agent in both food and waterborne outbreaks. In investigations vehicles have been imported frozen raspberries, oysters, mussels, cold served salads and drinking water. In 2007 Norovirus caused only 5 (17 %) food-borne outbreaks, which is the lowest number of Norovirus outbreaks since 1994. The most common vehicle (80%) reported was food contaminated by infected food handler at restaurant or catering. A total of six salmonella outbreaks were notified in 2007. The vehicles of these outbreaks were fresh produce (50%) and food contaminated by infected person (50%). In two outbreaks the origin of the vegetables remained unknown and in one outbreak the contaminated alfalfa seeds were intra community trade. Two foodborne outbreaks caused by *Campylobacter jejuni* from lettuce and use of 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 2007 these comprised five foodborne outbreaks from seafood; one outbreak from oysters and four histamine outbreaks from tuna. Traditional causes of food poisoning (*Clostridium perfringens* and *Staphylococcus aureus*) caused three outbreaks (10%). Meat and meat products were the only vehicles in these outbreaks.

In almost 30% of the foodborne outbreaks the causative agent and the vehicle remained unknown in 2007. 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 17 (58 %) outbreaks. In 2007 vegetables and vegetables products was the most common vehicle (14%) in foodborne outbreaks, whereas the second most common vehicle was meat and meat products (10 %).

A total of three outbreaks spread by drinking water were reported in 2007. All of the waterborne outbreaks were caused through drinking water contaminated with leakage of sewage. In the largest outbreak *Campylobacter* spp., Norovirus, *Giardia* spp. and other pathogens was isolated in samples from water and humans.

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

Raw materials were responsible for major proportion (35%) of the food-borne outbreaks in 2007 including four of the histamine outbreaks from tuna, three salmonella outbreaks from fresh produce, and the two *Campylobacter* outbreaks. Substandard kitchen and poor hand hygiene in restaurants were suspected being the cause in eight (28 %) outbreaks. The most generally substantiated contributing factors in the handling of food were connected with temperature including inadequate cooling, inadequate heating or reheating and improper storage temperature of food at restaurants and catering service. In Norovirus and salmonella outbreaks the most common reason was an infected food handler, who transferred pathogens via contaminated hands to the served food. A wastewater contamination in water purification plant caused the largest waterborne outbreaks in 2007.

### **Descriptions of single outbreaks of special interest**

The largest waterborne outbreak reported in Finland

On November 28th 2007, treated waste water leaked into the clean water supply, caused an extensive water borne outbreak in the town of Nokia in western Finland. Water treatment plant employee had accidentally opened the wrong valve on during maintenance work. The mistake went undetected for two days and estimated 450 000 litres of filtered sewage effluent entered the drinking water system. In the outbreak a total of 8000 cases of gastroenteritis were estimated to have been caused by the contamination making it the largest waterborne outbreak ever recorded in Finland. Almost 200 persons sought medical care with diagnosed *Campylobacter*, Norovirus, *Giardia* and *Salmonella* infections. The same pathogens were also isolated in water samples after the contamination. A boil water alert was issued on 2 December, and the water company begun a program of hyperchlorination (10 mg/ L) and flushing to clear the contamination from the distribution system. Schools were closed for a week. In an effort to limit secondary transmission of infections, health authorities advised ill people not to return to work or school for at least two days after symptoms have resolved. The persistence of Norovirus in some areas of the city required an extension of decontamination treatment. The boil water order was officially lifted on 19 February, more than 10 weeks after it was implemented. A questionnaire concerning the amount of the secondary infections, sequelas, costs of the outbreak and mental impact in the population is in progress in the spring 2008.

*Salmonella* Weltevreden outbreak in Norway, Finland and Denmark

The National reference laboratory at the Norwegian Institute of Public Health verified *Salmonella* Weltevreden from 4 patients with no history of foreign travel prior to onset of illness in 10.-15.10.2007. In response to the enquiry, Finland and Denmark reported a cluster of cases of *S. Weltevreden*. The next day salmonella isolate obtained from a major Danish alfalfa sprouts producer was serotyped as Weltevreden. The batch of seeds originated from a third EU country, probably from Italy. The Danish producer had exported part of the batch of seeds to a Norwegian alfalfa sprouts producer. The seeds imported to Finland were also from the same company, but not from the same batch. Subsequently it was found that the isolate from the sprouts had the same MLVA and PFGE profile as the cases from Denmark, Norway and Finland. A total of 45 people get ill in the outbreak; 20 in Norway, 8 in Finland and 19 in Denmark. Based on the available information it was concluded that alfalfa sprouts grown from contaminated seeds was the source of the outbreak in all three countries.

The outbreak report can be found in the Eurosurveillance Weekly:

<http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3321>

### **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 zoonoses. 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.

Finland 2007 Report on trends and sources of zoonoses

**Foodborne Outbreaks: summarized data**

	Total number of outbreaks	Number of possible outbreaks	Number of verified outbreaks
Bacillus	0	0	0
Campylobacter	3	0	3
Clostridium	2	0	2
Escherichia coli, pathogenic	0	0	0
Foodborne viruses	6	0	6
Listeria	0	0	0
Other agents	5	0	5
Parasites	0	0	0
Salmonella	6	0	6
Staphylococcus	1	0	1
Unknown	9	0	9
Yersinia	0	0	0

**Verified Foodborne Outbreaks: detailed data**

**C. jejuni**

Value

Code	fi_22
Subagent Choice	Campylobacter; C. jejuni
Outbreak type	General
Human cases	7
Hospitalized	0
Deaths	0
Foodstuff implicated	Unknown
More Foodstuff	lettuce, vegetables is missing on the pick list
Type of evidence	Laboratory detection in human cases
Setting	Household
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	

**C. jejuni**

Value

Code	fi_32
Subagent Choice	
Outbreak type	General
Human cases	4
Hospitalized	0
Deaths	0
Foodstuff implicated	Milk
More Foodstuff	unpasteurised
Type of evidence	Laboratory detection in human cases
Setting	Household
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	

**C. jejuni**

Value

Code	fi_47
Subagent Choice	
Outbreak type	General
Human cases	8000
Hospitalized	187
Deaths	unknown
Foodstuff implicated	Tap water, including well water
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Laboratory characterization of isolates, Laboratory detection in implicated food, Analytical epidemiological evidence
Setting	Household
Place of origin of problem	Water distribution system
Origin of foodstuff	Domestic
Contributory factors	Water treatment failure
Outbreaks	1
Comment	Leakage of effluent: norovirus, rotavirus, giardia, E. coli and S. enteritidis was also isolated from patients and drinking water.

**C. perfringens**

Value

Code	fi_A
Subagent Choice	Clostridium; C. perfringens
Outbreak type	General
Human cases	10
Hospitalized	0
Deaths	0
Foodstuff implicated	Bovine meat and products thereof
More Foodstuff	beef casserole
Type of evidence	Laboratory detection in implicated food, Laboratory characterization of isolates
Setting	Take-away or fast-food outlet
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Storage time/temperature abuse, Inadequate chilling
Outbreaks	1
Comment	



**C. perfringens**

Value

Code	fi_D
Subagent Choice	
Outbreak type	General
Human cases	6
Hospitalized	0
Deaths	0
Foodstuff implicated	Pig meat and products thereof
More Foodstuff	
Type of evidence	
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Inadequate chilling
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses  
**norovirus (Norwalk-like virus)**

Value

Code	fi_1
Subagent Choice	
Outbreak type	General
Human cases	24
Hospitalized	1
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory characterization of isolates
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Not relevant
Contributory factors	Infected food handler
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses  
**norovirus (Norwalk-like virus)**

Value

Code	fi_4
Subagent Choice	
Outbreak type	General
Human cases	50
Hospitalized	unknown
Deaths	0
Foodstuff implicated	Bakery products
More Foodstuff	fine bakery product containing pasteurised dairy product (cream)
Type of evidence	Laboratory detection in human cases
Setting	Other setting
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Not relevant
Contributory factors	Infected food handler
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses  
**norovirus (Norwalk-like virus)**

Value

Code	fi_13
Subagent Choice	
Outbreak type	General
Human cases	63
Hospitalized	1
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Laboratory characterization of isolates, Analytical epidemiological evidence
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Not relevant
Contributory factors	Infected food handler
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses  
**norovirus (Norwalk-like virus)**

Value

Code	fi_7
Subagent Choice	
Outbreak type	General
Human cases	17
Hospitalized	0
Deaths	0
Foodstuff implicated	Bakery products
More Foodstuff	fine bakery product containing pasteurised dairy product (cream) and raspberries
Type of evidence	Laboratory characterization of isolates
Setting	Residential institution (nursing home, prison, boarding school)
Place of origin of problem	Processing plant
Origin of foodstuff	Not relevant
Contributory factors	Infected food handler
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses  
**norovirus (Norwalk-like virus)**

Value

Code	fi_J
Subagent Choice	
Outbreak type	General
Human cases	16
Hospitalized	0
Deaths	0
Foodstuff implicated	Tap water, including well water
More Foodstuff	drilled well
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Water source
Origin of foodstuff	Not relevant
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses  
**norovirus (Norwalk-like virus)**

Value

Code	fi_C
Subagent Choice	
Outbreak type	General
Human cases	45
Hospitalized	0
Deaths	0
Foodstuff implicated	Unknown
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	School, kindergarten
Place of origin of problem	Unknown
Origin of foodstuff	Domestic
Contributory factors	Unknown
Outbreaks	1
Comment	

**Histamine**

Value

Code	fi_21
Subagent Choice	
Outbreak type	Household
Human cases	5
Hospitalized	0
Deaths	0
Foodstuff implicated	Fish and fish products
More Foodstuff	fresh tuna
Type of evidence	Laboratory detection in implicated food
Setting	Household
Place of origin of problem	Unknown
Origin of foodstuff	Imported from outside EU
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	country of origin Indonesia



**Histamine**

Value

Code	fi_28
Subagent Choice	
Outbreak type	General
Human cases	4
Hospitalized	0
Deaths	0
Foodstuff implicated	Canned food products
More Foodstuff	tuna
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Imported from outside EU
Contributory factors	Unknown
Outbreaks	1
Comment	

**Histamine**

Value

Code	fi_40
Subagent Choice	
Outbreak type	General
Human cases	2
Hospitalized	0
Deaths	0
Foodstuff implicated	Canned food products
More Foodstuff	tuna
Type of evidence	Laboratory detection in implicated food
Setting	Canteen or workplace catering
Place of origin of problem	Unknown
Origin of foodstuff	Imported from outside EU
Contributory factors	Unknown
Outbreaks	1
Comment	

**Histamine**

Value

Code	fi_B
Subagent Choice	
Outbreak type	General
Human cases	5
Hospitalized	0
Deaths	0
Foodstuff implicated	Fish and fish products
More Foodstuff	fried, frozen tuna
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Imported from outside EU
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	country of origin Indonesia

**S. boydii**

Value

Code	fi_46
Subagent Choice	
Outbreak type	General
Human cases	90
Hospitalized	unknown
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Domestic
Contributory factors	Unknown
Outbreaks	1
Comment	

**S. Agona**

Value

Code	fi_25
Subagent Choice	
Outbreak type	General
Human cases	27
Hospitalized	1
Deaths	0
Foodstuff implicated	Bakery products
More Foodstuff	fish sandwichcake
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases, Laboratory characterization of isolates, Analytical epidemiological evidence
Setting	Household
Place of origin of problem	Unknown
Origin of foodstuff	Domestic
Contributory factors	Infected food handler
Outbreaks	1
Comment	

**S. Agona**

Value

Code	fi_18
Subagent Choice	
Outbreak type	General
Human cases	13
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in human cases
Setting	Household
Place of origin of problem	Unknown
Origin of foodstuff	Domestic
Contributory factors	Unknown
Outbreaks	1
Comment	

**S. Newport**

Value

Code	fi_48
Subagent Choice	
Outbreak type	General
Human cases	4
Hospitalized	4
Deaths	0
Foodstuff implicated	Unknown
More Foodstuff	
Type of evidence	Laboratory detection in implicated food, Analytical epidemiological evidence, Laboratory detection in human cases
Setting	Residential institution (nursing home, prison, boarding school)
Place of origin of problem	Unknown
Origin of foodstuff	Intra community trade
Contributory factors	Unknown
Outbreaks	1
Comment	Common vehicle (vegetables) was suspected as a source of both S. Newport outbreaks

**S. Newport**

Value

Code	fi_44
Subagent Choice	
Outbreak type	General
Human cases	5
Hospitalized	2
Deaths	0
Foodstuff implicated	Unknown
More Foodstuff	
Type of evidence	Analytical epidemiological evidence, Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Intra community trade
Contributory factors	Unknown
Outbreaks	1
Comment	Common vehicle (vegetables) was suspected as a source of both S. Newport outbreaks



**S. Typhimurium**

Value

Code	fi_38
Subagent Choice	
Outbreak type	General
Human cases	18
Hospitalized	3
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Other setting
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Unknown
Outbreaks	1
Comment	

**S. Weltevreden**

Value

Code	fi_K
Subagent Choice	
Outbreak type	General
Human cases	8
Hospitalized	unknown
Deaths	0
Foodstuff implicated	Other foods
More Foodstuff	alfalfa sprouts from Italy (seeds)
Type of evidence	Laboratory characterization of isolates, Laboratory detection in implicated food, Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Household
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Intra community trade
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	

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**S. aureus**

Value

Code	fi_G
Subagent Choice	Staphylococcus; Staphylococcus spp., unspecified
Outbreak type	General
Human cases	13
Hospitalized	1
Deaths	0
Foodstuff implicated	Pig meat and products thereof
More Foodstuff	smoked ham
Type of evidence	Laboratory detection in implicated food
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Inadequate chilling
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses

**Unknown**

Value

Code	fi_14
Subagent Choice	
Outbreak type	General
Human cases	12
Hospitalized	0
Deaths	0
Foodstuff implicated	Bovine meat and products thereof
More Foodstuff	beef casserole
Type of evidence	Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Storage time/temperature abuse, Inadequate chilling
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses

**Unknown**

Value

Code	fi_17
Subagent Choice	
Outbreak type	General
Human cases	7
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Laboratory detection in implicated food
Setting	School, kindergarten
Place of origin of problem	Unknown
Origin of foodstuff	Not relevant
Contributory factors	Unknown
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses

**Unknown**

Value

Code	fi_27
Subagent Choice	
Outbreak type	General
Human cases	16
Hospitalized	0
Deaths	0
Foodstuff implicated	Other foods
More Foodstuff	marinated zucchini
Type of evidence	Analytical epidemiological evidence
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Domestic
Contributory factors	Unknown
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses

**Unknown**

Value

Code	fi_36
Subagent Choice	
Outbreak type	General
Human cases	118
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Analytical epidemiological evidence, Laboratory detection in human cases
Setting	Hospital or medical care facility
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Inadequate chilling
Outbreaks	1
Comment	

Finland 2007 Report on trends and sources of zoonoses

**Unknown**

Value

Code	fi_49
Subagent Choice	
Outbreak type	General
Human cases	11
Hospitalized	0
Deaths	0
Foodstuff implicated	Crustaceans, shellfish, molluscs and products thereof
More Foodstuff	oysters imported from France, Netherlands and Sweden
Type of evidence	Laboratory detection in implicated food, Laboratory characterization of isolates
Setting	Other setting
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Intra community trade
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	



**Unknown**

Value

Code	fi_30
Subagent Choice	
Outbreak type	General
Human cases	11
Hospitalized	1
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Analytical epidemiological evidence, Laboratory detection in human cases, Laboratory detection in implicated food
Setting	Household
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Unknown
Outbreaks	1
Comment	

**Unknown**

Value

Code	fi_H
Subagent Choice	
Outbreak type	General
Human cases	2000
Hospitalized	0
Deaths	0
Foodstuff implicated	Tap water, including well water
More Foodstuff	
Type of evidence	Analytical epidemiological evidence, Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Other setting
Place of origin of problem	Water distribution system
Origin of foodstuff	Not relevant
Contributory factors	Water treatment failure
Outbreaks	1
Comment	

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**Unknown**

Value

Code	fi_52
Subagent Choice	
Outbreak type	General
Human cases	9
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Analytical epidemiological evidence, Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Unknown
Outbreaks	1
Comment	

**Unknown**

Value

Code	fi_51
Subagent Choice	
Outbreak type	General
Human cases	3
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	soup
Type of evidence	Analytical epidemiological evidence, Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Inadequate chilling
Outbreaks	1
Comment	