ZOONOSES MONITORING

ESTONIA

The Report referred to in Article 5 of Directive 92/117/EEC

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

including information on foodborne outbreaks and antimicrobial resistance in zoonotic agents

IN 2004

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Estonia**

Reporting Year: **2004**

Institutions and laboratories involved in monitoring:

Laboratory name	Description	Contribution
Veterinary and Food Board (VFB)	A governmental agency carrying out its tasks under the government of Ministry of Agriculture, functions as a supervising body which executes supervision over fulfilment of the requirements stipulated by the legislation that governs veterinary, food safety, market regulation, animal welfare and farm animal breeding.	Responsible for the coordination of zoonoses monitoring and surveillance and reporting of trends and sources to the European Comission. Responsible for the composing of zoonoses monitoring programmes at farm and processing level.
Veterinary and Food Laboratory (VFL)	As a governmental institution the first priority of the VFL is to carry out the statutory testing under various farm animal disease surveillance and food safety control programmes, also laboratory testing of imported and exported animals and relevant goods.VFL has in its structure 4 laboratories, which all are accredited according to ISO 17025	Food samples and samples from animals are analysed in Veterinary and Food Laboratory.

Health Protection Inspectorate (HPI)	The Health Protection Inspectorate is a governmental institution under subordination of the Ministry if Social Affairs. The inspectorate represents the Repoublic when performing its duties and is financed from the state budget. The area of activity of the Inspectorate includes state supervision over the safety of foodstuffs transferred to the final consumer and their handling on retail and catering establishments; epidemiological surveillance; the prevention and control of communicable diseases; registration of communicable and parasitic diseases, investigation of the circumstances of infection transmission; supervision over the organisation of immunization of population and monitoring of immunisation	Responsible for the official food surveillance (incl. sampling) at retail level and for the control and prevention of communicable diseases in humans
Health Protection Inspectorate (HPI) laboratories	The HPI has 5 laboratories authorised to perform analysis with regard to official food control. HPI laboratories are accredited in the field of microbiological emamination of food and environmental samples and clinical materials. All HPI laboratories involved in official food control are governmental institutions and are accredited according to ISO 17025	Food samples and clinical (human) samples are analysed in HPI laboratories.

PREFACE

This report is submitted to the European Commission in accordance with Article 5 of Council Directive 92/117/EEC[1]. The information has also been forwarded to the European Food Safety Authority (EFSA).

The report contains information on trends and sources of zoonoses and zoonotic agents in Estonia during the year 2004. The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given.

The information given covers both zoonoses that are important for the public health in the whole European Community as well as zoonoses, which are relevant on the basis of the national epidemiological situation.

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

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

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

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[1] Council Directive 92/117/ECC of 17 December 1992 concerning measures for protection against specified zoonoses and specified zoonotic agents in animals and products of animal origin in order to prevent outbreaks of foodborne infections and intoxications, OJ L 62, 15.3.1993, p. 38

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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:

Estonian Veterinary and Food Board and Estonian Agricultural Register and Information Board.

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

All the figures provided are from December 31, 2004.

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

The number of susceptible population has been quite stable recently.

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

The highest cattle population density is in the middle-part of Estonia (Järva county) and the biggest pig farm is situated in the Viljandi county. The highest poultry flocks density is in the northern part of Estonia (Harjumaa county).

Table 14.1 Susceptible animal populations: number of herds and holdings rearing animals

* Only if different than current reporting year

Animal species	Category of animals	Number of herds or flocks	Year*	Number of holdings	Year*
Cattle (bovine animals)	dairy cows and heifers			1873	
	mixed herds			7509	
	in total (1)	9382		9382	
Gallus gallus	breeding animals for meat production line - in total (2)	22		8	
	parent birds for meat production line (3)	18		8	
	broilers (4)	42		24	
	laying hens (5)	19		19	
	in total (6)	101		59	
Goats	in total			237	
Pigs	in total			374	
Sheep	mixed herds (7)			1564	
	in total			1564	

(1): In the one holding there is usually one herd.
(2): one company has 8 buildings for parent stock and 4 buildings for rearing stock. In 2004 12 flocks have been slaughtered and 10 new flocks formed.
(3): parent stock is kept in 8 holdings of one company. In 2004 12 flocks have been slaughtered and 6 new flocks have been formed.
(4): 10 flocks with day-old chicks;
14 rearing flocks;
18 productive period flocks
(5): over 350 birds in the flock
(6): 18 parent flocks, 22 breeding and 14 rearing flocks.
8 holdings for parent stock, 8 holdings for breeding stocks and 4 holdings for rearing stocks.
(7): most sheep herds are mixed herds in Estonia

Table 14.2 Susceptible animal populations: number of animals

* Only if different than current reporting year

Animal species	Category of animals	Livestock numbers (live animals)	Year*	Number of slaughtered animals	Year*
Cattle (bovine animals)	in total	253149		66486	
Gallus gallus	broilers			9223864	
	laying hens			560851	
	in total	2197359		9784715	
Goats	in total	1616		11	
Pigs	in total	369192		444084	
Sheep	in total	39192		3647	
Solipeds	horses - in total	4155		4	

2. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

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

2.1. SALMONELLOSIS

2.1.1. General evaluation of the national situation

A. General evaluation

History of the disease and/or infection in the country

Surveillance of salmonellosis in human population is undertaken by the Health Protection Inspectorate.
Data show that human salmonellosis is the second most frequently reported disease in Estonia. Moreover, the majority of cases have acquired the infection in Estonia. Thus, salmonellosis is an important zoonotic disease in Estonia.

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

Surveillance of salmonella in feed, animals and food has been carried out in Estonia for many years. In addition to the surveillance systems, monitoring programmes are conducted and they provide additional epidemiological information. The State Programme on Monitorning and Surveillance of Animal Infectious Diseases take place. In 2002 the Estonian Salmonella Monitoring Programme for Food of Animal Origin has been started.
Investigations carried out in live animals show that 1,2 % of cattle, 1,1 % of pigs and 0,1 % of pultry were positive for Salmonella in 2004. The prevalent isolates were S.Dublin and S.group C in cattle, S.Stanleyville in pigs and S.enteritidis in poultry (Gallus gallus). No turkey, geese and duck flocks are present in Estonia.
The official surveillance programme documents no presence of Salmonella in feed materials and feedingstuffs examined in Estonia. Samples tested in 2004 were negative.
Food of animal origin is controlled according to the Estonian Salmonella Monitoring Programme for Food of Animal Origin (SMPF). At the same time, food samples are taken in the frames of official surveillance programmes of Veterinary and Food Board and Health Protection Inspectorate and according to Commission Recommendation of 19 December 2003 concerning coordinated programme for the official control of foodstuffs for 2004 (2004/24/EC).
4584 samples of meat and meat products were tested in 2004, 36 (0,8 %) were positive. 38,8 % of all positive samples compose fresh bovine meat. The predominant isolates were S.enteritidis and S.6,7:z10:-. 0,1 % of tested samples of other food products were posistive for Salmonella in 2004.
The overall prevalence of Salmonella in foodstuffs is about 0,5 %.
Salmonella isolates from foodstuffs tested for antibiotic resistance are collected in the frames of monitoring or surveillance programmes.
In the year 2001 - 852 tests for all pathogenic isolates (most of them were mastitis pathogens) wre performed.
In 2002 - 1095 tests (896 (81%) were mastitis pathogens, 123 (11,2%) - Salmonella from foodstuff, 29 (2,7%) - Salmonella from animals, 46 (4,2%) - Escherichia coli.
In 2003 - 335 tests were performed: 187 of Staphylococcus spp. isolated from mastitis samples and dog skin samples, 68 of Salmonella spp. isolates, 80 of indicator bacteria (E.coli/E.faecalis/E.faecium) isolated from faecal samples.
In 2004 - 229 tests for mastitis pathogens, 72 for Salmonella spp.
Investigations were performed by the VFL and project leaders were from Estonian Agricultural

University. The studies were funded by the Ministry of Agriculture.
Number of human cases of salmonellosis are decreasing since the year 2000. The predominant causative agent of salmonellosis in humans is S.Enteritidis. Young people and are more exposed to the illness in Estonia, especially children from 1 to 4 years old.
One outbreak of Salmonellosis was registered in 2004.

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

Salmonella infection in humans is mostly foodborne. In most cases the relevance of human cases to foodstuffs is determined on the basis of epidemiological investigation. The examination is usually complicated due to small quantities of food batches, which are usually consumed before the examination starts.
Transmission from an infected person to person is possible.

2.1.2. Salmonellosis in humans

A. Salmonellosis in humans

Reporting system in place for the human cases

Salmonella is a zoonotic infection of statutory monitoring according to the Communicable Diseases Prevention and Control Act (2003) and Regulation 297/2003. It complies with the EU standards as laid down in the Commission Decisions 2119/98/EC, 2003/99/EC, 2002/253/EC and 2160/2003.
The surveillance system is based on a double system of obligatory reporting. Clinicians, mainly family physicians (GPs) and laboratories are diagnosing and reporting cases of salmonellosis (under the Communicable Diseases Prevention and Control Act and Ministerial Regulation nr 297/2003).
The notification system is paper-based (with standard forms) and reporting by phone is required for indicated suspicion and clusters with foodborne transmission.
Reports are prepared by GP/med. doctors and sent on standard individual form to the HPI local offices and then in aggregated form sent to the national level.
Finally, the data are aggregated centrally within the HPI database.

Case definition

Clinical description:
clinical picture compatible with salmonellosis, e.g. diarrhoea, abdominal pain, nausea and sometimes vomiting. The organism may cause extraintestinal infections.
Laboratory criteria for diagnosis:
-isolation of Salmonella (non-typhi, non-paratyphi) from a clinical specimen.
Case classification:
Possible: N.A.
Probable: a laboratory confirmed isolate without clinical information or,
a case with clinical symptoms that has an epidemiological link.
Confirmed: a clinically compatible case that is laboratory confirmed.

Diagnostic/analytical methods used

Salmonellas are investigated by bacteriological and serological methods according to Manual of Clinical Microbiology, vol. 2, 8th ed., editor in chief Patric R. Murray, ASM Press, Washington,D.C., 2003.

Notification system in place

Compulsory notification is in place since 1958. Under Estonian legislation (Regulation of Ministry of Social Affairs No 99, in force since 01.08.2003) cases of human salmonellosis should be reported to the local department of Veterinary and Food Board to identify the animal sources and transmission routes of zoonoses.

History of the disease and/or infection in the country

Since 1985 the peak of incidence (2515 cases) was detected in 1991 (incidence rate 160,6 per 100 000 population). Since 1992 up to present time there is a decline of number of cases per

year.

Year	No of cases	Inc. rate per 100 000 inh
1985	458	29,8
1986	196	12,6
1987	395	25,3
1988	573	36,4
1989	1343	85,1
1990	1718	108,6
1991	2515	160,6
1992	1262	82,7
1993	493	32,7
1994	591	39,4
1995	437	29,4
1996	648	44,3
1997	710	48,9
1998	437	30,0
1999	462	31,9
2000	556	40,5
2001	304	22,2
2002	337	24,6
2003	184	13,5
2004	135	10,0

There is noted that young people are more exposed to the illness.

Results of the investigation

In 2004 135 culture-confirmed cases of human Salmonellosis were reported. 131 of them were autochtone. In 4 cases (3%) persons had acquired their infection abroad. The predominant cause of the infection was S.enteritidis - in 91 cases (67,4%). S.Typhimurium was identified as the causal agent in 13% of the total number of human salmonellosis. All imported cases were caused by S.Enteritidis. Children at the age from 1 to 5 years are most frequently reported to be affected by Salmonella - 42 cases (31% of total number of cases). On the second position were adults at the age from 25 to 44 - 29 cases. The incidence ratio in adult population and children up to 14 years was 0,9 to 1.
In 2004 the incidence had dynamic with peaks in May - June and in August.

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

Health Protection Inspectorate is the member of Dedicated Surveillance Network for Enteritic Pathogens (ENTER-NET) since 2004.
Since 2004 there has been a European case definition for reporting of salmonellosis.
During the last five years the number of reported cases of human salmonellosis decreased. The number of cases decreased by 75,7% since the year 2000, when 556 cases were notified.
In 2004 S.Enteritidis was the most common registered causal agent. The decline (by 18,2%) in number of reported cases caused by S.Enteritidis was discovered from the year 2000 till 2004 (in 2000 - 85,6% and in 2004 - 67,4% of total cases). The number of reported cases caused by S.Typhimurium increased (in 2000 - 5,6% and in 2004 - 13,3% of total cases).

Relevance as zoonotic disease

Human zoonoses are of high public health importance. Salmonella infection in humans is mostly foodborne (zoonotic source is often not defined), but transmission from an infected person to person is possible. In most cases the supposed source of infection in humans is determined on the basis of epidemiological investigation, but not bacteriologically.

Table 3.4.1.A Salmonellosis in man - species/serotype distribution

	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc	unknown status
Salmonella	135	7	131	7	4	0	0
S. Agona	3	0,2	3	0,2	0	0	0
S. Brandenburg	1	0,07	1	0,07	0	0	0
S. Chester	1	0,07	1	0,07	0	0	0
S. Derby	1	0,07	1	0,07	0	0	0
S. Enteritidis	91	6,7	87	6,4	4	0,3	0
S. Manhattan	1	0,07	1	0,07	0	0	0
S. Montevideo	1	0,07	1	0,07	0	0	0
S. Saintpaul	2	0,1	2	0,1	0	0	0
S. Sandiego	1	0,07	1	0,07	0	0	0
S. Schwarzengrund	1	0,07	1	0,07	0	0	0
S. Typhimurium	18	1,3	18	1,3	0	0	0
S. Species	2	0,1	2	0,1	0	0	0
S. Paratyphi B var. Java	1	0,07	1	0,07	0	0	0
S. group B	5	0,4	5	0,4	0	0	0
S. group C	3	0,2	3	0,2	0	0	0
S. group D	3	0,2	3	0,2	0	0	0

Table 3.4.1.B Salmonellosis in man - age distribution (Part A)

Age Distribution	S. Agona			S. Brandenburg			S. Chester			S. Derby			S. Enteritidis			S. Manhattan		
	All	M	F	All	M	F	All	M	F	All	M	F	All	M	F	All	M	F
<1 year	0	0	0	0	0	0	0	0	0	0	0	0	5	4	1	0	0	0
1 to 4 years	2	0	2	0	0	0	0	0	0	0	0	0	27	10	17	0	0	0
5 to 14 years	0	0	0	0	0	0	0	0	0	0	0	0	15	8	7	0	0	0
15 to 24 years	0	0	0	0	0	0	0	0	0	1	1	0	9	3	6	0	0	0
25 to 44 years	1	1	0	0	0	0	0	0	0	0	0	0	19	8	11	0	0	0
45 to 64 years	0	0	0	1	1	0	0	0	0	0	0	0	9	4	5	1	0	1
65 years and older	0	0	0	0	0	0	1	0	1	0	0	0	7	3	4	0	0	0
Age unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total :	3	1	2	1	1	0	1	0	1	1	1	0	91	40	51	1	0	1

Table 3.4.1.B Salmonellosis in man - age distribution (Part B)

Age Distribution	S. Montevideo			S. Saintpaul			S. Sandiego			S. Schwarzengrund			S. Typhimurium			S. Paratyphi B var. Java		
	All	M	F	All	M	F	All	M	F	All	M	F	All	M	F	All	M	F
<1 year	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1 to 4 years	0	0	0	0	0	0	1	0	1	0	0	0	5	2	3	1	1	0
5 to 14 years	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0
15 to 24 years	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0
25 to 44 years	1	1	0	0	0	0	0	0	0	1	1	0	4	3	1	0	0	0
45 to 64 years	0	0	0	1	0	1	0	0	0	0	0	0	4	2	2	0	0	0
65 years and older	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Age unknown	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total :	1	1	0	2	0	2	1	0	1	1	1	0	18	8	10	1	1	0

Table 3.4.1.B Salmonellosis in man - age distribution (Part C)

Age Distribution	Salmonella spp.			S. group B			S. group C			S. group D		
	All	M	F	All	M	F	All	M	F	All	M	F
<1 year	1	0	1	0	0	0	0	0	0	0	0	0
1 to 4 years	0	0	0	3	2	1	2	1	1	1	1	0
5 to 14 years	1	0	1	1	1	0	0	0	0	1	0	1
15 to 24 years	0	0	0	0	0	0	0	0	0	0	0	0
25 to 44 years	0	0	0	1	0	1	1	0	1	0	0	0
45 to 64 years	0	0	0	0	0	0	0	0	0	1	1	0
65 years and older	0	0	0	0	0	0	0	0	0	0	0	0
Age unknown	0	0	0	0	0	0	0	0	0	0	0	0
Total :	2	0	2	5	3	2	3	1	2	3	2	1

Table 3.4.2 Salmonellosis in man - seasonal distribution (Part A)

Month	S. Agona	S. Brandenburg	S. Chester	S. Derby	S. Enteritidis	S. Manhattan	S. Montevideo	S. Saintpaul
	Cases	Cases	Cases	Cases	Cases	Cases	Cases	Cases
January	0	0	0	0	3	0	0	0
February	0	0	0	0	4	0	0	0
March	1	0	1	0	1	0	0	0
April	1	0	0	0	7	1	0	0
May	0	0	0	0	16	0	0	0
June	0	0	0	0	17	0	0	2
July	0	0	0	0	14	0	0	0
August	0	0	0	0	17	0	1	0
September	0	0	0	1	4	0	0	0
October	0	0	0	0	5	0	0	0
November	1	1	0	0	1	0	0	0
December	0	0	0	0	2	0	0	0
not known	0	0	0	0	0	0	0	0
Total :	3	1	1	1	91	1	1	2

Table 3.4.2 Salmonellosis in man - seasonal distribution (Part B)

Month	S. Sandiego	S. Schwarzengrund	S. Typhimurium	S. Paratyphi B var. Java	Salmonella spp.	S. group B	S. group C	S. group D
	Cases	Cases	Cases	Cases	Cases	Cases	Cases	Cases
January	0	0	3	0	0	0	0	0
February	0	0	1	0	0	1	0	0
March	0	0	0	0	0	0	0	0
April	0	0	1	0	0	0	1	0
May	0	0	1	0	1	2	1	0
June	1	0	0	0	0	0	0	0
July	0	0	0	0	0	0	0	0
August	0	1	1	1	0	0	0	3
September	0	0	5	0	0	0	1	0
October	0	0	0	0	0	1	0	0
November	0	0	2	0	0	1	0	0
December	0	0	4	0	1	0	0	0
not known	0	0	0	0	0	0	0	0
Total :	1	1	18	1	2	5	3	3

2.1.3. Salmonella in foodstuffs

A. Salmonella spp in eggs and egg products

Monitoring system

Sampling strategy

Eggs and egg products are sampled by Veterinary and Food Board officials according to the Salmonella Monitoring Programme for Food of Animal Origin (SMPF) and in the frames of official food surveillance sampling plans.
At retail sampling is performed in accordance with the Health Protection Inspectorate annual plan as a part of official food control.
Sampling in the frames of SPMF and official food control is performed randomly. Targeted sampling is preformed in cases of suspicion, consumer complains etc.
In addition to official monitoring and surveillance, every food business operator has the obligation to take samples in the frames of self control programmes.

Frequency of the sampling

Eggs at egg packing centres (foodstuff based approach)

Sampling distributed evenly throughout the year

Eggs at retail

Sampling distributed evenly throughout the year

Egg products (at production plant and at retail)

Sampling distributed evenly throughout the year

Type of specimen taken

Eggs at egg packing centres (foodstuff based approach)

Mixture of yolk and white

Eggs at retail

Egg yolk

Egg products (at production plant and at retail)

Other: egg products, environmental sample

Methods of sampling (description of sampling techniques)

Eggs at egg packing centres (foodstuff based approach)

Eggs are sampled randomly. Sample analysed - 25g of mixture of yolk and white. Samples are stored at +2+4C and analysed as soon as possible.
Swabs are used for environmental sampling.

Eggs at retail

Sample taken - 5 eggs, sample analysed - 25 g of egg yolk. Pooling of samples take place. Swabs are used in some cases. Samples are stored at +2+4C and analysed as soon as possible.

Egg products (at production plant and at retail)

Egg products are sampled randomly. Sample analysed - 25 g.

Definition of positive finding

Eggs at egg packing centres (foodstuff based approach)

A sample where Salmonella spp. has been isolated.

Eggs at retail

A sample where Salmonella spp. has been isolated.

Egg products (at production plant and at retail)

A sample where Salmonella spp. has been isolated.

Diagnostic/analytical methods used

Eggs at egg packing centres (foodstuff based approach)

Bacteriological method: ISO 6579:2002

Eggs at retail

Bacteriological method: ISO 6579:2002

Raw material for egg products (at production plant)

Bacteriological method: ISO 6579:2002

Egg products (at production plant and at retail)

Bacteriological method: ISO 6579:2002

Control program/mechanisms

The control program/strategies in place

Salmonella Monitoring Programme for Food of Animal Origin (SMPF) is established according to the Regulation of Minister of Agriculture no1 from 07.01.2002 "Regulation on prevention against salmonelloses of farm animals". SMPF started in 2002 and is approved annually by the Director General of Veterinary and Food Board.
At retail sampling is performed according to the Health Protection Inspectorate annual plan for official food control and annual sampling plan, which is approved by the HPI Director General.

Measures in case of the positive findings

When salmonella is detected in samples taken at packaging centres, contaminated eggs can be used for the production of pastorised products.
When salmonella is detected in food already on the market, contaminated food or raw material will be withdrawn from the market or handling.

Notification system in place

Salmonella detection in food is notifiable since 2000 according to the Infectious Animal Disease Control Act and the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".
Laboratories inspecting the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board of the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or of suspicion of the occurrence of such pathogens in raw material or products.
Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

In 2004 Salmonella was not detected in any of 193 analysed eggs taken from packing centres and of 45 eggs taken at retail. 66 egg products taken from egg product establishments were analysed with no positive findings.

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

The Estonian Salmonella Monitoring Programme for Food of Animal Origin 2002-2004 indicate that eggs in packaging centres have not ben contaminated with Salmonella. 3,9 % of egg products tested in the frames of monitoring programme were positive for Salmonella.
The surveillance data 2000-2003 indicate that the prevalence of salmonella in eggs and egg products is below 1 %.

Year	No of samples	No of positive samples	%
2000	712	1	0,1 %
2001	635	0	0
2002	138	1	0,7 %
2003	121	1	0,8 %

All eggs that have been considered to be positive for Salmonella had been taken at retail level.

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

In the year 2004 some cases of infection in human were epidemiologically linked to the consumption of eggs.

B. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

At slaughterhouses and cutting plants sampling is performed by Veterinary and Food Board officials according to the Salmonella Monitoring Programme for Food of Animal Origin (SMPF) and in the frames of official food surveillance sampling plans. Samples are taken also at border inspection posts in the frames of border veterinary checks. The samples are taken randomly, but in case of noncompliance, more stringent checks for consignements of same origin are carried out.
In the frames of official food surveillance at slaughterhouse meat, offal, carcase chilling water and environment are sampled randomly. Targeted sampling is preformed in cases of suspicion.
In addition to official monitoring and surveillance, every food business operator has the obligation to take samples in frame of self control programmes.

At meat processing plant

The sampling in frame of official food surveillance is performed randomly. Targeted sampling is performed in cases of suspicion, consumer complains etc.

At retail

Random sampling is performed in accordance with the Health Protection Inspectorate annual plan as a part of official food control. Targeted sampling is preformed in cases of suspicion, consumer complains and etc.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

At meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Other: neck skin, fresh meat, scrap cuttings

At meat processing plant

Other: meat preparations, minced meat, meat products

At retail

Other: fresh meat, ready-to-eat and not-ready-to-eat products, environmental

samples and etc.

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

Salmonella Monitoring Programme for Food of Animal Origin comprises analyses of randomly sampled meat or neck skin from carcases at slaughterhouse and meat or scrap cuttings from cutting plants. At slaughterhouses the sampling is performed once a week. Samples are taken immediately after veterinary inspection at the final stage of slaughter line before chilling of caracses. Neck skin pieces of 10 g are taken using sterile instruments. Samples from 10 carcases may be accumulated into one clean sample container, marked in the way that the flock of origin and sampling date can be identified and sent to the laboratory as soon as possible, storing temperature +2 +4 C.
The sampling at cutting plants is performed randomly and carried out weekly or twice annually depending on the production capacity.

At meat processing plant

According to official food surveillance sampling plans:
1) minced meat, meat preparations plants - raw material, if not originating from the slaughterhouse of the same establishment,is sampled (sample analysed 25 g); minced meat, meat preparations and meat preparations made of minced meat are sampled (1 sample consists of 5 subsamples, which are examined individually; minced meat sample size - 10 g each subsample; meat preparations sample size - 1 g each subsample)
2) meat products establishments
Meat products are sampled regularly. Sample analysed - 25 g.

At retail

Sample taken - 200 g, sample analysed - 25 g. Swabs are used in some cases. Number of sub-samples varies from 1-5. Pooling of samples take place. Samples are stored at +2+4C and analysed as soon as possible.

Definition of positive finding

At slaughterhouse and cutting plant

A sample where Salmonella spp. has been isolated.

At meat processing plant

A sample where Salmonella spp. has been isolated or if Salmonella is isolated in any of subsamples.

At retail

A sample where Salmonella spp. has been isolated.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

At meat processing plant

Bacteriological method: ISO 6579:2002

At retail

Bacteriological method: NMKL No 71:1999

Control program/mechanisms

The control program/strategies in place

Salmonella Monitoring Programme for Food of Animal Origin (SMPF) is established according to the Regulation of Minister of Agriculture no 1 from 07.01.2002 "Regulation on prevention against salmonelloses of farm animals". SMPF started in 2002 and is approved annually by the Director General of Veterinary and Food Board.
At retail sampling is performed according to the Health Protection Inspectorate annual sampling plan which is approved by the HPI Director General.

Measures in case of the positive findings or single cases

In case of positive findings in poultry meat in handling establishments, the extent of contamination and its sources should be investigated. Thorough cleaning and disinfection should be carried out. The supervisory official may require the improvement of the efectivness of cleaning procedures on the establishment.
Poultry meat is considered conditionally fit for human consumption and can be destined for manufacturing of heat treated meat products under the supervision of official veterinarian.
When salmonella is detected in food on the masket, the food business operator has the obligation to remove the production with positive Salmonella finding from the market or handling.

Notification system in place

Salmonella detection in food is notifiable since 2000 according to the Infectious Animal Disease Control Act and the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".
Laboratories inspecting the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board of the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or of suspicion of the occurrence of such pathogens in raw material or products.
Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

10 (3,2%) of 313 investigated samples of broiler meat and broiler meat products were positive

for salmonella in 2004. All positives were fresh broiler meat samples. Mainly S.Enteritidis was detected.

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

Data received from Salmonella Monitoring Programme for Food of Animal Origin 2002-2004 show that during these years Salmonella was detected in 3 of 117 broiler meat samples taken at cutting plants, in 9 of 164 neck skin samples taken at salughter (2002 - 2, 2003 - 5, 2004 - 2).
No separate statistics is available concerning Salmonella in broiler meat and products thereof sampled at retail. According to the HPI annual reports the average presence of Salmonella in meat and meat products sampled at retail level in 1999-2003 composes 0,4 % of the foodstuffs of animal origin analysed (see also bovine meat and products thereof).

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

In the year 2004 broiler meat and products thereof were supposed to be the source of infection in human. The relevance of the source of infection in human to broiler meat and products thereof has been determined on the basis of epidemiological investigation, but not bacteriologically.

C. Salmonella spp. in turkey meat and products thereof

Monitoring system

Sampling strategy

At retail

Random sampling is performed in accordance with the Health Protection Inspectorate annual plan as a part of official food control. Targeted sampling is preformed in cases of suspicion, consumer complains and etc.

Frequency of the sampling

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At retail

Other: fresh meat, ready-to-eat and not-ready-to-eat products, environmental samples and etc

Methods of sampling (description of sampling techniques)

At retail

Sample taken - 200 g, sample analysed - 25 g. Swabs are used in some cases. Number of sub-samples varies from 1-5. Pooling of samples take place. Samples

are stored at +2+4C and analysed as soon as possible.

Definition of positive finding

At retail

A sample where Salmonella spp. has been isolated.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

At meat processing plant

Bacteriological method: ISO 6579:2002

At retail

Bacteriological method: ISO 6579:2002

Control program/mechanisms

The control program/strategies in place

Sampling at retail is performed according to the Health Protection Inspectorate annual sampling plan, which is approved by the HPI Director General.

Measures in case of the positive findings or single cases

The food or raw material for food should be removed from the market or handling.

Notification system in place

Salmonella detection in food is notifiable since 2000 according to the Infectious Animal Disease Control Act and the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".
Laboratories inspecting the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board of the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or of suspicion of the occurrence of such pathogens in raw material or products.
Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

There was 1 positive sample (turkey minced meat) for salmonella taken at retail level in 2004. This food product originated from EU.

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

There were no separate statistics concerning Salmonella in turkey meat and products thereof in

HPI. According to HPI annual reports the average presense of Salmonella in meat and meat products taken at retail level in 1999-2003 composes 0,4 % of the foodstuffs of animal origin analysed (see also bovine meat and products thereof).

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

In the year 2004 the turkey meat and products thereof were not confirmed or suspected as a source of infection in human.

D. Salmonella spp. in pig meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

Fresh meat from pigs is sampled by Veterinary and Food Board officials according to the Salmonella Monitoring Programme for Food of Animal Origin (SMPF) and in the frames of official food surveillance sampling plans. In addition to official monitoring and surveillance, every food business operator has the obligation to take samples in the frames of self control programmes.
SMPF comprises analyses of randomly sampled swabs from pig carcasses at slaughterhouse and meat or scrap cuttings from cutting plants. The number of surface swab samples is related to the number of annually slaughtered animals (0,15 % of slaughtered pigs in previous year) and the number of meat or scrap cuttings samples to the capacity of the cutting plant (from cutting plants with production quantity over 5 tons per week - one sample once a week; from cutting plants with production quantity up to 5 tons per week - one sample twice a year). In addition at the slaughterhouses, all carcases with infection suspicions and pigs slaughtered under special conditions should be sampled.
The sampling in the frames of official food surveillance is performed randomly. Targeted sampling is preformed in cases of suspicion, consumer complains etc.

At meat processing plant

In frame of official food surveillance raw, material, minced meat, meat preparations and meat products are sampled randomly by the officials of Veterinary and Food Board following the frequencies established in decrees of Director General of Veterinary and Food Board. Targeted sampling is performed in cases of suspicionm, consumer complains etc.

At retail

Random sampling is performed by the officials of Health Protection Inspectorate in accordance with the Health Protection Inspectorate annual plan as a part of official food control. Targeted sampling is preformed in cases of suspicion, consumer complains and etc.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

At meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Other: surface of carcase, fresh meat, environmental samples

At meat processing plant

Other: fresh meat, minced meat, meat preparations, meat products, environmental samples

At retail

Other: minced meat, ready-to-eat and not-ready-to-eat products, environmental samples and etc.

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

Salmonella Monitoring Programme for Food of Animal Origin - Swab samples at slaughterhouses should be taken after the inspection of the carcases at the final stage of the slaughter line before chilling of the carcase. 2 surface samples should be taken from each carcase, each from 700 cm2, altogether 1400 cm2. The first sample should be taken from the inner and outer surface of hind side, including inguinal, altogether from area of 700 cm2. The second surface sample should be taken from the inner and outer surface of thoracic cavity and abdominal cavity in the area of sternum, altogether from area of 700 cm2.
Two sterile tampons in 10 ml of buffered pepton water or special contact plates are used for sampling. The samples are sent to the laboratory as soon as possible. The samples should be marked so, that it enables to identify an animal, stockbreeder and date of sampling.
Salmonella Monitoring Programme for Food of Animal Origin - At cutting plants, samples should be taken during meat cutting from production line or any aother appropriate site in the cutting plant. Samples with size of at least 25 g are stored at 0-4 C and sent to the laboratory as soon as possible.
According to the official food surveillance sampling plans random sampling of meat is performed at slaughterhouses. Sample analysed - 25 g of meat. In cutting

plants or departments samples from raw material and from cuttings is sampled regularly in the frames of official surveillance. If appropriate, crushed meat for heat treated meat products production and raw material for minced meat production for retail establishments is sampled.

At meat processing plant

According to official food surveillance sampling plans:
1) minced meat, meat preparations (incl. raw sausages) plants - raw material, if not originating from the slaughterhouse of the same establishment, is sampled (sample analysed 25 g); minced meat, meat preparations and meat preparations made of minced meat are sampled (1 sample consists of 5 subsamples, which are examined individually; minced meat sample size - 10 g each subsample; meat preparations sample size - 1 g each subsample)
2) meat products establishments
Meat products are sampled regularly. Sample analysed - 25 g.

At retail

Sample taken - 200 g, sample analysed - 25 g. Swabs are used in some cases. Number of sub-samples varies from 1-5. Pooling of samples take place. Samples are stored at +2+4C and analysed as soon as possible.

Definition of positive finding

At slaughterhouse and cutting plant

A sample where Salmonella spp. has been isolated.

At meat processing plant

A sample where Salmonella spp. has been isolated. In case of 5 subsamples thesample is considered to be positive, if in one of subsamples Salmonella spp. was isolated.

At retail

A sample where Salmonella spp. has been isolated.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

At meat processing plant

Bacteriological method: ISO 6579:2002

At retail

Bacteriological method: ISO 6579:2002

Control program/mechanisms

The control program/strategies in place

Salmonella Monitoring Programme for Food of Animal Origin (SMPF) is established according to the Regulation of Minister of Agriculture no 1 from 07.01.2002 "Regulation on prevention against salmonelloses of farm animals". SMPF started in 2002 and is approved annually by the Director General of Veterinary and Food Board.
At retail sampling is performed according to the Health Protection Inspectorate annual sampling plan, which is approved by the HPI Director General.

Measures in case of the positive findings or single cases

In case of positive Salmonella findings at slaughterhouses and cutting plants, the extent of contamination and its sources should be investigated. Thorough cleaning and disinfection should be carried out and the efectivness of cleaning procedures should be improved. The infected carcases are considered as conditionally fit for human consumption and are destined for heat treatment.
The food or raw material for food already existing on the market should be removed from the market or handling.

Notification system in place

Salmonella detection in food is notifiable since 2000 according to the Infectious Animal Disease Control Act and the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".
Laboratories inspecting the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board of the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or of suspicion of the occurrence of such pathogens in raw material or products.
Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

One (0,19 %) of the 523 investigated samples of pig meat and pig meat products was posistive for salmonella in 2004. All 648 swabs taken from carcasses at slaughter were negative.

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

According to the data from Salmonella Monitoring Programme for Food of Animal Origin 2002 - 2004 altogether 3 of 772 pig meat samples taken at cutting plants and 1 of 1596 swab samples taken from carcases at slaughter were positive for Salmonella.
There was no separate statistics concerning Salmonella in pig meat and products thereof sampled at retail. According to the Health Protection Inspectorate annual reports the average presence of Salmonella in meat and meat products taken at retail level in 1999-2003 composes 0,4 % of the foodstuffs of animal origin analysed (see also bovine meat and products thereof).

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

In the year 2004 the pig meat and products thereof were not epidemiologically and bacteriologically confirmed source of infection in humans.

E. Salmonella spp in bovine meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

Fresh meat from cattle is sampled by Veterinary and Food Board officials according to the Salmonella Monitoring Programme for Food of Animal Origin (SMPF) and in the frame of official food surveillance sampling plans. In addition to official monitoring and surveillance, every food business operator is obliged to take samples in the frame of self control programmes.
SMPF comprises analyses of randomly sampled swabs from carcasses of cattle at slaughterhouse and meat or scrap cuttings from cutting plants. The number of surface swab samples is related to the number of annually slaughtered animals (0,6 % of slaughtered cattle in previous year) and the number of meat or scrap cuttings samples to the capacity of the cutting plant(from cutting plants with production quantity over 5 tons per week - one sample once a week; from cutting plants with production quantity up to 5 tons per week - one sample twice a year). In addition in the slaughterhouses, all carcases with infection suspicions and cattle slaughtered under special conditions should be sampled.
Sampling in the frame of official food control is performed randomly. Targeted sampling is preformed in cases of suspicion, consumer complains etc.

At meat processing plant

In the frames of official food surveillance raw material, minced meat, meat preparations and meat products are sampled randomly by the officials of Veterinary and Food Board. The frequencies are established in decrees of Director General of Veterinary and Food Board. Targeted sampling is preformed in cases of suspicion, consumer complains etc.

At retail

Random sampling is performed in accordance with the Health Protection Inspectorate annual plan as a part of official food control. Targeted sampling is preformed in cases of suspicion, consumer complains and etc.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

At meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Other: surface of carcase, fresh meat

At meat processing plant

Other: fresh meat, meat preparations, minced meat, meat products

At retail

Other: fresh meat, minced meat, ready-to-eat and not-ready-to-eat products

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

Salmonella Monitoring Programme for Food of Animal Origin - swab samples at slaughterhouses should be taken after inspection of carcases at the final stage of the slaughter line before chilling of the carcase. 2 surface samples should be taken from each carcas, each from 700 cm2, altogether 1400 cm2. The first sample should be taken from the inner and outer surface of hind side, including inguinal, altogether from area of 700 cm2. The second surface sample should be taken from the inner and outer surface of thoracic cavity and abdominal cavity in the area of sternum, altogether from area of 700 cm2.
Two sterile tampons in 10 ml of buffered pepton water or special contact plates are used for sampling. The samples are sent to the laboratory as soon as possible. The samples should be marked so, that it enables to identify an animal, stockbreeder and date of sampling.
In addition to monitoring programme, meat is sampled at slaughterhouses according to the official food surveillance sampling plans. The weight of sample analysed is 25 g.
Salmonella Monitoring Programme for Food of Animal Origin - at cutting plants: samples should be taken during meat cutting from production line or any other appropriate site in the cutting plant. Samples with the weight of at least 25 g are stored at 0-4 C and sent to the laboratory as soon as possible.
In addition, regular sampling of raw material and cuttings at cutting plants or departments is performed according to official surveillance sampling plans. If appropriate, crushed meat for heat treated meat products production and raw material for minced meat production for retail establishments is sampled. The weight of sample analysed is 25 g.

At meat processing plant

According to official food surveillance sampling plans:
1) at minced meat/meat preparations (incl. raw sausages) plants - raw material, if

not originating from the slaughterhouse of the same establishment, is sampled (sample weight 25 g); minced meat, meat preparations and meat preparations made of minced meat are sampled (1 sample consists of 5 subsamples, which are examined individually; minced meat sample weight - 10 g of each subsample; meat preparations sample weight - 1g of each subsample)
2) meat products establishments
Meat products are sampled regularly. Weight of sample analysed is 25 g.

At retail

Sample taken - 200 g, sample analysed - 25 g. Swabs are used in some cases. Number of sub-samples varies from 1-5. Pooling of samples take place. Samples are stored at +2+4C and analysed as soon as possible.

Definition of positive finding

At slaughterhouse and cutting plant

The sample is considered positive, if Salmonella spp is isolated.

At meat processing plant

The sample is considered positive, if Salmonella spp is isolated or if Salmonella spp is isolated in any of subsamples(minced meat, meat preparations).

At retail

A sample where Salmonella spp. has been isolated.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

At meat processing plant

Bacteriological method: ISO 6579:2002

At retail

Bacteriological method: ISO 6579:2002

Preventive measures in place

Animal products should be examined in order to prevent the illness from spreading to people and to find out the health status of the herd from which animal products originate. Sampling is performed in the frames of Salmonella Monitoring Programme for Food of Animal Origin, official food surveillance and own-check programs of food business operators.

Control program/mechanisms

The control program/strategies in place

Salmonella Monitoring Programme for Food of Animal Origin (SMPF) has been established according to the Regulation of Minister of Agriculture No 1 from 07.01.2002 "Regulation on prevention against salmonelloses of farm animals". SMPF started in 2002 and is approved annually by the Director General of Veterinary and Food Board.
Sampling at retail is performed according to the Health Protection Inspectorate annual sampling plan, which is approved by the HPI Director General.

Measures in case of the positive findings or single cases

In case of positive Salmonella findings at slaughterhouses and cutting plants, the extent of contamination and its sources should be investigated. Thorough cleaning and disinfection should be carried out and the efectivness of cleaning procedures should be improved. The infected carcases are considered as conditionally fit for human consumption and are destined for heat treatment.
Retail: the food or raw material for food should be removed from the market or handling.

Notification system in place

Salmonella detection in food is notifiable since 2000 according to the Infectious Animal Disease Control Act and the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".
Laboratories inspecting the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board of the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or of suspicion of the occurrence of such pathogens in raw material or products.
Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

166 samples were tested in frame of post mortem meat control when there was a suspicion that the slaughtered animal could be infected with Salmonella. 10 (6 %) samples were considered to be positive. 5 samples were positive for S.Dublin and 5 samples for S.6,7:z10:-.
4 (1,7 %) of the 231 samples investigated in the frames of surveillance programme in 2004 were positive for salmonella.
Mostly fresh bovine meat samples were contaminated with Salmonella.
All swab samples taken from carcasses at slaughterhouses were negative.

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

2004 year data show that mostly fresh and minced bovine meat was contaminated with salmonella.
Salmonella Monitoring Programme for Food of Animal Origin 2002-2004 data document that Salmonella was not isolated from the samples of bovine meat taken at cutting plants. Salmonella was detected in 1 of 277 swab samples taken from carcasses at slaughter in 2002, 2 of 354 samples - in 2003 and 0 of 358 - in 2004.
There was no separate statistics concerning Salmonella in bovine meat and products thereof at retail until 2005. According to Health Protection Inspectorate annual reports the average presence of Salmonella in meat and meat products taken at retail level in 1999-2003 composes

0,4 %.

Year	No of samples	No of positive samples	%
1999	3845	20	0,5 %
2000	3128	22	0,7 %
2001	1792	1	0,05 %
2002	651	3	0,46 %
2003	497	1	0,2 %

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

In the year 2004 no one case of infection in human were epidemiologically linked to the bovine meat and products thereof.

Table 3.3.1 Salmonella sp. in meat and meat products

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Stanleyville	S. Muenchen	S. Saintpaul	S. Dublin	S. Infantis	S. Agona	S. Reading	S. Montevideo	S. Koenigstuhl	Salmonella spp.	S. Diogoye	S. 6,7:z10:-
Bovine meat																				
fresh																				
- at slaughter (1)	surv., VFB		sample	25 g	144	2			1			1								
- at processing plant (2)	control prog.		sample	25 g	60	0														
- at retail	surv., HPI		sample	25 g	1	0														
- at slaughter - official food or feed controls - sampling based on suspicion	official meat insp.		sample	25 g	166	10						5								5
minced meat																				
- at retail	surv., HPI		sample	25 g	12	2	1		1											
meat products																				
ready-to-eat																				
- at retail	surv., HPI		sample	25 g	14	0														
carcasse																				
- at slaughter (13)	control prog.		sample	swab	371	0														
Pig meat																				
fresh																				
- at slaughter (3)	surv., VFB		sample	25 g	216	0														

- at processing plant (4)	control prog.		sample	25 g	225	1													1
- at slaughter - official food or feed controls - sampling based on suspicion	official meat insp.		sample	25 g	2	0													
minced meat																			
- at retail	surv., HPI		sample	25 g	19	0													
meat products																			
non-ready-to-eat																			
- at retail	surv., HPI		sample	25 g	7	0													
ready-to-eat																			
- at retail	surv., HPI		sample	25 g	54	0													
carcasse																			
- at slaughter (14)	control prog.			swab	648	0													
Broiler meat																			
fresh																			
- at slaughter (5)	surv., VFB		sample	25 g	84	6	1	1					1	1	1			1		
- at processing plant (6)	control prog.		sample	25 g	42	2	2													
- at retail	surv., HPI			25 g	9	0													
- at slaughter - Control programme (12)	VFB		sample	10x10g or 25g	62	2	2													
minced meat																			
- at retail	surv., HPI		sample	25 g	1	0													
meat products																			
non-ready-to-eat																			
- at retail	surv., HPI		sample	25 g	4	0													
ready-to-eat																			

- at retail	surv., HPI	sample	25 g	89	0																										
mechanically separated meat																															
- import	import control, VFB	sample	25g	18	0																										
offal																															
- at slaughter	surv., VFB	sample	25g	4	0																										
Turkey meat																															
minced meat																															
- at retail	surv., HPI	sample	25 g	1	1					1																					
meat products																															
ready-to-eat																															
- at retail	surv., HPI	sample	25 g	2	0																										
Other meat																															
fresh																															
- at processing plant (7)	surv., VFB	sample	25 g	276	1											1															
- import controls	VFB	sample	25 g	3	0																										
Mixed meat																															
minced meat																															
- at processing plant (10)	surv., VFB	sample	25 g	235	4		1								1										1	1					
- at retail	surv., HPI	sample	25 g	77	1						1																				
meat not specified																															
meat preparation																															
- at processing plant - surveillance	VFB	sample	25 g	591	3																			2			1				
- at retail - surveillance	HPI	sample	25 g	42	1		1																								
meat products																															

- at processing plant - surveillance (15)	VFB		sample	25 g	426	0														
- at retail - surveillance	HPI		sample	25 g	274	0														
offal																				
- at slaughter - surveillance	VFB		sample	25 g	4	0														
- import controls	VFB		sample	25 g	14	0														
- in total - environmental sample - surveillance	VFB		swab		46	0														
Wild game meat - land mammals																				
fresh																				
- at game handling establishment	surv., VFB		sample	25 g	27	0														
Farmed game meat - ratites																				
fresh																				
- surveillance	VFB		sample	25 g	3	0														
Meat from sheep																				
fresh																				
- surveillance	VFB		sample	25 g	9	0														
Rabbit meat																				
fresh																				
- surveillance	VFB		sample	25 g	2	0														

(1) : including import
(2) : Salmonella Monitoring Programme for Food of Animal Origin
(3) : including import
(4) : Salmonella Monitoring Programme for Food of Animal Origin
(5) : including import
(6) : Salmonella Monitoring Programme for Food of Animal Origin
(7) : beaf, pork, sheep, broiler, wild game meat
(8) : see data under other meat or mixed meat
(9) : see data under other meat or mixed meat
(10) : including import;2positives from border control samples and 2 positives from sausage meat intended for the production of the meat products

(11) : including import
(12) : Salmonella Monitoring Programme for Food of Animal Origin
(13) : Salmonella Monitoring Programme for Food of Animal Origin
(14) : Salmonella Monitoring Programme for Food of Animal Origin
(15) : including import

Footnote

Section "other animals or mixed meat" contains data from several animal species(bovine,pork, broiler, wild game), where spieces are not distinguishable or they are mixed
Control programme - Salmonella Monitoring Programme for Food of Animal Origin
VFB - Veterinary and Food Board; Surv. VFB - Surveillance Veterinary and Food Board
HPI - Health Protection Inspectorate; Surv. HPI - Surveillance Health Protection Inspectorate

Table 3.3.2 Salmonella sp. in other food

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Kentucky	S. Kottbus	S. Abaetetuba
cow milk											
raw (1)											
- at processing plant - surveillance (11)	VFB		sample	25 g	30	0					
- at retail - surveillance	HPI		sample	25g	25	0					
heat-treated											
- at processing plant - surveillance	VFB		sample	25 g	20	0					
Dairy products											
ready-to-eat (2)	retail, HPI		sample	25 g	67	0					
- surveillance (8)	VFB		sample	25 g	363	1	1				
- Control programme (9)	VFB		sample	25 g	100	0					
other products											
- at retail (margarines)	surv., HPI		sample	25 g	24	0					
Table eggs											
- at packing centre (3)	surv., VFB		sample	25 g	44	0					
- at retail	surv., HPI		sample	25 g	45	0					
- at packing centre - Control programme (10)	VFB		sample	25 g	149	0					
Egg products (4)	VFB		sample	25 g	61	0					
Raw material (liquid egg) for egg products	surv., VFB		sample	25 g	5	0					
Fishery products											
fish (5)	surv., VFB		sample	25 g	110	1				1	
ready-to-eat											
- at processing plant - surveillance	VFB		sample	25 g	90	0					
processed											
- at retail - surveillance	HPI		sample	25 g	129	0					
Cheeses											
- at retail - monitoring programme (6)	HPI		sample	25 g	16	0					
Spices and herbs											
- at retail - monitoring programme (7)	HPI		sample	25 g	19	0					

- monitoring programme (19)	VFB		sample	25 g	15	1					1
- surveillance	VFB		sample	25 g	1	0					
Bakery products											
- at processing plant - surveillance	VFB		sample	25 g	41	0					
- at retail - surveillance	HPI		sample	25 g	425	0					
Confectionery products and pastes											
- at processing plant - surveillance (12)	VFB		sample		25	0					
Chocolate											
- at processing plant - surveillance (13)	VFB		sample	25 g	21	0					
Fat											
- at processing plant - surveillance (14)	VFB		sample	25 g	2	0					
Bottled water											
- at processing plant - surveillance	VFB		sample	25 g	1	0					
Fruit & Vegetables											
- at processing plant - surveillance (15)	VFB		sample	25 g	20	0					
Juice											
- at processing plant - surveillance (16)	VFB		sample	25 g	7	0					
Mill-products											
- at processing plant - surveillance (17)	VFB		sample	25 g	9	0					
Nut and nut products											
- at processing plant - surveillance (18)	VFB		sample	25 g	11	0					
Prepared food, ready to eat											
- at processing plant - surveillance	VFB		sample	25 g	27	0					
- at retail - surveillance	HPI		sample	25 g	235	0					
Processed fruits and vegetables											
- at processing plant - surveillance	VFB		sample	25 g	3	0					
Sauce and dressings											
- at processing plant - surveillance	VFB		sample	25 g	7	0					
Other food											
food non animal origin - surveillance (20)	VFB		sample	25 g	17	0					
Vegetables											
salads											

- at retail - surveillance (21)	HPI		sample	25 g	1040	1			1		
- at processing plant - surveillance (22)	VFB		sample	25 g	28	0					
Soft drinks											
- at retail - surveillance	HPI		sample	25 g	6	0					
Infant formula											
powdered											
- at retail - surveillance	HPI		sample	25 g	28	0					

(1) : retail - samples are taken in the frames of surveillance programme
(2) : surveillance
(3) : including import
(4) : Salmonella Monitoring Programme for Food of Animal Origin
(5) : fresh, frozen, salted fish
including import
positive sample - sample taken from imported fish
(6) : Commission Recommendation 2004/24/EC
(7) : Commission Recommendation 2004/24/EC
(8) : including import
positive sample - dairy product (ice cream) from the other EU Member State
(9) : Salmonella Monitoring Programme for Food of Animal Origin
(10) : Salmonella Monitoring Programme for Food of Animal Origin
(11) : the number includes also samples from farm, both for direct human consupmtion and milk for manufacturing
(12) : including import
(13) : products of chocolate and cocoa
including import
(14) : fat and oil
including import
(15) : including import
(16) : juices, nectars and drinks, based on essence and concentrate
(17) : including import
(18) : including import
(19) : Commission Recommendation 2004/24/EC
(20) : including import
(21) : including salads containing meat, fish, cheese etc.
(22) : including salads containing meat, fish, cheese etc.

Footnote

VFB - Veterinary and Food Board; Surv. VFB - Surveillance Veterinary and Food Board
HPI - Health Protection Inspectorate; Surv. HPI - Surveillance Health Protection Inspectorate

2.1.4. Salmonella in animals

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

Monitoring system

Sampling strategy

Laying hens flocks

To prevent the spread of salmonellosis of farm animals, the animals should be examined regularly in order to prove absence of salmonellosis in them or when the infection has been detected in the herd to apply in a timely manner the prevention measures.The prevention of salmonellosis of farm animals should be conducted through the studies on the basis of salmonella monitoring plan and enterprise self-inspection plan. Sampling is targeted (suspected flocks and herds), sampling is performed by official and authorised veterinarians of the Veterinary and Food Board. Samples are taken at the farm, hatchery and slaughter houses. Sampling is a part of a permanent monitoring scheme.

Frequency of the sampling

Laying hens: Rearing period

Other: at the age of 5-6 weeks or 2 weeks before production period

Laying hens: Production period

At the age of 20-24 and 98-104 weeks

Laying hens: Before slaughter at farm

2 weeks prior to slaughter

Type of specimen taken

Laying hens: Day-old chicks

Dead chicks

Laying hens: Rearing period

Faeces

Laying hens: Production period

Faeces

Laying hens: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

Laying hens: Day-old chicks

United meconium sample taken from 250 chicks hatched out from the eggs of each flock brought to the hatchery or
50 chicks that have died inside the eggshells or have been hatched out and died then.

Laying hens: Rearing period

The number of samples taken from each flock is prescribed below:

Number of birds in the flock	number of samples
1-24	equal to the number of birds
25-29	20
30-39	25
40-49	30
50-59	35
60-89	40
90-199	50
200-499	55
500 and more	60

In all the bird raising enterprises producing hatching eggs, 10% of the birds of breeding flock shall be studied by the method of blood-drop agglutination, if the egg-laying rate of egg breeds and meat breeds has reached respectively 50% and 30%.
To monitor salmonelloses in birds, the owner or person responsible for the hatchery or birds flock should examine once a year at his expense the flocks and hatcheries in the proportions specified in the table above.
In case of bacteriological studies of breeding flock samples should be replaced by official samples in every 8-th week.

Laying hens: Production period

See "Laying hens: Rearing period".

Laying hens: Before slaughter at farm

See "Laying hens: Rearing period".

Case definition

Laying hens: Production period

Sample is considered to be positive when flock is infected with the salmonella (salmonella is isolated in the Veterinary and Food Laboratory).

Diagnostic/analytical methods used

Laying hens: Day-old chicks

Bacteriological method: ISO 6579:2002

Laying hens: Rearing period

Bacteriological method: ISO 6579:2002

Laying hens: Production period

Bacteriological method: ISO 6579:2002

Laying hens: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

Laying hens flocks

Vaccination against salmonella is forbidden in Estonia.

Control program/mechanisms

The control program/strategies in place

Laying hens flocks

At present national programme exists based on national legislation and Directive 92/117 EEC. Programme is approved by national authorities.

Measures in case of the positive findings or single cases

Laying hens flocks

The supervision official should find out the infection sources and their spreading ways,remove or block them.It is prohibited to take birds to a flock doubted to be infected or actually infected or totake them out, except for slaughter of birds.All flocks of birds (young birds, breeding flock, productive flock), where S. typhimuriumor S. enteritidis has been diagnosed should be executed or sent immediately for slaughter.After the flock infected by salmonellosis has been taken to the slaughterhouse, thecarriage boxes, transport boxes and transport means shall be cleaned, washed anddisinfected.The litter of flocks infected by salmonellosis shall be composted away from the livestockbuildings. Enclosures and inventory of poultry farm shall be cleaned, washed and disinfected after the litter of birds has been taken out and tested then bacetriologically for salmonellas.The dead and slaughtered birds shall be made harmless or utilised.In poultry buildings the efficiency of deratisation, disinfection and of protection againstwild birds shall be checked, and improved if necessary. Empty period is required for 21 day.Disposal of manure is restricted. Feedingstuffs should be destructed or heat-treated. The Veterinary and Food Board has the right, considering the particulars of each case, toallow instead slaughter of breeding flock alternative methods like treatment withantibiotics.

Notification system in place

Infection with Sallmonella spp. (S. enteritidis, S. typhimurium, S. dublin, S. newport, S.

cholerasuis) is notifiable since 2000 according to the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

During 2004 2852 samples were tested from laying and broiler flocks. S. enteritidis was isolated once from laying flock and two positive samples were from one broiler flock.

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

The overall prevalence of salmonella is very low (0,03 %).

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)

To prevent the spread of salmonellosis of farm animals, the animals should beexamined regularly in order to prove absence of salmonellosis in them or whenthe infection has been detected in the herd to apply the prevention measures in atimely manner.The prevention of salmonellosis of farm animals should be conducted throughthe studies on the basis of salmonella monitoring plan and enterprisecontrol plan.Sampling is targeted (suspected flocks and herds), sampling is performed byofficial and authorised veterinarians of the Veterinary and Food Board. Samplesare taken in the farm, hatchery and slaughterhouses. Sampling is a part of apermanent monitorning scheme.

Broiler flocks

The same as above described.

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

At the age of 5-6 weeks

Broiler flocks: Before slaughter at farm

Every flock is sampled

Type of specimen taken

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

Dead chicks

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

Faeces

Broiler flocks: Day-old chicks

Dead chicks

Broiler flocks: Rearing period

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

from young birds of the breeding flock - day-old chicks that have got killed and internal linings of chick boxes 10 samples per flock/lot

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

during the growing period, 3 weeks before relocation copro samples or cloaca tampon samples from each flock

Broiler flocks: Day-old chicks

from young birds of the breeding flock - day-old chicks that have got killed and internal linings of chick boxes 10 samples per flock/lot

Broiler flocks: Rearing period

from young birds of productive flock - at the age of 5-6 weeks or 1-2 weeks before their transfer to productive flock copro samples or cloaca tampon samples from each flock

Broiler flocks: Before slaughter at farm

from broilers - 1-2 weeks before their slaughter copro samples or cloaca tampon samples from each flock in the number prescribed below:

Number of birds in the flock	Number of samples
1-24	equal to the number of birds
25-29	20
30-39	25
40-49	30
50-59	35
60-89	40
90-199	50
200-499	55
500 and more	60

Case definition

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

A positive case is a unit confirmed positive for Salmonella (salmonella is isolated in the Veterinary and Food Laboratory).

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

The same as mentioned above.

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

The same as mentioned above.

Broiler flocks: Day-old chicks

The same as mentioned above.

Broiler flocks: Rearing period

The same as mentioned above.

Broiler flocks: Before slaughter at farm

The same as mentioned above.

Diagnostic/analytical methods used

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

Broiler flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Broiler flocks: Rearing period

Bacteriological method: ISO 6579:2002

Broiler flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

Broiler flocks

Vaccination against salmonella is forbidden in Estonia.

Other preventive measures than vaccination in place

Broiler flocks

The handler should notify the authorised veterinarian servicing the enterprise or the veterinary supervision official of the occurrence of salmonella bacteria detected in the course of self-inspection of the enterprise. Veterinarian or supervision official should take samples to confirm the infection and establish the prevention measures.
The final products on the enterprises handling feedingstuffs shall be studied bacteriologically under the framework of monitoring and self-inspection.
Official samples from imported feedingstuffs should be taken in the course of random inspection of their storing.
Altogether 100 official samples should be taken and studied each year.

Control program/mechanisms

The control program/strategies in place

Broiler flocks

The salmonella monitoring plan should be drafted and supervised by the Veterinary and Food Board.
From broilers - 1-2 weeks before their slaughter copro samples or cloaca tampon samples from each flock in the number prescribed below:

Number of birds in the flock	Number of samples
1-24	equal to the number of birds
25-29	20
30-39	25
40-49	30
50-59	35
60-89	40
90-199	50
200-499	55
500 and more	60

In all bird raising enterprises producing hatching eggs, 10% of the birds of breeding flock should be studied by the method of blood-drop agglutination, if the egg-laying rate of egg breeds and meat breeds has reached respectively 50% and 30%.

To monitor salmonelloses in birds, the owner or person responsible for the hatchery or birds flock should examine at his expense the flocks and hatcheries in the proportions specified in the table above once a year and in the case of bacteriological studies concerning the breeding flock in each 8 weeks the samples shall be replaced by official samples.

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 supervision official should find out the infection sources and their spreading ways,remove or block them.It is prohibited to take birds to a flock doubted to be infected or actually infected or totake them out, except for slaughter of birds.All flocks of birds (young birds, breeding flock, productive flock), where S. typhimuriumor S. enteritidis has been diagnosed should be executed or sent immediately for slaughter.After the flock infected by salmonellosis has been taken to the slaughterhouse, thecarriage boxes, transport boxes and transport means shall be cleaned, washed and disinfected. The litter of flocks infected by salmonellosis shall be composted away from the livestock buildings. Enclosures and inventory of poultry farm shall be cleaned, washed and disinfected after the litter of birds has been taken out and tested then bacetriologically for salmonellas. The dead and slaughtered birds shall be made harmless or utilised.In poultry buildings the efficiency of deratisation, disinfection and of protection against wild birds shall be checked, and improved if necessary. Empty period is required for 21 day. Disposal of manure is restricted. Feedingstuffs should be destructed or heat-treated. The Veterinary and Food Board has the right, considering the particulars of each case, to allow instead slaughter of breeding flock alternative methods like treatment with antibiotics.

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

The same as mentioned above.

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

The same as mentioned above.

Broiler flocks: Day-old chicks

The same as mentioned above.

Broiler flocks: Rearing period

The same as mentioned above.

Broiler flocks: Before slaughter at farm

The same as mentioned above.

Notification system in place

Infection with Sallmonella spp. (S. enteritidis, S. typhimurium, S. dublin, S. newport, S. cholerasuis) is notifiable since 2000 according to the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

During 2004 2852 samples were tested from laying and broiler flocks. S. enteritidis was isolated once from laying flock and two positive samples were from one broiler flock.

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

The occurence of salmonella in breeding flocks for meat production is very low.

C. Salmonella spp in pigs

Monitoring system

Sampling strategy

Multiplying herds

In order to monitor salmonelloses in breeding, multiplying or fattening pig herds, the herds as well as animals sent to the artificial fertilisation stations should be examined. As official samples the herds should be examined in the quantities provided by the monitoring plan of the Veterinary and Food Board.
The herds should be examined bacteriologically on the basis of copro samples, taking into account the following proportions:

Size of the herd	Number of animals to be examined
less than 25	equal to the number of animals
25-100	25
over 100	30

Copro samples should be taken by age groups or keeping groups from meat pigs less than one year old, a copro sample of one animal per 5-10 animals.
Copro samples from animals under examination should be united into a pooled sample.
In transferring the pigs to artificial fertilisation station or to the breeding herd

kept for the purposes of artificial fertilisation, they should be examined bacteriologically within 30 days before the transfer on the basis of individual copro samples or at the fertilisation station during the quarantine on the basis of individual copro samples.

Type of specimen taken

Breeding herds

Blood

Multiplying herds

Faeces

Fattening herds at farm

Faeces

Methods of sampling (description of sampling techniques)

Multiplying herds

To diagnose salmonellosis in pigs, instead of a clinical picture or pathologic-anatomical findings, copro samples should be taken from the rectum of animals with the doubt of salmonellosis.
From the rectum of animals under examination a faecis sample (at least 10 grams) should be taken by an individual plastic glove or bag, the inside of which shall be turned out then and marked for identification of the sample.
The individual copro samples in the laboratory should be halved. At least 5 grams should be necessary for the studies and at least 5 g should be preserved at the temperature 4°C until the end of bacteriological studies. The halves under study may be united by five into a pooled sample. If the pooled sample has positive reaction, the animals accumulated under the pooled sample shall be examined again on the basis of individual samples.

Case definition

Multiplying herds

Sample is considered to be positive when flock is infected with salmonella (salmonella is isolated in the Veterinary and Food Laboratory).

Diagnostic/analytical methods used

Breeding herds

Bacteriological method: ISO 6579:2002

Multiplying herds

Bacteriological method: ISO 6579:2002

Fattening herds at farm

Bacteriological method: ISO 6579:2002

Fattening herds at slaughterhouse (herd based approach)

Bacteriological method: ISO 6579:2002

Vaccination policy

Breeding herds

Vaccination against salmonella is forbidden in Estonia.

Multiplying herds

Vaccination against salmonella is forbidden in Estonia.

Fattening herds

Vaccination against salmonella is forbidden in Estonia.

Control program/mechanisms

The control program/strategies in place

Multiplying herds

At present the national programme exists based on national legislation and Directive 92/117 EEC. Programme is approved by national authorities.

Measures in case of the positive findings or single cases

The infection sources and spreading ways should be found out in a herd infected by salmonellosis and then they should be removed or blocked.
To find out the origin of infection, samples on occurrence of salmonellas also from contact farm animals, while one animal from 5-10 animals should be examined and from feedstuffs should be taken. If any animal has the characteristics of clinical salmonellosis, individual samples shall be taken from such animals.
If in a farm salmonellosis is detected in animals other than pigs or it is detected in people working in the farm, the herds of pigs in the farms shall be examined.
In diagnosing salmonellosis in a pig, the animals in the herd of origin, which have not been examined for salmonellosis, or if salmonellosis has been detected in the course of annual monitoring, samples shall be taken from the herd of origin.
The stockbreeder shall immediately separate the animals that are clinically ill and salmonella positive from other animals as safely as possible.
The separated animals shall be subjected to medical treatment if necessary, and the occurrence of salmonellas shall be studied on the basis of individual copro samples in every week until receiving two consecutive negative results, or shall be sent for slaughter.
Pigs shall be kept inside rooms so that they cannot be in contact with other animals.
Only the personnel looking after animals are allowed to stay in the farm. When looking after the animals, the personnel shall wear appropriate protective clothes and in leaving the livestock

premises their footwear shall be cleaned thoroughly and disinfected.
A stockbreeder shall keep records of the salmonella studies concerning all the farm animals.
After sending the animals doubted to be infected or actually infected for slaughter, the livestock premises, bedsteads, feeding stands and keeping tools shall be cleaned and disinfected according to the prescriptions of veterinarian.
Manure and used litter of pigs shall be handled according to the prescriptions of authorised veterinarian so that the spread of salmonella will be prevented.
To organise deratisation, disinfection and protection against wild birds.
To preclude the access of dogs and cats to livestock premises.

Notification system in place

Infection with Sallmonella spp. (S. enteritidis, S. typhimurium, S. dublin, S. newport, S. cholerasuis) is notifiable since 2000 according to the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

During 2004 623 samples were tested. S.Stanleyville was isolated seven times (1,1 %) in the frames of the State Programme on Monitorning and Surveillance of Animal Infectious Diseases and clinical investigations. There were no isolates of other salmonella serotypes from pig herds.

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

S.Stanleyville is an only and predominant bacteria isolated from pigs in 2004.

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

There were no human cases of salmonellosis caused by S.Stanleyville.

D. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

To monitor salmonellosis in cattle, the herds as well as animals sent to artificial fertilisation stations shall be examined. As official samples the herds shall be examined in the quantities provided by the monitoring plan of the Veterinary and Food Board.
The herds shall be examined bacteriologically on the basis of copro samples, taking into account the following proportions:

Size of the herd	Number of animals to be examined
less than 25	equal to the number of animals
25-100	25
over 100	30

From cattle less than one year old copro samples shall be taken by age groups or keeping groups, a copro sample of one animal per 5-10 animals.
The copro samples of the animals under examination shall be united into a pooled sample.

In transferring the cattle to artificial fertilisation station or to the breeding herd kept for the purposes of artificial fertilisation, they shall be examined bacteriologically within 30 days before the transfer on the basis of individual copro samples or in the fertilisation station during the quarantine on the basis of individual copro samples.

Type of specimen taken

Animals at farm

Faeces

Methods of sampling (description of sampling techniques)

Animals at farm

To diagnose salmonellosis in cattle, instead of a clinical picture or pathologic-anatomical findings, copro samples shall be taken from the rectum of animals with the doubt of salmonellosis.
From the rectum of animals under examination a faecis sample at least 10 grams shall be taken by an individual plastic glove or bag, the inside of which shall be turned out then and marked for identification of the sample.
The individual copro samples in the laboratory shall be halved. At least 5 grams shall be necessary for the studies and at least 5 g shall be preserved at the temperature 4°C until the end of bacteriological studies. The halves under study may be united by five into a pooled sample. If the pooled sample has positive reaction, the animals accumulated under the pooled sample shall be examined again on the basis of individual samples.
To diagnose salmonelloses in cattle, besides copro samples also organ samples shall be taken from dead animals.
From animals tissue samples of at least 25 grams shall be taken from liver, spleen and from lymph nodes in small intestine and caecum area (3-5 pieces), each sample shall be placed separately in a new plastic bag and marked for identification of the sample. The organ samples from one animal may be accumulated in an additional package.
The organ samples from one animal may be integrated into one sample in the laboratory. The sample shall be homogenised and pre-enriched in buffered peptone water.
The following shall be taken from the herd infected by salmonellosis detected during the studies or monitoring:
individual copro samples from all the cattle, male and female pigs over one year old. The samples may be accumulated by five into an additional package;
individual copro samples from the cattle and meat-pigs less than one year old, that have clinical characteristics referring to salmonellosis;
copro samples from the cattle and meat-pigs without clinical characteristics, breakdown by age groups or keeping groups, a sample from one animal per 5-10 animals;
samples of feedstuffs or their components.

Case definition

Animals at farm

Sample is considered to be positive when flock is infected with the salmonella (salmonella is isolated in the Veterinary and Food Laboratory).

Diagnostic/analytical methods used

Animals at farm

Bacteriological method: ISO 6579:2002

Animals at slaughter (herd based approach)

Bacteriological method: ISO 6579:2002

Vaccination policy

Vaccination against salmonella is forbidden in Estonia.

Control program/mechanisms

The control program/strategies in place

At present exist national programme based on national legislation and Directive 92/117/EEC. Programme is approved by national authorities.

Measures in case of the positive findings or single cases

In a herd infected by salmonellosis the infection sources and spreading ways shall be found out, they shall be removed or blocked.
To find out the origin of infection, samples of occurrence of salmonellas also from contact farm animals, while one animal from 5-10 animals shall be examined, and from feedstuffs shall be taken. If any animal has the characteristics of clinical salmonellosis, individual samples shall be taken from such animals.
If in a farm salmonellosis is detected in animals other than cattle or it is detected in people working in the farm, the herds of cattle in the farms shall be examined.
In diagnosing salmonellosis in cattle, the animals in the herd of origin which have not been examined for salmonellosis, or if salmonellosis has been detected in the course of annual monitoring, samples shall be taken from the herd of origin.
The stockbreeder shall immediately separate the animals that are clinically ill and salmonella positive from other animals as safely as possible.
The separated animals shall be subjected to medical treatment if necessary, and the occurrence of salmonellas shall be studied on the basis of individual copro samples in every week until receiving two consecutive negative results, or shall be sent for slaughter.
Cattles shall be kept inside rooms so that they cannot be in contact with other animals.
Only the personnel looking after animals are allowed to stay in the farm. When looking after the animals, the personnel shall wear appropriate protective clothes and in leaving the livestock premises their footwear shall be cleaned thoroughly and disinfected.
A stockbreeder shall keep records of the salmonella studies concerning all the farm animals.
After sending the animals doubted to be infected or actually infected for slaughter, the livestock premises, bedsteads, feeding stands and keeping tools shall be cleaned and disinfected according

to the prescriptions of veterinarian.
Manure and used litter of cattle shall be handled according to the prescriptions of authorised veterinarian so that the spread of salmonella will be prevented.
To organise deratisation, disinfection and protection against wild birds.
To preclude the access of dogs and cats to livestock premises.

Notification system in place

Infection with Sallmonella spp. (S. enteritidis, S. typhimurium, S. dublin, S. newport, S. cholerasuis) is notifiable since 2000 according to the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

In 2004 one cattle (0,1 %) was positive for Salmonella (S.Stanleyville was isolated) in the State Programme on Monitorning and Surveillance of Animal Infectious Diseases.
In connection with clinical investigations 19 animals were positive (1 S.Enteritidis, 4 S.Typhimurium, 6 S.Dublin, 1 S.Mikawasima, 2 S.Menden, 5 S.group C were isolated).

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

The existing control programmes and investigations document that S.Dublin and S.group C are prevalent isolates detected in Estonian food production animals. S.Typhimurium is on the third place.

Table 3.2.2 Salmonella sp. in other commercial poultry

	Source of information	Remarks	Epidemiological unit	Flocks tested	Flocks positive	S. Enteritidis	S. Typhimurium
Gallus gallus							
unspecified							
- Control programme (1)	VFL		pooled sample	2852	3	3	

(1) : flocks tested - number of pooled samples, we have no data about flocks or birds.
flocks positive - 2 positive samples were from one flock and 1 from another flock.

Footnote

VFL - Veterinary and Food Laboratory

Table 3.2.3 Salmonella sp. in non-commercial poultry and birds

	Source of information	Remarks	Epidemiological unit	Flocks tested	Flocks positive	S. Enteritidis	S. Moscow	S. Typhimurium
Pigeons	VFL-DE	organs	F	1	0			
Quails	VFL	faecal sample	F	1	0			
Pheasants	VFL-DE	faecal sample	F	1	0			
- clinical investigations	VFL- DE	organs	F	2	0			
Ostriches (1)	VFL-DE		sample	10	1			1
Wildlife								
wild birds								
- clinical investigations (2)	VFL	organs	B	2	2			2
Zoo animals								
ground hornbill	VFL-DE	faecal sample	B	1	1		1	

(1) : faecal samples and cloacal swabs
(2) : 1 black stork, 1 gull from nature park at the same time

Footnote

VFL - Veterinary and Food Laboratory
DE - diagnostic examination
F - a flock
B - a bird

Table 3.2.4 Salmonella sp. in animals (non poultry)

	Source of information	Remarks	Epidemiological unit	Units tested	Units positive	S. Enteritidis	S. Typhimurium	S. Stanleyville	S. Dublin	S. Mikawasima	S. Menden	S. group C
Cattle (bovine animals) (1)	control prog.	faecal sample	Animal	983	1			1				
- clinical investigations (organs)	VFL		Animal	153	8	1	1		6			
- clinical investigations (faecal sample) (3)	VFL		Sample	585	11		3			1	2	5
Pigs												
unspecified (2)	control prog.	faecal sample	Animal	532	2			2				
- clinical investigations	VFL	organs	Animal	91	5			5				

(1) : positive - pooled sample (5 cattles)
(2) : positive sample - pooled sample
(3) : VFL N=585, this is the number of all pooled faecal sample of cattle (control programme and clinical investigation)

Footnote

VFL - Veterinary and Food Laboratory; Control prog. - Control programme

2.1.5. Salmonella in feedstuffs

Table 3.1.1 Salmonella sp. in feed material of animal origin

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Typhimurium	S. Enteritidis
Feed material of marine animal origin								
Fish meal (1)	surv., PPI		sample	25 g	4	0		

(1) : including import

Footnote

PPI - Estonian Plant Production Inspectorate; Surv. PPI - Surveillance Plant Production Inspectorate

Table 3.1.2 Salmonella sp. in feed of vegetable origin

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Typhimurium	S. Enteritidis
Feed material of cereal grain origin								
Maize	surv., PPI		sample	25 g	1	0		
Feed material of oil seed or fruit origin								
Rape seed derived	surv., PPI		sample	25 g	1	0		
Soya (bean) derived	surv., PPI		sample	25 g	2	0		
Sunflower seed derived	surv., PPI		sample	25 g	1	0		
Linseed derived	surv., PPI		sample	25 g	1	0		

Footnote

PPI - Estonian Plant Production Inspectorate; Surv. PPI - Surveillance Plant Protection Inspectorate

Table 3.1.3 Salmonella sp. in compound feedingstuff

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	S. Enteritidis	S. Typhimurium
Compound feedingstuffs for cattle								
Final product	surv., PPI			25 g	7	0		
Compound feedingstuffs for pigs								
Process control	surv., PPI			25 g	1	0		
Final product	surv., PPI			25 g	10	0		
Compound feedingstuffs for poultry - laying hens								
Final product	surv., PPI			25 g	6	0		
Compund feedingstuffs for poultry - broilers								
Final Product	surv., PPI			25 g	1	0		
Pet food								
Dog snacks (pig ears, chewing bones)	surv., PPI			25 g	1	0		

Footnote

PPI - Estonian Plant Production Inspectorate; Surv. PPI - Surveillance Plant Production Inspectorate

2.1.6. *Salmonella* serovars and phagetype distribution

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

Table 3.3.3 Salmonella serovars in animals

Serovars		Cattle (bovine animals)		Pigs		Gallus gallus		Other poultry		Wildlife - wild birds		Ostriches		Zoo animals	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=	1	19	2	5	3					2		1		1
Number of isolates serotyped	N=	1	19	2	5	3					2		1		1
Number of isolates per type															
S. Dublin			6												
S. Enteritidis			1			3									
S. Menden			2												
S. Mikawasima			1												
S. Moscow															1
S. Stanleyville		1		2	5										
S. Typhimurium			4								2		1		
S. group C			5												
Total of typed *Salmonella*isolates															

Footnote

(*) M : Monitor, C : Clinical
VFL - Veterinary and Food Laboratory

Table 3.3.4 Salmonella serovars in food

Serovars		Bovine meat		Pig meat		Broiler meat		Other poultry		Other products of animal origin		Vegetables - salads - at retail - surveillance - targeted surveillance		Spices and herbs - monitoring programme		Mixed meat - minced meat - surveillance		Fishery products - fish - surveillance	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory (1)	N=	14		1		10		1		6		1		1		4		1	
Number of isolates serotyped (2)	N=	14		1		10		1		6		1		1		4		1	
Number of isolates per type														1					
S. Abaetetuba																			
S. Agona						1													

S. Diogoye									1									
S. Dublin	6																	
S. Enteritidis	1				5				1									
S. Infantis					1				2									
S. Kentucky											1							
S. Koenigstuhl															1			
S. Kottbus																	1	
S. Montevideo									2									
S. Muenchen							1											
S. Reading					1													
S. Saintpaul															1			
S. Stanleyville	2																	
S. Typhimurium					1										1			
S. 6,7:z10:-	5		1															
Salmonella spp.					1										1			
Total of typed *Salmonella*isolates																		

(1) : HPI,VFL
(2) : HPI,VFL

Footnote

(*) M : Monitor, C : Clinical

Table 3.3.9 S. Enteritidis phagetypes in humans

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

Footnote

(*) M : Monitor, C : Clinical

Table 3.3.10 S. Typhimurium phagetypes in humans

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

Footnote

(*) M : Monitor, C : Clinical

2.1.7. Antimicrobial resistance in *Salmonella* isolates

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

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Frequency of the sampling

There is no special sampling programme for antimicrobial resistance of Salmonella in animals.
The isolates are collected from samples that routinely come to the lab, e.g control programmes, clinical samples.

Methods of sampling (description of sampling techniques)

See text about Salmonella spp. in bovine animals.

Procedures for the selection of isolates for antimicrobial testing

Passive antimicrobial resistance monitoring system is used for collecting strains. The isolates are collected from samples that routinely come to the lab, e.g control programmes, clinical samples.
One isolate from one herd or flock is included to the present report.
If Salmonella is isolated, tested by biochemical properties and serotyped, the strains isolated from clinical cases will be tested immediately.
Isolates from the other samples are collected before testing.
Serovars of epidemiological importance will be included.

Methods used for collecting data

All isolates and data concerning isolates are collected in the Central Laboratory of the Veterinary and Food Laboratory.
Susceptibility testing is performed in the Central Lab.

Laboratory methodology used for identification of the microbial isolates

Method used for Salmonella isolation is bacteriological method ISO 6579:2002.
Resistance testing is performed according to NCCLS using disc diffusion method in Mueller-Hinton agar plates.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, gentamicin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole,

nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Breakpoints are based on the NCCLS. See table 3.2.6.

Control program/mechanisms

The control program/strategies in place

Since 2001 studies for resistance monitoring of Salmonella, E.coli (from pig and poultry clinical samples) and some mastitis and pets pathogens (Staphylococcus spp.) were carried out.

Recent actions taken to control the zoonoses

Studies on resistance monitoring of Salmonella spp., Campylobacter spp., E.coli, indicator organisms (E.coli/E.faecalis/E.faecium) will be continued.

Results of the investigation

In the year 2004 11 Salmonella isolates from cattle were tested.
8 isolates (73 %) were fully sensitive.
1 isolate(9 %) was resistant to 1 antimicrobial (nitrofurantoin)
1 isolate (9 %) (S.typhimurium) was resistant to 3 antimicrobials: to tetracycline, streptomycin, sulfonamide.
1 isolate (9 %), S.Dublin was resistant to 5 antimicrobials: sulfonamide, sulfonamide/trimethoprim, trimethoprim, streptomycin, tetracyclin.

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

Salmonella (isolated from pathological samples) data since 2001:
In the year 2001 20 isolates (6 S.Enteritidis, 4 S.Typhimurium, 5 S.Infantis, 1 S.Dublin, 1 S.Canada, 1 S.Rissen, 1 S.Wagenia, 1 S.Cholera-suis) were tested:
10 (50 %) were fully sensitive,
8 (40 %) were resistant to 1 antimicrobial,
1 (5 %) was resistant to 2 antimicrobials (S.Infantis)
1 (5 %) was resistant to 3 antimicrobials (S.Typhimurium)
Resistance was found against nitrofurantoin (4/20 - 20%), sulfonamide (3/20 - 15 %), streptomycin (3/20 - 15 %), tetracyclin (1/20 - 5 %), nalidixic acid (1/20 - 5 %), cefuroxim (1/20 -5 %).
In 2002 8 culture of Salmonella (5 S.Dublin, 2 Salmonella spp. D-group , 1 Salmonella spp. B group) were tested:
6 (75 %) were fully sensitive,
1 (12,5 %) was resistant to 1 antimicrobial (S.spp. D-group - nitrofurantoin)
1 (12,5 %) was resistant to 4 antimicrobials (S.spp. B-group - resistance against sulfonamide, sulfamethoxazole/trimethoprim, streptomycin, tetracyclin)
In 2003 8 Salmonella cultures (5 S.enteritis, 3 S.Dublin) were tested:
3 (38 %) were fully sensitive,
5 (63 %) were resistant to 1 antimicrobial (nitrofurantoin). All of them were S.Enteritidis

isolates.
In 2004 17 Salmonella cultures were tested:
13 (76 %) were fully sensitive,
1 (6 %) was resistant to 1 antimicrobial (nitrofurantoin). All of them were S.Enteritidis isolates.
1 (6 %) was resistant to 2 antimicrobials
1 (6 %)was resistant to 3 antimicrobials
1 (6 %) was resistant to 5 antimicrobials (S.Dublin)
Detailed information about 2004 can be found in resistance tables.

B. Antimicrobial resistance in Salmonella in pigs

Sampling strategy used in monitoring

Frequency of the sampling

There is no special sampling programme for antimicrobial resistance in Salmonella in animals.
The isolates are collected from samples that routinely come to the lab, e.g control programmes, clinical samples.

Procedures for the selection of isolates for antimicrobial testing

Passive antimicrobial resistance monitoring system is used for collecting strains. The isolates are collected from samples that routinely come to the lab, e.g control programmes, clinical samples.
One isolate from one herd or flock is included in the present report.
If Salmonella is isolated, tested by biochemical properties and serotyped, the strains isolated from clinical cases will be tested immediately.
Isolates from the other samples are collected before testing.
Serovars of epidemiological importance will be included.

Methods used for collecting data

All isolates and data concerning isolates are collected to the Central Laboratory of the Veterinary and Food Laboratory.
Susceptibility testing are performed in the Central Lab.

Laboratory methodology used for identification of the microbial isolates

Method for isolation of Salmonella used is bacteriological method ISO 6579:2002. Serotyping is performed in the VFL Central Lab.
Resistance testing is performed according to NCCLS using disc diffusion method in Mueller-Hinton agar plates.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, gentamycin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole,

nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Breakpoints are based on the NCCLS. See table 3.2.6.

Control program/mechanisms

The control program/strategies in place

Since 2001 carried out studies for monitoring resistance of Salmonella, E.coli (from pig and poultry clinical samples) and some mastitis and pets pathogens (Staphylococcus spp.).

Results of the investigation

1 Salmonella strain (S.Stanleyville) originated from pig was tested.
This isolate was fully sensitive to all antimicrobials.

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

See text form "antimicrobial resistance of Salmonella in foodstuff derived from cattle"

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Frequency of the sampling

There is no special sampling programme for antimicrobial resistance in Salmonella in animals.
The isolates are collected from samples that routinely come to the lab, e.g control programmes, clinical samples.

Procedures for the selection of isolates for antimicrobial testing

Passive antimicrobial resistance monitoring system is used for collecting strains. The isolates are collected from samples that routinely come to the lab, e.g control programmes, clinical samples.
One isolate from one herd or flock is included in the present report.
If Salmonella is isolated, tested by biochemical properties and serotyped, the strains isolated from clinical cases will be tested immediately.
Isolates from the other samples are collected before testing.
Serovars of epidemiological importance will be included.

Methods used for collecting data

All isolates and data concerning isolates are collected to the Central Laboratory of the Veterinary and Food Laboratory.
Susceptibility testing are performed in the Central Lab.

Laboratory methodology used for identification of the microbial isolates

Method for isolation of Salmonella used is bacteriological method ISO 6579:2002. Serotyping is performed in the VFL Central Lab.
Resistance testing is performed according to NCCLS using disc diffusion method in Mueller-Hinton agar plates.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, gentamycin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole, nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Breakpoints are based on the NCCLS. See table 3.2.6.

Control program/mechanisms

The control program/strategies in place

Since 2001 carried out studies for monitoring resistance of Salmonella, E.coli (from pig and poultry clinical samples) and some mastitis and pets pathogens (Staphylococcus spp.).

Recent actions taken to control the zoonoses

Studies on resistance monitoring of Salmonella spp., Campylobacter spp., E.coli, indicator organisms (E.coli/E.faecalis/E.faecium) will be continued.

Results of the investigation

2 isolates (S.Enteritidis) originated from poultry were tested:
1 (50%) was fully sensitive
1 (50%) was resistant to 2 antimicrobials (nitrofurantoin and nalidixic acid).

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

See text form "antimicrobial resistance of Salmonella in foodstuff derived from cattle"

D. Antimicrobial resistance in Salmonella in foodstuff derived from cattle

Sampling strategy used in monitoring

Frequency of the sampling

There is no special sampling programme for antimicrobial resistance of Salmonella in foodstuffs derived from cattle.
The strains are collected from samples that routinely come to the lab, e.g control programmes, clinical samples.

Procedures for the selection of isolates for antimicrobial testing

Passive antimicrobial resistance monitoring system is used for collecting strains. The strains are collected from samples that routinely come to the lab, e.g control programmes, clinical samples.
One isolate from one herd is included in the present report.
If Salmonella is isolated, tested by biochemical properties and serotyped, the strains isolated from clinical cases will be tested immediately.
Isolates from the other samples are collected before testing.
Serovars of epidemiological importance will be included.

Laboratory methodology used for identification of the microbial isolates

Method used for Salmonella isolation is bacteriological method ISO 6579:2002. Serotyping is performed in the VFL Central Lab.
Resistance testing is performed according to NCCLS using disc diffusion method in Mueller-Hinton agar plates.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, gentamycin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole, nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Breakpoints are based on the NCCLS. See table 3.2.6.

Control program/mechanisms

The control program/strategies in place

Since 2001 studies for resistance monitoring of Salmonella, E.coli (from pig and poultry clinical samples) and some mastitis and pets pathogens (Staphylococcus spp.) were carried out.

Recent actions taken to control the zoonoses

Studies on resistance monitoring of Salmonella spp., Campylobacter spp., E.coli, indicator organisms (E.coli/E.faecalis/E.faecium) will be continued.

Results of the investigation

4 Salmonella isolates originated from beef were tested:
3 isolates (75 %)- S.Enteritidis, S.Stanleyville, S.Dublin - were fully sensitive,
1 isolate (25 %) (S.Enteritidis) was resistant to nitrofurantoin.

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

Since 2001 Salmonella from foodstuffs (not specified) and feed was tested:
In 2001 7 isolates were tested:
6 (86 %) were fully sensitive,

1 (14 %) (S.Typhimurium) was resistant to 3 antimicrobials: tetracyclin, trimethoprim/sulfamethoxazole, trimethoprim.
In 2002 - 38 isolates:
12 (32 %) were fully sensitive,
21 (55 %) was resistant to 1 antimicrobial
4 (11 %) were resistant to 2 antimicrobials
1 (3 %) was resistant to 3 antimicrobials.
The resistance was detected against nitrofurantoin (22/38 - 58 %), tetracycline (4/38 - 11 %), sulfonamide (3/38 - 8 %), streptomycin (2/38 - 5 %), nalidixic acid (1/38 - 3 %).
In 2003 - 10 isolates were tested:
9 (90 %) were fully sensitive
1 (10 %) S.Enteritis was resistant to nalidixic acid.
In 2004 48 Salmonella isolates were tested by the VFL and 5 isolates by the HPL.
17 (32 %) were fully sensitive.
15 (28 %) were resistant to 1 antimicrobial
4 (8 %) were resistant to 2 antimircobials
2 (4 %) were resistant to 3 antimicrobials
4 (8 %) were resistant to 4 antimicrobials
5 (9 %) were resistant to 5 antimicrobials
5 (9 %) were resistant to 6 antimicrobials
1 (2 %) were resistant to 7 antimicrobials
Detailed information is in the resistance tables.

E. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Sampling strategy used in monitoring

Frequency of the sampling

There is no special sampling programme for antimicrobial resistance of Salmonella in pig meat.
The isolates are collected from samples that routinely come to the lab, e.g control programmes, surveillance, self control programme, clinical samples.

Procedures for the selection of isolates for antimicrobial testing

Passive antimicrobial resistance monitoring system is used for collecting strains. The isolates are collected from samples that routinely come to the lab, e.g control programmes, surveillance, self control programme, clinical samples.
One isolate from one herd or flock is included in the present report.
If Salmonella is isolated, tested by biochemical properties and serotyped, the strains isolated from clinical cases will be tested immediately.
Isolates from the other samples are collected before testing.
Serovars of epidemiological importance will be included.

Methods used for collecting data

All isolates and data concerning isolates are collected in the Central Laboratory of the Veterinary and Food Laboratory.

Susceptibility testing are performed in the Central Lab.

Laboratory methodology used for identification of the microbial isolates

Method used for Salmonella isolation is bacteriological method ISO 6579:2002. Serotyping is performed in the VFL Central Lab.
Resistance testing is performed according to NCCLS using disc diffusion method in Mueller-Hinton agar plates.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, gentamicin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole, nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Breakpoints are based on the NCCLS. See table 3.2.6.

Control program/mechanisms

The control program/strategies in place

Since 2001 VFL has carried out studies for monitoring resistance of Salmonella, E.coli (from pig and poultry clinical samples) and some mastitis and pets pathogens (Staphylococcus spp.).

Recent actions taken to control the zoonoses

Studies on resistance monitoring of Salmonella spp., Campylobacter spp., E.coli, indicator organisms (E.coli/E.faecalis/E.faecium) will be continued.

Results of the investigation

2 isolates originated from pork (S.typhimurium) were tested:
both strains were resistant to 6 antimicrobials: tetracyclin, chloramphenicol, sulfonamide, streptomycin, nitrofurantoin, ampicillin.

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

See text form "antimicrobial resistance of Salmonella in foodstuff derived from cattle"

F. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Sampling strategy used in monitoring

Frequency of the sampling

There is no special sampling programme for antimicrobial resistance in Salmonella in foodstoff derived from poultry.
The strains are collected from samples that routinely come to the lab, e.g control

programmes, surveillance, self control programme, clinical samples.

Procedures for the selection of isolates for antimicrobial testing

Passive antimicrobial resistance monitoring system is used for collecting strains. The strains are collected from samples that routinely come to the lab, e.g control programmes, surveillance, self control programme, clinical samples.
One isolate from one herd or flock is included in the present report.
If Salmonella is isolated, tested by biochemical properties and serotyped, the strains isolated from clinical cases will be tested immediately.
Isolates from the other samples are collected before testing.
Serovars of epidemiological importance will be included.

Methods used for collecting data

All isolates and data concerning isolates are collected in the Central Laboratory of the Veterinary and Food Laboratory.
Susceptibility testing are performed in the Central Lab.

Laboratory methodology used for identification of the microbial isolates

Method for isolation of Salmonella used is bacteriological method ISO 6579:2002. Serotyping is performed in the VFL Central Lab.
Resistance testing is performed according to NCCLS using disc diffusion method in Mueller-Hinton agar plates.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, gentamycin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole, nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Breakpoints are based on the NCCLS. See table 3.2.6.

Control program/mechanisms

The control program/strategies in place

Since 2001 carried out studies for monitoring resistance of Salmonella, E.coli (from pig and poultry clinical samples) and some mastitis and pets pathogens (Staphylococcus spp.).

Recent actions taken to control the zoonoses

Studies on resistance monitoring of Salmonella spp., Campylobacter spp., E.coli, indicator organisms (E.coli/E.faecalis/E.faecium) will be continued.

Results of the investigation

33 strains originated from poultry meat were tested:
1) 25 strains from broiler meat: 9 S.Enteritidis, 8 S.infantis, the other serotypes were tested (one from each).
Resistance was found mainly against nitrofurantoin (68 %), tetracycline (40 %), nalidixic acid and sulfonamide (36 %), streptomycin (16 %), ampicillin (8%), cefuroxim and chloramphenicol (4 %). All 8 strains of S.infantis were resistant to minimum 3 antimicrobials.
2) 8 strains from duck and turkey meat were tested: 62,5 % were resistant to ampicillin, 50 % to tetracyclin, 37,5 % to sulfonamide, 33,3 % to nitrofurantoin, 25 % to trimethoprim and trimethoprim/sulfonamide, 12,5 % to streptomycin.

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

See text form "antimicrobial resistance in Salmonella in foodstuff derived from cattle"

Table Antimicrobial susceptibility testing of S. Abaetetuba in Spices and herbs - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Abaetetuba
	Spices and herbs
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																	1													
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																									1					
Cefuroxim	1	0																		1												
Fluoroquinolones																																
Ciprofloxacin	1	0																													1	
Enrofloxacin	1	0																											1			
Norfloxacin	1	0																									1					
Quinolones																																
Nalidixic acid	1	0																				1										
Trimethoprim	1	0%																								1						
Sulfonamides																																
Sulfonamide	1	0																		1												
Aminoglycosides																																
Streptomycin	1	0										1																				
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																							1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																	1													
Penicillins																																
Ampicillin	1	0																				1										
Number of multiresistant isolates																																
fully sensitives	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Agona in Broiler meat - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Agona
	Broiler meat - surveillance
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%															1															
Amphenicols																																
Chloramphenicol	1	0																			1											
Cephalosporin																																
Cefotaxim	1	0																									1					
Cefuroxim	1	0																	1													
Fluoroquinolones																																
Ciprofloxacin	1	0																												1		
Enrofloxacin	1	0																											1			
Norfloxacin	1	0																										1				
Quinolones																																
Nalidixic acid	1	0																				1										
Trimethoprim	1	0%																							1							
Sulfonamides																																
Sulfonamide	1	0																			1											
Aminoglycosides																																
Streptomycin	1	0											1																			
Gentamicin	1	0															1															
Trimethoprim + sulfonamides	1	0%																								1						
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																			1											
Penicillins																																
Ampicillin	1	100	1																													
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Ahmadi in Other meat - meat products - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Ahmadi
	Other meat - meat products
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																			1											
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																													1	
Cefuroxim	1	0																					1									
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																														1
Norfloxacin	1	0																											1			
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																						1								
Sulfonamides																																
Sulfonamide	1	0																					1									
Aminoglycosides																																
Streptomycin	1	0																			1											
Gentamicin	1	0															1															
Trimethoprim + sulfonamides	1	0%																							1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																					1									
Penicillins																																
Ampicillin	1	0													1																	
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Braenderup in Broiler meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Braenderup
	Broiler meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%															1															
Amphenicols																																
Chloramphenicol	1	0																				1										
Cephalosporin																																
Cefotaxim	1	0																										1				
Cefuroxim	1	0																		1												
Fluoroquinolones																																
Ciprofloxacin	1	0																											1			
Enrofloxacin	1	0																									1					
Norfloxacin	1	0																									1					
Quinolones																																
Nalidixic acid	1	0																				1										
Trimethoprim	1	0%																					1									
Sulfonamides																																
Sulfonamide	1	0																								1						
Aminoglycosides																																
Streptomycin	1	0										1																				
Gentamicin	1	0															1															
Trimethoprim + sulfonamides	1	0%																							1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																1														
Penicillins																																
Ampicillin	1	0																			1											
Number of multiresistant isolates																																
fully sensitives	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Cerro in Broiler meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Cerro
	Broiler meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																1														
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																													1	
Cefuroxim	1	0																				1										
Fluoroquinolones																																
Ciprofloxacin	1	0																												1		
Enrofloxacin	1	0																											1			
Norfloxacin	1	0																										1				
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																							1							
Sulfonamides																																
Sulfonamide	1	0																1														
Aminoglycosides																																
Streptomycin	1	0													1																	
Gentamicin	1	0															1															
Trimethoprim + sulfonamides	1	0%																							1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																		1												
Penicillins																																
Ampicillin	1	0																						1								
Number of multiresistant isolates																																
fully sensitives	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Diogoye in Broiler meat - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Diogoye
	Broiler meat - surveillance
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																	1													
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																										1				
Cefuroxim	1	0																		1												
Fluoroquinolones																																
Ciprofloxacin	1	0																												1		
Enrofloxacin	1	0																											1			
Norfloxacin	1	0																											1			
Quinolones																																
Nalidixic acid	1	0																				1										
Trimethoprim	1	0%																									1					
Sulfonamides																																
Sulfonamide	1	0																					1									
Aminoglycosides																																
Streptomycin	1	0												1																		
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																										1				
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																		1												
Penicillins																																
Ampicillin	1	0																							1							
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Dublin in Cattle (bovine animals) - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Dublin
	Cattle (bovine animals)
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	4

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	4	25%					1						1			1	1															
Amphenicols																																
Chloramphenicol	4	0																		1	1				1		1					
Cephalosporin																																
Cefotaxim	4	0																1										1		1	1	
Cefuroxim	4	0																1	1	2												
Fluoroquinolones																																
Ciprofloxacin	4	0																							1				1	1		1
Enrofloxacin	4	0																									1	2			1	
Norfloxacin	4	0																						1		2				1		
Quinolones																																
Nalidixic acid	4	0																			1	2			1							
Trimethoprim	4	25%	1																					1	1	1						
Sulfonamides																																
Sulfonamide	4	25	1																	1	1			1								
Aminoglycosides																																
Streptomycin	4	25	1								1			1	1																	
Gentamicin	4	0															2		1			1										
Trimethoprim + sulfonamides	4	25%	1																							1	1		1			
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	4	25	1																								1	1		1		
Penicillins																																
Ampicillin	4	0									1								1		1				1							
Number of multiresistant isolates																																
fully sensitives	3	75																														
resistant to >4 antimicrobials	1	25																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Dublin in Bovine meat - at slaughter - official food or feed controls - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Dublin
	Bovine meat - at slaughter - official food or feed controls
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	6

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																		1												
Amphenicols																																
Chloramphenicol	1	0																									1					
Cephalosporin																																
Cefotaxim	1	0																														1
Cefuroxim	1	0																							1							
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																														1
Norfloxacin	1	0																												1		
Quinolones																																
Nalidixic acid	1	0																								1						
Trimethoprim	1	0%																									1					
Sulfonamides																																
Sulfonamide	1	0																						1								
Aminoglycosides																																
Streptomycin	1	0													1																	
Gentamicin	1	0																				1										
Trimethoprim + sulfonamides	1	0%																										1				
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																	1													
Penicillins																																
Ampicillin	1	0																									1					
Number of multiresistant isolates																																

Footnote

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Table 3.2.5.2 Antimicrobial susceptibility testing of S.Enteritidis in animals

	S. Enteritidis							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus**		**Turkeys**	
Isolates out of a monitoring program	yes				yes			
Number of isolates available in the laboratory	1				3			
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	1	0%			2	0%		
Amphenicols								
Chloramphenicol	1	0%			2	0%		
Cephalosporin								
Cefotaxim	1	0%			2	0%		
Cefuroxim	1	0%			2	0%		
Fluoroquinolones								
Ciprofloxacin	1	0%			2	0%		
Enrofloxacin	1	0%			2	0%		
Norfloxacin	1	0%			2	0%		
Quinolones								
Nalidixic acid	1	0%			2	50%		
Trimethoprim	1	0%			2	0%		
Sulfonamides								
Sulfonamide	1	0%			2	0%		
Aminoglycosides								
Streptomycin	1	0%			2	0%		
Gentamicin	1	0%			2	0%		
Trimethoprim + sulfonamides	1	0%			2	0%		
Nitroimidazoles and Nitrofurans								
Nitrofurantoin	1	100%			2	50%		
Penicillins								
Ampicillin	1	0%			2	0%		
Number of multiresistant isolates								
fully sensitives	0	0%			1	50%		
resistant to 1 antimicrobial	1	100%			0	0%		
resistant to 2 antimicrobials	0	0%			1	50%		
resistant to 3 antimicrobials	0	0%			0	0%		
resistant to 4 antimicrobials	0	0%			0	0%		
resistant to >4 antimicrobials	0	0%			0	0%		

Table Antimicrobial susceptibility testing of S. Enteritidis in Gallus gallus - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Enteritidis
	Gallus gallus
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	3

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	2	0%												1			1															
Amphenicols																																
Chloramphenicol	2	0																				1		1								
Cephalosporin																																
Cefotaxim	2	0																									1			1		
Cefuroxim	2	0																	2													
Fluoroquinolones																																
Ciprofloxacin	2	0																							1					1		
Enrofloxacin	2	0																					1						1			
Norfloxacin	2	0																					1				1					
Quinolones																																
Nalidixic acid	2	50	1																		1											
Trimethoprim	2	0%																							1		1					
Sulfonamides																																
Sulfonamide	2	0																		1	1											
Aminoglycosides																																
Streptomycin	2	0														1	1															
Gentamicin	2	0																	1	1												
Trimethoprim + sulfonamides	2	0%																		1					1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	2	50							1											1												
Penicillins																																
Ampicillin	2	0																				1	1									
Number of multiresistant isolates																																
resistant to 1 antimicrobial	1	50																														
resistant to 2 antimicrobials	1	50																														

Footnote

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Table Antimicrobial susceptibility testing of S. Enteritidis in Cattle (bovine animals) - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Enteritidis
	Cattle (bovine animals)
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%														1																
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																											1			
Cefuroxim	1	0																	1													
Fluoroquinolones																																
Ciprofloxacin	1	0																												1		
Enrofloxacin	1	0																										1				
Norfloxacin	1	0																											1			
Quinolones																																
Nalidixic acid	1	0																						1								
Trimethoprim	1	0%																									1					
Sulfonamides																																
Sulfonamide	1	0																					1									
Aminoglycosides																																
Streptomycin	1	0														1																
Gentamicin	1	0																		1												
Trimethoprim + sulfonamides	1	0%																								1						
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	100							1																							
Penicillins																																
Ampicillin	1	0																				1										
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Enteritidis in Dairy products - ice-cream - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Enteritidis
	Dairy products - ice-cream - surveillance
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																1														
Amphenicols																																
Chloramphenicol	1	0																					1									
Fluoroquinolones																																
Ciprofloxacin	1	0																							1							
Enrofloxacin	1	0																					1									
Norfloxacin	1	0																					1									
Quinolones																																
Nalidixic acid	1	100	1																													
Trimethoprim	1	0%																									1					
Sulfonamides																																
Sulfonamide	1	0																					1									
Aminoglycosides																																
Streptomycin	1	0														1																
Gentamicin	1	0																		1												
Neomycin	0	0																														
Trimethoprim + sulfonamides	1	0%																								1						
Cephalosporin																																
Cefotaxim	1	0																												1		
Cefuroxim	1	0																1														
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	100							1																							
Penicillins																																
Ampicillin	1	0																					1									

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Enteritidis in Bovine meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Enteritidis
	Bovine meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																1														
Amphenicols																																
Chloramphenicol	1	0																		1												
Cephalosporin																																
Cefotaxim	1	0																								1						
Cefuroxim	1	0															1															
Fluoroquinolones																																
Ciprofloxacin	1	0																										1				
Enrofloxacin	1	0																									1					
Norfloxacin	1	0																									1					
Quinolones																																
Nalidixic acid	1	0																				1										
Trimethoprim	1	0%																							1							
Sulfonamides																																
Sulfonamide	1	0																			1											
Aminoglycosides																																
Streptomycin	1	0												1																		
Gentamicin	1	0															1															
Trimethoprim + sulfonamides	1	0%																							1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	100							1																							
Penicillins																																
Ampicillin	1	0																				1										
Number of multiresistant isolates																																
resistant to 1 antimicrobial	1	100																														

Footnote

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Table Antimicrobial susceptibility testing of S. Enteritidis - qualitative data

	S. Enteritidis					
	Broiler meat		**Bovine meat**		**Dairy products - ice-cream**	
Isolates out of a monitoring program	yes		yes		yes	
Number of isolates available in the laboratory	9		2		1	
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	9	11%	2	0%	1	0%
Amphenicols						
Chloramphenicol	9	0%	2	0%	1	0%
Cephalosporin						
Cefotaxim	9	0%	2	0%	1	0%
Cefuroxim	9	11%	1	0%	1	0%
Fluoroquinolones						
Ciprofloxacin	9	0%	2	0%	1	0%
Enrofloxacin	9	0%	1	0%	1	0%
Norfloxacin	9	0%	1	0%	1	0%
Quinolones						
Nalidixic acid	9	11%	2	0%	1	100%
Trimethoprim	9	0%	2	0%	1	0%
Sulfonamides						
Sulfonamide	9	11%	2	0%	1	0%
Aminoglycosides						
Streptomycin	9	0%	2	0%	1	0%
Gentamicin	9	0%	2	0%	1	0%
Trimethoprim + sulfonamides	9	0%	2	0%	1	0%
Nitroimidazoles and Nitrofurans						
Nitrofurantoin	9	89%	1	100%	1	100%
Penicillins						
Ampicillin	9	11%	2	0%	1	0%
Number of multiresistant isolates						
fully sensitives	0	0%	1	50%	0	0%
resistant to 1 antimicrobial	7	78%	1	50%	0	0%
resistant to 2 antimicrobials	1	11%	0	0%	1	100%
resistant to 4 antimicrobials	1	11%	0	0%	0	0%

Table Antimicrobial susceptibility testing of S. Enteritidis in Poultry meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Enteritidis
	Poultry meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	9

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	9	11%	1									1					2	3		1	1										
Amphenicols																																
Chloramphenicol	9	0																				2	1	1	3	2						
Cephalosporin																																
Cefotaxim	9	0														1									1		1		1	4		1
Cefuroxim	9	0									1			1				2	2	1	2											
Fluoroquinolones																																
Ciprofloxacin	9	0																		1							2			3	2	1
Enrofloxacin	9	0																			1						1	1	3	3		
Norfloxacin	9	0															1										3	3	1		1	
Quinolones																																
Nalidixic acid	9	11	1																			5	2			1						
Trimethoprim	9	0%																					1	1		5	1		1			
Sulfonamides																																
Sulfonamide	9	11	1																1		1	2	4									
Aminoglycosides																																
Streptomycin	9	0												1	5	3																
Gentamicin	9	0															1		8													
Trimethoprim + sulfonamides	9	0%																					1	1	1	2	4					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	9	89								3	4	1	1																			
Penicillins																																
Ampicillin	9	11	1															1				2	3	1	1							
Number of multiresistant isolates																																
resistant to 1 antimicrobial	7	78																														
resistant to 2 antimicrobials	1	11																														

resistant to 4 antimicrobials

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Table Antimicrobial susceptibility testing of S. Enteritidis in Other meat - minced meat - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Enteritidis
	Other meat - minced meat - surveillance
Isolates out of a monitoring program	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																	1													
Amphenicols																																
Chloramphenicol	1	0															1															
Fluoroquinolones																																
Ciprofloxacin	1	0																	1													
Quinolones																																
Nalidixic acid	1	0																1														
Trimethoprim	1	0%																		1												
Sulfonamides																																
Sulfonamide	1	100	1																													
Aminoglycosides																																
Streptomycin	1	0											1																			
Gentamicin	1	0												1																		
Trimethoprim + sulfonamides	1	0%															1															
Cephalosporin																																
Cefotaxim	1	0																									1					
Penicillins																																
Ampicillin	1	0																1														
Number of multiresistant isolates																																
resistant to 1 antimicrobial	1	100																														

Footnote

HPL - the sample was taken after complaint

Table 3.2.7.6 Antimicrobial susceptibility testing of S. Enteritidis in humans - qualitative data

	S. Enteritidis	
	humans	
Isolates out of a monitoring program	yes	
Number of isolates available in the laboratory	19	
Antimicrobials:	**N**	**%R**
Tetracycline	19	0%
Amphenicols		
Chloramphenicol	19	0%
Florfenicol	0	0%
Cephalosporin		
3rd generation cephalosporins	19	0%
Fluoroquinolones		
Ciprofloxacin	19	0%
Enrofloxacin	0	0%
Quinolones		
Nalidixic acid	19	0%
Trimethoprim	19	0%
Sulfonamides		
Sulfonamide	19	26.3%
Aminoglycosides		
Streptomycin	19	0%
Gentamicin	19	0%
Neomycin	0	0%
Kanamycin	0	0%
Trimethoprim + sulfonamides	19	0%
Penicillins		
Ampicillin	19	0%
Number of multiresistant isolates		
fully sensitives	14	73.7%
resistant to 1 antimicrobial	5	26.3%
resistant to 2 antimicrobials	0	0%
resistant to 3 antimicrobials	0	0%
resistant to 4 antimicrobials	0	0%
resistant to >4 antimicrobials	0	0%

Table Antimicrobial susceptibility testing of S. Glostrup in Turkey meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Glostrup
	Turkey meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	100%	1																													
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																												1		
Cefuroxim	1	0																		1												
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																											1			
Norfloxacin	1	0																											1			
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																								1						
Sulfonamides																																
Sulfonamide	1	0																				1										
Aminoglycosides																																
Streptomycin	1	0							1																							
Gentamicin	1	0																1														
Trimethoprim + sulfonamides	1	0%																									1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																		1												
Penicillins																																
Ampicillin	1	0																				1										
Number of multiresistant isolates																																
resistant to 1 antimicrobial	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Hayindogo in Broiler meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Hayindogo
	Broiler meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																1														
Amphenicols																																
Chloramphenicol	1	0																							1							
Cephalosporin																																
Cefotaxim	1	0																													1	
Cefuroxim	1	0																			1											
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																													1	
Norfloxacin	1	0																													1	
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																									1					
Sulfonamides																																
Sulfonamide	1	0																					1									
Aminoglycosides																																
Streptomycin	1	0											1																			
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																									1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																			1											
Penicillins																																
Ampicillin	1	0																								1						
Number of multiresistant isolates																																
fully sensitives	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Heidelberg in Turkey meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Heidelberg Turkey meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	100%	1																													
Amphenicols																																
Chloramphenicol	1	0																							1							
Cephalosporin																																
Cefotaxim	1	0																												1		
Cefuroxim	1	0																			1											
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																													1	
Norfloxacin	1	0																														1
Quinolones																																
Nalidixic acid	1	0																				1										
Trimethoprim	1	0%																									1					
Sulfonamides																																
Sulfonamide	1	0																		1												
Aminoglycosides																																
Streptomycin	1	0											1																			
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																										1				
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																		1												
Penicillins																																
Ampicillin	1	0																							1							
Number of multiresistant isolates																																
resistant to 1 antimicrobial	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Infantis in Other meat - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Infantis
	Other meat - surveillance
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	2	0%														1				1												
Amphenicols																																
Chloramphenicol	2	0																		1		1										
Cephalosporin																																
Cefotaxim	2	0																									1		1			
Cefuroxim	2	0																1		1												
Fluoroquinolones																																
Ciprofloxacin	2	0																													1	1
Enrofloxacin	2	0																												1		1
Norfloxacin	2	0																							1				1			
Quinolones																																
Nalidixic acid	2	0																					1	1								
Trimethoprim	2	0%																				1			1							
Sulfonamides																																
Sulfonamide	2	0																				1	1									
Aminoglycosides																																
Streptomycin	2	0											1	1																		
Gentamicin	2	0													1	1																
Trimethoprim + sulfonamides	2	0%																				1			1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	2	0											1		1																	
Penicillins																																
Ampicillin	2	0																				1		1								
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Infantis in Broiler meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Infantis
	Broiler meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	8

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	8	100%	8																													
Amphenicols																																
Chloramphenicol	8	0														2	2	1		1			1		1							
Cephalosporin																																
Cefotaxim	8	0																							1	1	3	1	1	1		
Cefuroxim	8	0												4		1			1	2												
Fluoroquinolones																																
Ciprofloxacin	8	0																	1	1	2	1	1			2						
Enrofloxacin	8	0														4	1		1	2												
Norfloxacin	8	0																2	3				1	1	1							
Quinolones																																
Nalidixic acid	8	100	8																													
Trimethoprim	8	0%																			2	2	1		2	1						
Sulfonamides																																
Sulfonamide	8	87,5	7																				1									
Aminoglycosides																																
Streptomycin	8	50					2	2	1	1	1				1																	
Gentamicin	8	0															2	1	3	1		1										
Trimethoprim + sulfonamides	8	0%															2	2	1		1	1										
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	8	100		1	3	3	1																									
Penicillins																																
Ampicillin	8	0															1	2	1		1	2		1								
Number of multiresistant isolates																																
resistant to 3 antimicrobials	1	12,5																														
resistant to 4 antimicrobials	3	37,5																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Kentucky in Prepared food, ready to eat - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Kentucky
	Prepared food, ready to eat - surveillance
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%															1															
Amphenicols																																
Chloramphenicol	1	0																1														
Cephalosporin																																
Cefotaxim	1	0																				1										
Fluoroquinolones																																
Ciprofloxacin	1	0																1														
Quinolones																																
Nalidixic acid	1	100	100																													
Trimethoprim	1	0%																			1											
Sulfonamides																																
Sulfonamide	1	0													1																	
Aminoglycosides																																
Streptomycin	1	0										1																				
Gentamicin	1	0													1																	
Trimethoprim + sulfonamides	1	0%																				1										
Penicillins																																
Ampicillin	1	0																1														
Number of multiresistant isolates																																
resistant to 1 antimicrobial	1	100																														

Footnote

HPL

Table Antimicrobial susceptibility testing of S. Kentucky in Poultry meat - meat products - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Kentucky
	Poultry meat - meat products
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																1														
Amphenicols																																
Chloramphenicol	1	0																							1							
Cephalosporin																																
Cefotaxim	1	0																													1	
Cefuroxim	1	0																		1												
Fluoroquinolones																																
Ciprofloxacin	1	0																													1	
Enrofloxacin	1	0																														1
Norfloxacin	1	0																											1			
Quinolones																																
Nalidixic acid	1	0																						1								
Trimethoprim	1	0%																									1					
Sulfonamides																																
Sulfonamide	1	0																	1													
Aminoglycosides																																
Streptomycin	1	0													1																	
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																									1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																			1											
Penicillins																																
Ampicillin	1	0																						1								
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Koenigstuhl in Broiler meat - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Koenigstuhl
	Broiler meat - surveillance
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	100%	1																													
Amphenicols																																
Chloramphenicol	1	100	1																													
Cephalosporin																																
Cefotaxim	1	0																									1					
Cefuroxim	1	0																		1												
Fluoroquinolones																																
Ciprofloxacin	1	0																											1			
Enrofloxacin	1	0																								1						
Norfloxacin	1	0																								1						
Quinolones																																
Nalidixic acid	1	0																			1											
Trimethoprim	1	0%																								1						
Sulfonamides																																
Sulfonamide	1	100	1																													
Aminoglycosides																																
Streptomycin	1	0								1																						
Gentamicin	1	0															1															
Trimethoprim + sulfonamides	1	0%																				1										
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																	1													
Penicillins																																
Ampicillin	1	100	1																													
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Kottbus in Fishery products - import controls - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Kottbus
	Fishery products - import controls
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																		1												
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																										1				
Cefuroxim	1	0																			1											
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																											1			
Norfloxacin	1	0																											1			
Quinolones																																
Nalidixic acid	1	0																				1										
Trimethoprim	1	0%																									1					
Sulfonamides																																
Sulfonamide	1	0																		1												
Aminoglycosides																																
Streptomycin	1	0												1																		
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																									1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																		1												
Penicillins																																
Ampicillin	1	0																					1									
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Mbandaka - qualitative data

	S. Mbandaka	
	humans	
Isolates out of a monitoring program	yes	
Number of isolates available in the laboratory	1	
Antimicrobials:	**N**	**%R**
Tetracycline	1	0%
Amphenicols		
Chloramphenicol	1	0%
Florfenicol	0	0%
Cephalosporin		
3rd generation cephalosporins	1	0%
Fluoroquinolones		
Ciprofloxacin	1	0%
Enrofloxacin	0	0%
Quinolones		
Nalidixic acid	1	0%
Trimethoprim	1	0%
Sulfonamides		
Sulfonamide	1	100%
Aminoglycosides		
Streptomycin	1	0%
Gentamicin	1	0%
Neomycin	0	0%
Kanamycin	0	0%
Trimethoprim + sulfonamides	1	0%
Penicillins		
Ampicillin	1	100%

Table Antimicrobial susceptibility testing of S. Menden in Cattle (bovine animals) - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Menden
	Cattle (bovine animals)
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%														1																
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																												1		
Cefuroxim	1	0																	1													
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																														1
Norfloxacin	1	0																														1
Quinolones																																
Nalidixic acid	1	0																						1								
Trimethoprim	1	0%																							1							
Sulfonamides																																
Sulfonamide	1	0																			1											
Aminoglycosides																																
Streptomycin	1	0													1																	
Gentamicin	1	0																		1												
Trimethoprim + sulfonamides	1	0%																									1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																		1												
Penicillins																																
Ampicillin	1	0																					1									
Number of multiresistant isolates																																
fully sensitives	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Mikawasima in Cattle (bovine animals) - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Mikawasima
	Cattle (bovine animals)
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																	1													
Amphenicols																																
Chloramphenicol	1	0																				1										
Cephalosporin																																
Cefotaxim	1	0																									1					
Cefuroxim	1	0																1														
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																												1		
Norfloxacin	1	0																									1					
Quinolones																																
Nalidixic acid	1	0																						1								
Trimethoprim	1	0%																						1								
Sulfonamides																																
Sulfonamide	1	0																1														
Aminoglycosides																																
Streptomycin	1	0											1																			
Gentamicin	1	0																1														
Trimethoprim + sulfonamides	1	0%																							1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																		1												
Penicillins																																
Ampicillin	1	0																				1										
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Montevideo in Poultry meat - meat products - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Montevideo
	Poultry meat - meat products
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%															1															
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																											1			
Cefuroxim	1	0																				1										
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																											1			
Norfloxacin	1	0																														1
Quinolones																																
Nalidixic acid	1	0																			1											
Trimethoprim	1	0%																							1							
Sulfonamides																																
Sulfonamide	1	0																						1								
Aminoglycosides																																
Streptomycin	1	0											1																			
Gentamicin	1	0															1															
Trimethoprim + sulfonamides	1	0%																									1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																			1											
Penicillins																																
Ampicillin	1	0																						1								
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Muenchen in Turkey meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Muenchen
	Turkey meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%															1															
Amphenicols																																
Chloramphenicol	1	0																	1													
Cephalosporin																																
Cefotaxim	1	0																					1									
Fluoroquinolones																																
Ciprofloxacin	1	0															1															
Quinolones																																
Nalidixic acid	1	0											1																			
Trimethoprim	1	0%															1															
Sulfonamides																																
Sulfonamide	1	100	1																													
Aminoglycosides																																
Streptomycin	1	0										1																				
Gentamicin	1	0														1																
Trimethoprim + sulfonamides	1	0%																	1													
Penicillins																																
Ampicillin	1	100	1																													
Number of multiresistant isolates																																
resistant to 2 antimicrobials	1	100																														

Footnote

HPL- surveillance

Table Antimicrobial susceptibility testing of S. Reading in Turkey meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Reading
	Turkey meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	100%	1																													
Amphenicols																																
Chloramphenicol	1	0																				1										
Cephalosporin																																
Cefotaxim	1	0																									1					
Cefuroxim	1	0															1															
Fluoroquinolones																																
Ciprofloxacin	1	0																												1		
Enrofloxacin	1	0																										1				
Norfloxacin	1	0																										1				
Quinolones																																
Nalidixic acid	1	0																			1											
Trimethoprim	1	0%																									1					
Sulfonamides																																
Sulfonamide	1	0																	1													
Aminoglycosides																																
Streptomycin	1	0											1																			
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																									1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																	1													
Penicillins																																
Ampicillin	1	100	1																													
Number of multiresistant isolates																																
resistant to 2 antimicrobials	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Saintpaul in Broiler meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Saintpaul
	Broiler meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%													1																	
Amphenicols																																
Chloramphenicol	1	0																					1									
Cephalosporin																																
Cefotaxim	1	0																													1	
Cefuroxim	1	0																		1												
Fluoroquinolones																																
Ciprofloxacin	1	0																												1		
Enrofloxacin	1	0																												1		
Norfloxacin	1	0																											1			
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																								1						
Sulfonamides																																
Sulfonamide	1	100	1																													
Aminoglycosides																																
Streptomycin	1	100				1																										
Gentamicin	1	0									1																					
Trimethoprim + sulfonamides	1	0%																					1									
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0													1																	
Penicillins																																
Ampicillin	1	100	1																													
Number of multiresistant isolates																																
resistant to 3 antimicrobials	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Saintpaul in Turkey meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Saintpaul
	Turkey meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	100%	1																													
Amphenicols																																
Chloramphenicol	1	0																				1										
Cephalosporin																																
Cefotaxim	1	0																					1									
Fluoroquinolones																																
Ciprofloxacin	1	0																			1											
Quinolones																																
Nalidixic acid	1	100	1																													
Trimethoprim	1	100%	1																													
Sulfonamides																																
Sulfonamide	1	100	1																													
Aminoglycosides																																
Streptomycin	1	100	1																													
Gentamicin	1	0											1																			
Trimethoprim + sulfonamides	1	100%	1																													
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	0	0																														
Penicillins																																
Ampicillin	0	100	1																													
Number of multiresistant isolates																																
resistant to >4 antimicrobials	1	100																														

Footnote

HPL

Table Antimicrobial susceptibility testing of S. Schwarzengrund - qualitative data

	S. Schwarzengrund	
	humans	
Isolates out of a monitoring program	yes	
Number of isolates available in the laboratory	1	
Antimicrobials:	**N**	**%R**
Tetracycline	1	0%
Amphenicols		
Chloramphenicol	1	0%
Florfenicol	0	0%
Cephalosporin		
3rd generation cephalosporins	1	0%
Fluoroquinolones		
Ciprofloxacin	1	0%
Enrofloxacin	0	0%
Quinolones		
Nalidixic acid	1	0%
Trimethoprim	1	0%
Sulfonamides		
Sulfonamide	1	100%
Aminoglycosides		
Streptomycin	1	0%
Gentamicin	1	0%
Neomycin	0	0%
Kanamycin	0	0%
Trimethoprim + sulfonamides	1	0%
Penicillins		
Ampicillin	1	0%

Table Antimicrobial susceptibility testing of S. Stanleyville in Cattle (bovine animals) - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Stanleyville Cattle (bovine animals)
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%															1															
Amphenicols																																
Chloramphenicol	1	0																					1									
Cephalosporin																																
Cefotaxim	1	0																												1		
Cefuroxim	1	0																		1												
Fluoroquinolones																																
Ciprofloxacin	1	0																												1		
Enrofloxacin	1	0																											1			
Norfloxacin	1	0																									1					
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																								1						
Sulfonamides																																
Sulfonamide	1	0																						1								
Aminoglycosides																																
Streptomycin	1	0										1																				
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																									1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0														1																
Penicillins																																
Ampicillin	1	0																			1											
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Stanleyville in Pigs - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Stanleyville
	Pigs
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%													1																	
Amphenicols																																
Chloramphenicol	1	0																			1											
Cephalosporin																																
Cefotaxim	1	0																										1				
Cefuroxim	1	0																	1													
Fluoroquinolones																																
Ciprofloxacin	1	0																											1			
Enrofloxacin	1	0																												1		
Norfloxacin	1	0																								1						
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																							1							
Sulfonamides																																
Sulfonamide	1	0																				1										
Aminoglycosides																																
Streptomycin	1	0													1																	
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																								1						
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0															1															
Penicillins																																
Ampicillin	1	0																			1											
Number of multiresistant isolates																																
fully sensitives	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Stanleyville in Bovine meat - minced meat - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Stanleyville Bovine meat - minced meat - surveillance
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%															1															
Amphenicols																																
Chloramphenicol	1	0																		1												
Cephalosporin																																
Cefotaxim	1	0																										1				
Fluoroquinolones																																
Ciprofloxacin	1	0																									1					
Quinolones																																
Nalidixic acid	1	0													1																	
Trimethoprim	1	0%																					1									
Sulfonamides																																
Sulfonamide	1	0												1																		
Aminoglycosides																																
Streptomycin	1	0											1																			
Gentamicin	1	0															1															
Trimethoprim + sulfonamides	1	0%																					1									
Penicillins																																
Ampicillin	1	0																		1												
Number of multiresistant isolates																																
fully sensitives	1	100																														

Footnote

HPL

Table Antimicrobial susceptibility testing of S. Stanleyville in Bovine meat - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Stanleyville
	Bovine meat - surveillance
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																	1													
Amphenicols																																
Chloramphenicol	1	0																				1										
Cephalosporin																																
Cefotaxim	1	0																									1					
Cefuroxim	1	0																			1											
Fluoroquinolones																																
Ciprofloxacin	1	0																											1			
Enrofloxacin	1	0																											1			
Norfloxacin	1	0																									1					
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																							1							
Sulfonamides																																
Sulfonamide	1	0																			1											
Aminoglycosides																																
Streptomycin	1	0												1																		
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																							1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																	1													
Penicillins																																
Ampicillin	1	0																						1								
Number of multiresistant isolates																																

Footnote

VFL

Table 3.2.5.3 Antimicrobial susceptibility testing of S.Typhimurium in animals

	S. Typhimurium											
	Cattle (bovine animals)		**Pigs**		**Gallus gallus**		**Turkeys**		**Ostriches**		**Wildlife - wild birds**	
Isolates out of a monitoring program	yes								yes		yes	
Number of isolates available in the laboratory	4								1		2	
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	2	50%							1	0%	2	0%
Amphenicols												
Chloramphenicol	2	0%							1	0%	2	0%
Florfenicol									1	0%		
Cephalosporin												
Cefotaxim	2	0%							1	0%	2	0%
Cefuroxim	2	0%							1	0%	2	0%
Fluoroquinolones												
Ciprofloxacin	2	0%							1	0%	2	0%
Enrofloxacin	2	0%							1	0%	2	0%
Norfloxacin	2	0%							1	0%	2	0%
Quinolones												
Nalidixic acid	2	0%							1	0%	2	0%
Trimethoprim	1	0%							1	0%	2	0%
Sulfonamides												
Sulfonamide	2	50%							1	0%	2	0%
Aminoglycosides												
Streptomycin	2	50%							1	0%	2	0%
Gentamicin	2	0%							1	0%	2	0%
Trimethoprim + sulfonamides	2	0%							1	0%	2	0%
Nitroimidazoles and Nitrofurans												
Nitrofurantoin	2	0%							1	0%	2	0%
Penicillins												
Ampicillin	2	0%							1	0%	2	0%
Number of multiresistant isolates												
fully sensitives	1	50%							1	100%	2	100%
resistant to 1 antimicrobial	0	0%							0	0%	0	0%
resistant to 2 antimicrobials	0	0%							0	0%	0	0%
resistant to 3 antimicrobials	1	50%							0	0%	0	0%
resistant to 4 antimicrobials	0	0%							0	0%	0	0%
resistant to >4 antimicrobials	0	0%							0	0%	0	0%

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

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Typhimurium
	Cattle (bovine animals)
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory (1)	4

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	2	50%	1												1																	
Amphenicols																																
Chloramphenicol	2	0																			1	1										
Cephalosporin																																
Cefotaxim	2	0																										1		1		
Cefuroxim	2	0																1	1													
Fluoroquinolones																																
Ciprofloxacin	2	0																											1		1	
Enrofloxacin	2	0																														
Norfloxacin	2	0																1	1													
Quinolones																																
Nalidixic acid	2	0																			1		1									
Trimethoprim	1	0%																										1				
Sulfonamides																																
Sulfonamide	2	50	1																	1												
Aminoglycosides																																
Streptomycin	2	50	1											1																		
Gentamicin	2	0														1		1														
Trimethoprim + sulfonamides	2	0%																							1			1				
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	2	0												1								1										
Penicillins																																
Ampicillin	2	0																		1		1										
Number of multiresistant isolates																																

fully sensitives	1	50																														
resistant to 3 antimicrobials	1	50																														

(1) : 3 isolates originated from the same herd at the same time, thereof we report data about one isolate

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Typhimurium in Ostriches - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Typhimurium
	Ostriches
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%												1																		
Amphenicols																																
Chloramphenicol	1	0																				1										
Cephalosporin																																
Cefotaxim	1	0																										1				
Cefuroxim	1	0															1															
Fluoroquinolones																																
Ciprofloxacin	1	0																											1			
Enrofloxacin	1	0																									1					
Norfloxacin	1	0																								1						
Quinolones																																
Nalidixic acid	1	0																				1										
Trimethoprim	1	0%																					1									
Sulfonamides																																
Sulfonamide	1	0																		1												
Aminoglycosides																																
Streptomycin	1	0										1																				
Gentamicin	1	0															1															
Trimethoprim + sulfonamides	1	0%																						1								
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0												1																		
Penicillins																																
Ampicillin	1	0																						1								
Number of multiresistant isolates																																
fully sensitives	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Typhimurium in Wildlife - wild birds - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Typhimurium
	Wildlife - wild birds
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	2	0%															1		1													
Amphenicols																																
Chloramphenicol	2	0																				1				1						
Cephalosporin																																
Cefotaxim	2	0																													1	1
Cefuroxim	2	0																			1	1										
Fluoroquinolones																																
Ciprofloxacin	2	0																													1	1
Enrofloxacin	2	0																														2
Norfloxacin	2	0																											1	1		
Quinolones																																
Nalidixic acid	2	0																						1	1							
Trimethoprim	2	0%																									1	1				
Sulfonamides																																
Sulfonamide	2	0																	1	1												
Aminoglycosides																																
Streptomycin	2	0												2																		
Gentamicin	2	0															1	1														
Trimethoprim + sulfonamides	2	0%																									1	1				
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	2	0													1					1												
Penicillins																																
Ampicillin	2	0																							2							
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Typhimurium in Poultry meat - surveillance - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Typhimurium
	Poultry meat - surveillance
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%															1															
Amphenicols																																
Chloramphenicol	1	0																						1								
Fluoroquinolones																																
Ciprofloxacin	1	0																												1		
Enrofloxacin	1	0																												1		
Norfloxacin	1	0																												1		
Quinolones																																
Nalidixic acid	1	0																				1										
Trimethoprim	1	0%																										1				
Sulfonamides																																
Sulfonamide	1	0																						1								
Aminoglycosides																																
Streptomycin	1	0											1																			
Gentamicin	1	0																1														
Neomycin	0	0																														
Kanamycin	0																															
Trimethoprim + sulfonamides	1	0%																									1					
Cephalosporin																																
Cefotaxim	1	0																												1		
Cefuroxim	1	0																	1													
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	100									1																					
Penicillins																																

Ampicillin	1	0																					1								
Number of multiresistant isolates																															
resistant to 1 antimicrobial	1	100																													

Footnote

VFL- duck meat

Table Antimicrobial susceptibility testing of S. Typhimurium in Pig meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Typhimurium
	Pig meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	2	100%			1		1																									
Amphenicols																																
Chloramphenicol	2	100	2																													
Cephalosporin																																
Cefotaxim	2	0																								1			1			
Cefuroxim	2	0																1			1											
Fluoroquinolones																																
Ciprofloxacin	2	0																										1				1
Enrofloxacin	2	0																												2		
Norfloxacin	2	0																									1		1			
Quinolones																																
Nalidixic acid	2	0																				1	1									
Trimethoprim	2	0%																							1		1					
Sulfonamides																																
Sulfonamide	2	100	2																													
Aminoglycosides																																
Streptomycin	2	100		1		1																										
Gentamicin	2	0																												2		
Trimethoprim + sulfonamides	2	0%																		1			1									
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	2	100						1		1																						
Penicillins																																
Ampicillin	2	100	2																													
Number of multiresistant isolates																																
resistant to >4 antimicrobials	2	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Typhimurium in Other meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Typhimurium
	Other meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	2	100%					1	1																								
Amphenicols																																
Chloramphenicol	2	100	2																													
Cephalosporin																																
Cefotaxim	2	0																									1	1				
Cefuroxim	2	0																	1		1											
Fluoroquinolones																																
Ciprofloxacin	2	0																										1		1		
Enrofloxacin	2	0																										1		1		
Norfloxacin	2	0																									1	1				
Quinolones																																
Nalidixic acid	2	0																				2										
Trimethoprim	2	0%																							1		1					
Sulfonamides																																
Sulfonamide	2	100	2																													
Aminoglycosides																																
Streptomycin	2	100		2																												
Gentamicin	2	0															2															
Trimethoprim + sulfonamides	2	0%																			1	1										
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	2	100						1		1																						
Penicillins																																
Ampicillin	2	100	2																													
Number of multiresistant isolates																																
resistant to >4 antimicrobials	2	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Typhimurium - qualitative data

	S. Typhimurium							
	Broiler meat		**Duck meat**		**Pig meat**		**Other animals or mixed meat**	
Isolates out of a monitoring program	yes		yes		yes		yes	
Number of isolates available in the laboratory	1		1		2		2	
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	1	0%	1	0%	2	100%	2	100%
Amphenicols								
Chloramphenicol	1	0%	1	0%	2	100%	2	100%
Cephalosporin								
Cefotaxim	1	0%	1	0%	2	0%	2	0%
Cefuroxim	1	0%	1	0%	2	0%	2	0%
Fluoroquinolones								
Ciprofloxacin	1	0%	1	0%	2	0%	2	0%
Enrofloxacin	1	0%	1	0%	2	0%	2	0%
Norfloxacin	1	0%	1	0%	2	0%	2	0%
Quinolones								
Nalidixic acid	1	0%	1	0%	2	0%	2	0%
Trimethoprim	1	0%	1	0%	2	0%	2	0%
Sulfonamides								
Sulfonamide	1	0%	1	0%	2	100%	2	100%
Aminoglycosides								
Streptomycin	1	0%	1	0%	2	100%	2	100%
Gentamicin	1	0%	1	0%	2	0%	2	0%
Trimethoprim + sulfonamides	1	0%	1	0%	2	0%	2	0%
Nitroimidazoles and Nitrofurans								
Nitrofurantoin	1	100%	1	100%	2	100%	2	100%
Penicillins								
Ampicillin	1	0%	1	0%	2	100%	2	100%
Number of multiresistant isolates								
resistant to 1 antimicrobial	1	100%	1	100%				
resistant to >4 antimicrobials					2	100%	2	100%

Table Antimicrobial susceptibility testing of S. Typhimurium in Broiler meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Typhimurium
	Broiler meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																1														
Amphenicols																																
Chloramphenicol	1	0																					1									
Cephalosporin																																
Cefotaxim	1	0																													1	
Cefuroxim	1	0																	1													
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																												1		
Norfloxacin	1	0																											1			
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																										1				
Sulfonamides																																
Sulfonamide	1	0																					1									
Aminoglycosides																																
Streptomycin	1	0														1																
Gentamicin	1	0																		1												
Trimethoprim + sulfonamides	1	0%																										1				
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	100					1																									
Penicillins																																
Ampicillin	1	0																						1								
Number of multiresistant isolates																																
resistant to 1 antimicrobial	1	100																														

Footnote

VFL

Table 3.2.7.7 Antimicrobial susceptibility testing of S. Typhimurium in humans - qualitative data

	S. Typhimurium	
	humans	
Isolates out of a monitoring program	yes	
Number of isolates available in the laboratory	8	
Antimicrobials:	**N**	**%R**
Tetracycline	8	50%
Cephalosporin		
3rd generation cephalosporins	7	0%
Fluoroquinolones		
Ciprofloxacin	8	0%
Enrofloxacin	0	0%
Quinolones		
Nalidixic acid	8	0%
Trimethoprim	8	50%
Sulfonamides		
Sulfonamide	8	87.5%
Aminoglycosides		
Streptomycin	8	62.5%
Gentamicin	8	25%
Neomycin	0	0%
Kanamycin	0	0%
Trimethoprim + sulfonamides	8	50%
Penicillins		
Ampicillin	8	62.5%
Number of multiresistant isolates		
fully sensitives	1	12.5%
resistant to 1 antimicrobial	0	0%
resistant to 2 antimicrobials	2	25%
resistant to 3 antimicrobials	0	0%
resistant to 4 antimicrobials	1	12.5%
resistant to >4 antimicrobials	4	50%
Number of multiresistant DT104		
with penta resistance	0	0%
resistant to other antimicrobials	0	0%

Table Antimicrobial susceptibility testing of S. Virchow in Broiler meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Virchow
	Broiler meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																		1												
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																														1
Cefuroxim	1	0																					1									
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																												1		
Norfloxacin	1	0																												1		
Quinolones																																
Nalidixic acid	1	0																					1									
Trimethoprim	1	0%																										1				
Sulfonamides																																
Sulfonamide	1	0																				1										
Aminoglycosides																																
Streptomycin	1	0													1																	
Gentamicin	1	0																		1												
Trimethoprim + sulfonamides	1	0%																												1		
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0															1															
Penicillins																																
Ampicillin	1	0																							1							
Number of multiresistant isolates																																
fully sensitives	1	100																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Paratyphi B var. Java - qualitative data

	S. Paratyphi B var. Java	
	humans	
Isolates out of a monitoring program	yes	
Number of isolates available in the laboratory	1	
Antimicrobials:	**N**	**%R**
Tetracycline	1	0%
Amphenicols		
Chloramphenicol	1	0%
Florfenicol	0	0%
Cephalosporin		
3rd generation cephalosporins	1	0%
Fluoroquinolones		
Ciprofloxacin	1	0%
Enrofloxacin	0	0%
Quinolones		
Nalidixic acid	1	0%
Trimethoprim	1	0%
Sulfonamides		
Sulfonamide	1	0%
Aminoglycosides		
Streptomycin	1	0%
Gentamicin	1	0%
Neomycin	0	0%
Kanamycin	0	0%
Trimethoprim + sulfonamides	1	0%
Penicillins		
Ampicillin	1	0%

Table 3.2.5.1 Antimicrobial susceptibility testing of Salmonella spp. in animals

	Salmonella spp.							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus**		**Turkeys**	
Isolates out of a monitoring program	yes		yes					
Number of isolates available in the laboratory	8		1					
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	8	12,5%	1	0%				
Amphenicols								
Chloramphenicol	8	0%	1	0%				
Cephalosporin								
Cefotaxim	8	0%	1	0%				
Cefuroxim	8	0%	1	0%				
Fluoroquinolones								
Ciprofloxacin	8	0%	1	0%				
Enrofloxacin	8	0%	1	0%				
Norfloxacin	8	0%	1	0%				
Quinolones								
Nalidixic acid	8	0%	1	0%				
Trimethoprim	8	12,5%	1	0%				
Sulfonamides								
Sulfonamide	8	12,5%	1	0%				
Aminoglycosides								
Streptomycin	8	12,5%	1	0%				
Gentamicin	8	0%	1	0%				
Trimethoprim + sulfonamides	8	12,5%	1	0%				
Nitroimidazoles and Nitrofurans								
Nitrofurantoin	8	0%	1	0%				
Penicillins								
Ampicillin	8	0%	1	0%				
Number of multiresistant isolates								
fully sensitives	7	27,5%	1	100%				
resistant to 1 antimicrobial	0	0%	0	0%				
resistant to 2 antimicrobials	0	0%	0	0%				
resistant to 3 antimicrobials	0	0%	0	0%				
resistant to 4 antimicrobials	0	0%	0	0%				
resistant to >4 antimicrobials	1	12,5%	0	0%				

Footnote

VFL - in this table antimicrobial suscebility qualitative data about S.dublin, S.Mikawasima, S.Menden, S.Stanleyville and Salmonella group C

Table 3.2.5.5 Antimicrobial susceptibility testing of Salmonella spp. in food

	Salmonella spp.													
	Broiler meat		**Other poultry meat**		**Pig meat**		**Bovine meat**		**Spices and herbs**		**Other products of animal origin**		**Prepared food, ready to eat**	
Isolates out of a monitoring program	yes		yes		yes		yes		yes		yes		yes	
Number of isolates available in the laboratory	25		8		2		4		1		10		1	
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline	25	40%	8	50%	2	100%	4	0%	1	0%	10	20%	1	0%
Amphenicols														
Chloramphenicol	25	4%	8	0%	2	100%	4	0%	1	0%	10	20%	1	0%
Cephalosporin														
Cefotaxim	25	0%	8	0%	2	0%	4	0%	1	0%	10	0%	1	0%
Cefuroxim	25	4%	6	0%	2	0%	3	0%	1	0%	9	0%		
Fluoroquinolones														
Ciprofloxacin	25	0%	8	0%	2	0%	4	0%	1	0%	10	0%	1	0%
Enrofloxacin	25	0%	6	0%	2	0%	3	0%	1	0%	9	0%		
Norfloxacin	25	0%	6	0%	2	0%	3	0%	1	0%	9	0%		
Quinolones														
Nalidixic acid	25	36%	8	0%	2	0%	4	0%	1	0%	10	0%	1	100%
Trimethoprim	25	0%	8	25%	2	0%	4	0%	1	0%	10	0%	1	0%
Sulfonamides														
Sulfonamide	25	36%	8	37,5%	2	100%	4	0%	1	0%	10	40%	1	0%
Aminoglycosides														
Streptomycin	25	16%	8	12,5%	2	100%	4	0%	1	0%	10	30%	1	0%
Gentamicin	25	0%	8	0%	2	0%	4	0%	1	0%	10	0%	1	0%
Trimethoprim + sulfonamides	25	0%	8	25%	2	0%	4	0%	1	0%	10	0%	1	0%
Nitroimidazoles and Nitrofurans														
Nitrofurantoin	25	68%	6	33,3%	2	100%	3	33,3%	1	0%	9	22,2%		
Penicillins														
Ampicillin	25	8%	8	62,5%	2	100%	4	0%	1	0%	10	30%	1	0%
Number of multiresistant isolates														
fully sensitives	6	24%	1	12,5%	0	0%	3	75%	1	100%	6	60%	0	0%
resistant to 1 antimicrobial	8	32%	3	37,5%	0	0%	1	25%	1	0%	1	10%	1	100%
resistant to 2 antimicrobials	1	4%	2	25%	0	0%	0	0%	1	0%	0	0%	0	0%
resistant to 3 antimicrobials	1	4%	0	0%	0	0%	0	0%	1	0%	1	10%	0	0%
resistant to 4 antimicrobials	4	16%	0	0%	0	0%	0	0%	1	0%	0	0%	0	0%
resistant to >4 antimicrobials	5	20%	2	25%	2	100%	0	0%	1	0%	2	20%	0	0%

Footnote

VFL- data about 5 Salmonella strains resistance originated from the HPL, in this table data about all Salmonella strains isolated from food

Table 3.2.7.5 Antimicrobial susceptibility testing of Salmonella spp. in humans - qualitative data

	Salmonella spp.	
	humans	
Isolates out of a monitoring program	no	
Number of isolates available in the laboratory	0	
Antimicrobials:	**N**	**%R**
Tetracycline	0	
Amphenicols		
Chloramphenicol	0	
Florfenicol	0	
Cephalosporin		
3rd generation cephalosporins	0	
Fluoroquinolones		
Ciprofloxacin	0	
Enrofloxacin	0	
Quinolones		
Nalidixic acid	0	
Trimethoprim	0	
Sulfonamides		
Sulfonamide	0	
Aminoglycosides		
Streptomycin	0	
Gentamicin	0	
Neomycin	0	
Kanamycin	0	
Trimethoprim + sulfonamides	0	
Penicillins		
Ampicillin	0	
Number of multiresistant isolates		
fully sensitives	0	
resistant to 1 antimicrobial	0	
resistant to 2 antimicrobials	0	
resistant to 3 antimicrobials	0	
resistant to 4 antimicrobials	0	
resistant to >4 antimicrobials	0	

Table Antimicrobial susceptibility testing of S. group C in Cattle (bovine animals) - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. group C Cattle (bovine animals)
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																	1													
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporin																																
Cefotaxim	1	0																														1
Cefuroxim	1	0																		1												
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																														1
Norfloxacin	1	0																														1
Quinolones																																
Nalidixic acid	1	0																						1								
Trimethoprim	1	0%																								1						
Sulfonamides																																
Sulfonamide	1	0																		1												
Aminoglycosides																																
Streptomycin	1	0													1																	
Gentamicin	1	0																	1													
Trimethoprim + sulfonamides	1	0%																									1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																		1												
Penicillins																																
Ampicillin	1	0																						1								
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. group C in Bovine meat - at slaughter - official food or feed controls - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

S. group C

Bovine meat - at slaughter - official food or feed controls

Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	5

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	2	0%										1	1																			
Amphenicols																																
Chloramphenicol	2	0														1		1														
Cephalosporin																																
Cefotaxim	2	0																						1	1							
Cefuroxim	2	0															2															
Fluoroquinolones																																
Ciprofloxacin	2	0																									2					
Enrofloxacin	2	0																				1					1					
Norfloxacin	2	0																						1	1							
Quinolones																																
Nalidixic acid	2	0																		1	1											
Trimethoprim	2	0%																			1	1										
Sulfonamides																																
Sulfonamide	2	0																				2										
Aminoglycosides																																
Streptomycin	2	0										2																				
Gentamicin	2	0												1			1															
Trimethoprim + sulfonamides	2	0%																			1	1										
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	2	0													2																	
Penicillins																																
Ampicillin	2	0																			2											
Number of multiresistant isolates																																

Footnote

VFL

Table Antimicrobial susceptibility testing of S. group O:4 in Poultry meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. group O:4
	Poultry meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	2	0%																1	1													
Amphenicols																																
Chloramphenicol	2	0																				1			1							
Cephalosporin																																
Cefotaxim	2	0																										1			1	
Cefuroxim	2	0																	1				1									
Fluoroquinolones																																
Ciprofloxacin	2	0																				1										1
Enrofloxacin	2	0																	1												1	
Norfloxacin	2	0																			1									1		
Quinolones																																
Nalidixic acid	2	50	1																				1									
Trimethoprim	2	50%	1																						1							
Sulfonamides																																
Sulfonamide	2	50	1																	1												
Aminoglycosides																																
Streptomycin	2	0							1					1																		
Gentamicin	2	0																2														
Trimethoprim + sulfonamides	2	50%	1																							1						
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	2	50			1															1												
Penicillins																																
Ampicillin	2	50	1																						1							
Number of multiresistant isolates																																
fully sensitives	1	50																														
resistant to >4 antimicrobials	1	50																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Gallinarum in Mixed meat - minced meat - quantitative data [Diffusion method]

Percentage of resistant isolates (R%) and percentage of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to

	S. Gallinarum
	Mixed meat - minced meat
Isolates out of a monitoring program	yes
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**%R**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**
Tetracycline	1	0%																				1										
Amphenicols																																
Chloramphenicol	1	0																								1						
Cephalosporin																																
Cefotaxim	1	0																														1
Cefuroxim	1	0																								1						
Fluoroquinolones																																
Ciprofloxacin	1	0																														1
Enrofloxacin	1	0																														1
Norfloxacin	1	0																														1
Quinolones																																
Nalidixic acid	1	0																										1				
Trimethoprim	1	0%																														1
Sulfonamides																																
Sulfonamide	1	0																											1			
Aminoglycosides																																
Streptomycin	1	0																				1										
Gentamicin	1	0																						1								
Trimethoprim + sulfonamides	1	0%																														1
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																		1												
Penicillins																																
Ampicillin	1	0																													1	
Number of multiresistant isolates																																

Footnote

VFL

Table 3.2.6 Breakpoints for antibiotic resistance of Salmonella in Animals

Test Method Used

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

Standards used for testing

- NCCLS
- CASFM

Subject to quality control

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracycline	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin	NCCLS						5	20		16
Norfloxacin	NCCLS						10	17		12
Quinolones										
Nalidixic acid	NCCLS						30	19		13
Trimethoprim	NCCLS						5	16		10
Sulfonamides										
Sulfonamide	NCCLS						300	17		12
Sulfisoxazol (sulfafurazol)	NCCLS						250	17		12
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides	NCCLS							16		10
Cephalosporin										
Cefotaxim	NCCLS						30	23		14
Cefuroxim	NCCLS						30	18		14
3rd generation cephalosporins										
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	NCCLS						300	17		14
Penicillins										
Ampicillin	NCCLS						10	17		13

Table 3.2.6 Breakpoints for antibiotic resistance of Salmonella in Food

Test Method Used

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

Standards used for testing

- NCCLS
- CASFM

Subject to quality control

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracycline(1)	NCCLS						30	19		14
Amphenicols										
Chloramphenicol(2	NCCLS						30	18		12
Florfenicol										
Fluoroquinolones										
Ciprofloxacin(3)	NCCLS						5	21		15
Enrofloxacin(4)	NCCLS						5	20		16
Norfloxacin(13)	NCCLS						10	17		12
Quinolones										
Nalidixic acid(5)	NCCLS						30	19		13
Trimethoprim(6)	NCCLS						5	16		10
Sulfonamides										
Sulfonamide(7)	NCCLS						300	17		12
Aminoglycosides										
Streptomycin(8)	NCCLS						10	15		11
Gentamicin(9)	NCCLS						10	15		12
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides(10)	NCCLS							16		10
Cephalosporin										
Cefotaxim(11)	NCCLS						30	23		14
Cefuroxim(12)	NCCLS						30	18		14
3rd generation cephalosporins										
Nitroimidazoles and Nitrofurans										
Nitrofurantoin(14)	NCCLS						300	17		14
Penicillins										
Ampicillin(15)	NCCLS						10	17		13

(1) : VFL -intermediate 15-18
(2) : VFL - intermediate 13-17
(3) : VFL - intermediate 16-20
(4) : VFL - intermediate 17-19
(5) : VFL - intermediate 14-18
(6) : VFL - intermediate 11-15
(7) : VFL - intermediate 13-16
(8) : VFL - intemediate 12-14
(9) : VFL - intermediate 13-14
(10) : VFL- disc content 1,25/23,75 mcg, intermediate 11-15
(11) : VFL intermediate 15-22
(12) : VFL - intermediate 15-17
(13) : VFL - intermediate 13-16

(14) : VFL - intermediate 15-16
(15) : VFL -intermediate 14-16

Table 3.2.6 Breakpoints for antibiotic resistance of Salmonella in Feedingstuff

Test Method Used

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

Standards used for testing

- NCCLS
- CASFM

Subject to quality control

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracycline	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin	NCCLS						5	20		16
Norfloxacin	NCCLS						10	17		12
Quinolones										
Nalidixic acid	NCCLS						30	19		13
Trimethoprim	NCCLS						5	16		10
Sulfonamides										
Sulfonamide	NCCLS						300	17		12
Sulfisoxazol (sulfafurazol)	NCCLS						250	17		12
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides	NCCLS							16		10
Cephalosporin										
Cefotaxim	NCCLS						30	23		14
Cefuroxim	NCCLS						30	18		14
3rd generation cephalosporins										
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	NCCLS						300	17		14
Penicillins										
Ampicillin	NCCLS						10	17		13

Table 3.2.6 Breakpoints for antibiotic resistance of Salmonella in Humans

Test Method Used

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

Standards used for testing

- NCCLS
- CASFM

Subject to quality control

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracycline	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin	NCCLS						5	20		16
Norfloxacin	NCCLS						10	17		12
Quinolones										
Nalidixic acid	NCCLS						30	19		13
Trimethoprim	NCCLS						5	16		10
Sulfonamides										
Sulfonamide	NCCLS						300	17		12
Sulfisoxazol (sulfafurazol)	NCCLS						250	17		12
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides(1)	NCCLS							16		10
Cephalosporin										
Cefotaxim	NCCLS						30	23		14
Cefuroxim	NCCLS						30	18		14
3rd generation cephalosporins										
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	NCCLS						300	17		14
Penicillins										
Ampicillin	NCCLS						10	17		13

(1) : 1,25/23,75 mcg

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

Human campylobacteriosis is one of the most important diseases in Estonia.
Since 1997 the highest number of cases were registered in 1999 (150 cases). The rate of incidence varies between 7,2 and 9,1.
No outbreaks were reported.

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

There are no official monitoring programmes in regard to Campylobacter in animals and feedengstuffs.
76 food samples were examined in 2004, 15 (19,7 %) of them were positive. Studies indicate that the vast majority of positive samples were due to C.jejuni.
In 2004 broiler meat and cheeses were examined according to Commission Recommendation of 19 December 2003 conserning coordinated programme for the official control of foodsuffs for 2004 (2004/24/EC). All samples were negative.
The presence of Campylobacter in foodstuffs taken at retail level is considered to be low. At the same time the number of samples taken has been reduced.

Year	No of samples analysed in regard of Campylobacter	No of positive samples	%
1999	450	4	0,9
2000	200	2	1
2001	53	0	0
2002	1	0	0
2003	0	0	0
2004	36	0	0

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

Poultry meat is thought to be the most significant source of infection in humans. In most cases the sources of infection are not laboratory confirmed. C.jejuni is a predominant isolate in foodstuffs and in humans.

2.2.2. Campylobacteriosis in humans

A. Thermophilic Campylobacter in humans

Reporting system in place for the human cases

Campylobacter is a zoonotic infection of statutory monitoring according to the Communicable Diseases Prevention and Control Act (2003) and Regulation 297/2003. It complines with the EU standarts as laid down in the Commission Decisions 2119/98/EC, 2003/99/EC and 2002/253/EC.
The surveillance system is based on a double system of obligatory reporting. Clinicians, mainly family physicians (GPs) and laboratories are diagnosing and reporting cases of campylobacteriosis(under the Communicable Diseases Prevention and Control Act and Ministerial Regulation nr 297/2003).
The notification system is paper-based (with standard forms) and reporting by phone is required for indicated suspicion and clusters with foodborne transmission.
Reports are prepared by GP/med. doctors and sent on standard individual form to the HPI local offices and then in aggregated form sent to the national level.
Finally, the data are aggregated centrally within the HPI database.

Case definition

Clinical description:
Clinical picture compatible with campylobacteriosis, e.g. diarrhoeal illness of variable severity.
Laboratory criteria for diagnosis:
-Isolation of Campylobacter sp. from any clinical specimen.
Case definition:
Probable case: a clinically compatible case with an epidemiological link.
Confirmed case: a clinicaly compatible case that is laboratory confirmed.

Diagnostic/analytical methods used

Cultivation according to internationally accepted methods. Manual of clinical microbiology. 2003. 8th ed. Murray, P. R. et al.(eds). Washington, DC: American Society for Microbiology.
Quality assurance procedures:
Internal Quality Assurance (IQA) according to Quality Manual of the laboratory (EVS-EN ISO/IEC 17025:2000).
External Quality Assurance (EQA) from Labquality Helsinki, Finland.

Notification system in place

Compulsory notification is in place since 1988. Under Estonian legislation (Regulation of Ministry of Social Affairs No 99, in force since 01.08.2003) cases of human campylobacteriosis should be reported to the local department of Veterinary and Food Board to define animal sources and transmission routes of zoonoses.

History of the disease and/or infection in the country

Estonia has started to register human cases of campylobacteriosis in 1997. From the beginning of campylobacteriosis surveillance the number of notified cases varied between 52 in 1997 and

150 in 1999. Average rate per 100 000 inhabitans was 7,9.

Year	Incidence rate per 100 000 inhabitants
1997	3,6
1998	6,9
1999	10,4
2000	9,1
2001	8,3
2002	8,3
2003	7,2
2004	9,1

Results of the investigation

The number of cases reported for human campylobacteriosis was 124 in 2004. 120 of the total number of cases were autochtone and 4 cases were imported. The vast majority of the cases were caused by Campylobacter jejuni - 98% of total cases (122 cases) and 2% by Campylobacter Coli (2 cases).
In 2004 from the total number of cases, 4 (3,2 %) persons had acquired their infection abroad (Turkey - 2, United Kingdom - 1, Austria - 1).
All cases were sporadic, no outbreaks have been registered.
In 2004 cases of campylobacteriosis were registered from March to November with the maximum level in September.
The age distribution shows the highest incidence in the age group 1-4 years old - 33 % of total number of cases.

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

The campylobacter is commonly present in the alimentary tracts of mammals and birds. The bacterium is unable to multiply outside the alimentary tract but survives for long periods, in, for example, water systems. Poultry meat and contaminated drinking water are thought to be most significant sources of infection in humans. Clear seasonal fluctuation can be seen in the prevalence of campylobacter infections: infections are more common late summer and early autumn.
Developing and implementation of monitoring programmes with the aim of discovery of the most probable sources of infection will be the objective in fortcoming years.

Relevance as zoonotic disease

Human campylobacteriosis is of high public health importance.

Table 6.3.A Campylobacteriosis in man - species/serotype distribution

	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc	unknown status
Campylobacter	124	9	120	8	4	0	0
C. coli	2	0,1	2	0,1	0	0	0
C. jejuni	122	9,0	118	8,7	4	0,3	0
C. upsaliensis	0	0	0	0	0	0	0

Table 6.3.B Campylobacteriosis in man - age distribution

Age Distribution	C. coli			C. jejuni			Campylobacter spp.		
	All	M	F	All	M	F	All	M	F
<1 year									
1 to 4 years									
5 to 14 years									
15 to 24 years									
25 to 44 years									
45 to 64 years									
65 years and older									
Age unknown									
Total :	0	0	0	0	0	0	0	0	0

Footnote

Data on C.jejuni and C.coli by age is not available

Table 6.3.C Campylobacteriosis in man - seasonal distribution

Month	C. coli	C. jejuni	C. upsaliensis	Campylobacter spp.
	Cases	Cases	Cases	Cases
January	0	4	0	0
February	0	3	0	0
March	0	9	0	0
April	0	12	0	0
May	0	8	0	0
June	0	11	0	0
July	0	13	0	0
August	0	14	0	0
September	0	17	0	0
October	0	14	0	0
November	2	14	0	0
December	0	5	0	0
not known	0	0	0	0
Total :	2	124	0	0

2.2.3. Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

Fresh refrigerated poultry meat was sampled and tested for the presence of thermophilic Campylobacter according to the Commission Recommendation of 19 December 2003 conserning coordinated programme for the official control of foodsuffs for 2004 (2004/24/EC)
Programme started in July 2004. Sampling was performed by the officials of Veterinary and Food Board and samples were analysed in Veterinary and Food Laboratory (VFL).

At meat processing plant

Random sampling of meat from other EU member states was performed at their first destination establishment by the officials of Veterinary and Food Board and samples were analysed in Veterinary and Food Laboratory (VFL).

At retail

Sampling is performed partly according to Commission Recommendation of concerning a coordinated programme for the official control of foodstuffs for 2004 and partly in the frames of surveillance programme of HPI. Sampling was performed by the officials from the Health Protection Inspectorate. Samples were analysed in the Health Protection Inspectorate`s laboratories of Microbiology.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling takes place during the months July to December

At meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling takes place during the months May to October

Type of specimen taken

At slaughterhouse and cutting plant

Other: neck skin

At meat processing plant

Fresh meat

At retail

Fresh meat

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

10 g of neck skin, n=5, c=0. Subsamples were analysed individually.

At meat processing plant

25 g of meat was sampled, handled hygienically, placed in refrigerated containers and sent immediately to the laboratory.

At retail

The samples, of 10 g each taken from breast meat, handled hygienically, placed in refrigerated containers and sent immediately to the laboratory.

Definition of positive finding

At slaughterhouse and cutting plant

The sample was considered positive, if in any of five subsamples Thermophilic Campylobacter was isolated.

At meat processing plant

A sample where Thermofilic Campylobacter was isolated

At retail

A sample where Thermofilic Campylobacter was isolated.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: NMKL 119:1990, ISO 10272:1995

At meat processing plant

Bacteriological method: NMKL 119:1990, ISO 10272:1995

At retail

Bacteriological method: NMKL 119:1990

Control program/mechanisms

The control program/strategies in place

Commission Recommendation of 19 December 2003 concerning coordinated programme for the official control of foodstuffs for 2004 (2004/24/EC) includes sampling at slaughterhouse and retail.
In addition, at retail level, the sampling is performed according to the annual sampling plan approved by the Health Protection Inspectorate Director General.
Broiler meat from other member states was sampled at their first destination establishments (processing plants or wholesale storages).

Measures in case of the positive findings or single cases

The own check plan of the food handling establishment should be improved.
The food or raw material for food already existing on the market should be removed from handling.

Notification system in place

According to Infectious Animal Disease Control Act laboratories inspecting the safety and quality of the products of enterprises which handle animal products are required to notify the Veterinary and Food Board of the isolation of pathogens which cause infectious animal diseases subject to notification or registration or of suspicion of the occurrence of such pathogens in raw material or products. Campylobacter jejuni is pathogen subject to registration.
Laboratories report quaterly the list of registered pathogens in food to the Veterinary and Food Board.

Results of the investigation

Altogether 15 (26,8 %) of 56 poultry meat samples tested in the year 2004 against Campylobacter were positive. C.jejuni was detected in 13 (86,7 %) samples, in 1 sample - C.coli and in 1 sample - C.lari.

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

The occurence of Campylobacter in fresh broiler meat is quite high. The prevalence of C.jejuni is obvious.

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

The most of the human cases are foodborne and suspected relevance of human cases to foodstuffs (broiler meat, drinking water) was not laboratory confirmed. In 98 % cases human campylobacteriosis was caused by C.jejuni.

Table 6.2 Thermophilic Campylobacter spp. in food

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	C. lari	C. jejuni	C. coli	C. upsaliensis	Campylobacter spp.
Poultry meat										
fresh										
- at processing plant (2)	VFB		sample	25	12	1	3	1		
- at retail	surv., HPI		sample	10	7					
- at retail - monitoring programme (5)	HPI		sample	10	10					
- at slaughter - monitoring programme (7)	VFB		sample	10	27		10			
cow milk										
raw (3)	surv., VFB		sample	25	1					
Dairy products										
ready-to-eat (4)	retail, HPI		sample	10	5					
Cheeses										
- at retail - monitoring programme (6)	HPI		sample	10	14					

(1) : VFL
(2) : meat from other EU member states, sampled at their first destination establishment
(3) : VFL
(4) : surveillance
(5) : Commission Recommendation 2004/24/EC
(6) : Commission Recommendation 2004/24/EC
(7) : Commission Recommendation 2004/24/EC
every sample consists of 5 subsamples

Footnote

VFB - Veterinary and Food Board; Surv., VFB - Surveillance Veterinary and Food Board
VFL - Veterinary and Food Laboratory
HPI - Health Protection Inspectorate; Surv., HPI - Surveillance Health Protection Inspectorate

2.2.4. Campylobacter in animals

2.2.5. Antimicrobial resistance in *Campylobacter* isolates

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

The data indicate that the number of laboratory confirmed cases of Listeriosis in Estonia has been very low. There were 3 cases of human listeriosis recorded between 1999 and 2004.
No outbreaks involving Listeria were reported.

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

2,9 % of samples examined in 2004 were positive for Listeria. The prevalent presence of Listeria was determined in fishery products. 25 (22,9%) of 109 investigated fishery products contained Listeria monocytogenes. 6 (1,1 %) meat products, 1 (0,8) cheese, 3 (0,9 %) dairy products - 2 of them were raw cows milk for direct human consumption - were positive in 2004.
16 cheese samples were examined in regard of Listeria according to Commission Recommendation of 19 December 2003 concerning coordinated programme for the official control of foodsuffs for 2004 (2004/24/EC). In no one Listeria was detected.
The surveillance data from 1999 till 2004 indicate that the overall prevanlence of Listeria in foodstuffs taken at retail level and examined for Listeria was 0,7%.

Year	No of samples	No of positive samples	%
1999	1139	15	1,3
2000	486	2	0,4
2001	731	2	0,3
2002	545	4	0,7
2003	591	4	0,7
2004	308	0	0

In general, the occurrence of L.monocytogenes in foodstuffs at retail level is low.
Fish products may represent a risk to the consumer in regard to Listeria according to surveillance data.

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

Foodborne transmission is believed to be more important than transmission from animals.

2.3.2. Listeriosis in humans

A. Listeriosis in humans

Reporting system in place for the human cases

GP/Health Care professional report laboratory confirmed cases of listeriosis to Public Health Regional Office. They report data to the Health Protection Inspectorate, where the data are aggregated nationally.

Case definition

Clinical description:
Infection caused by Listeria monocytogenes, which may produse any several clinical syndromes, including stillbirth, listeriosis of the newborn, meningitis, bacterimia, or localized infections.
Laboratory criteria for diagnosis:
-Isolation of L. monocytogenes from a normally sterile site (e.g. blood or cerebro-spinal fluid or, less commonly, joint, pleural, or pericardial fluid.
Case definition:
Confirmed case: a clinically compatible case that is laboratory confirmed.

Diagnostic/analytical methods used

Cultivation according to internationally accepted methods. Manual of clinical microbiology. 2003. 8th ed. Murray, P. R. et al.(eds). Washington, DC: American Society for Microbiology.
Quality assurance procedures:
Internal Quality Assurance (IQA) according to Quality Manual of the laboratory (EVS-EN ISO/IEC 17025:2000).
External Quality Assurance (EQA) from Labquality Helsinki, Finland.

Notification system in place

The human listeriosis is in the list of notifiable infectious diseases since 2003.

History of the disease and/or infection in the country

The annual incidence of human listeriosis in Estonia so far has been very low and predominantly involved sporadic cases. In the years 2000 - 2003 there were no registered cases of listeriosis.

Results of the investigation

A total of 2 confirmed cases of listeriosis were notified, in both L.monocytogenes was detected.

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

In the past six years (1999-2004), 3 cases of human listeriosis have been reported in Estonia, one case (inc rate 0,07) in 1999 and two cases (inc rate 0,15) in 2004. All cases were sporadic, no clusters have been registered. All of them were caused by Listeria monocytogenes.

Relevance as zoonotic disease

Listeriosis in humans is a relatively rare disease in Estonia.

Table 7.2.A Listeriosis in man - species/serotype distribution

Listeria	Cases	Cases Inc
	2	0
Listeria spp.	2	0,15
congenital cases	0	0
deaths	0	0

Table 7.2.B Listeriosis in man - age distribution

Age Distribution	L. monocytogenes			Listeria spp.		
	All	M	F	All	M	F
<1 year	0	0	0			
1 to 4 years	0	0	0			
5 to 14 years	0	0	0			
15 to 24 years	0	0	0			
25 to 44 years	0	0	0			
45 to 64 years	2	1	1			
65 years and older	0	0	0			
Age unknown	0	0	0			
Total :	2	1	1	0	0	0

2.3.3. Listeria in foodstuffs

Table 7.1 Listeria monocytogenes in food

	Source of information	Remarks	Epidemiological unit	Sample weight	Definition used	Units tested	<100 cfu/g	>100 cfu/g	L. monocytogenes
Bovine meat									
meat products									
ready-to-eat									
- at retail	HPI, surv.		sample	25 g		7			0
Pig meat									
meat products									
ready-to-eat									
- at retail	HPI, surv.		sample	25 g		22			0
Poultry meat									
meat products									
ready to eat									
- at retail	HPI, surv.		sample	25 g		32			0
Other meat									
meat products									
ready-to-eat									
- at processing plant (1)	surv., VFB		sample	25 g		385			6
- at processing plant - environmental sample	surv., VFB		swab			15			0
- at retail	surv., HPI			25 g		144			0
Cheeses									
- at processing plant (2)	surv., VFB		sample	25 g		126			1
- at retail	surv., HPI		sample	25 g		7			0
- at retail - monitoring programme (4)	HPI		sample	25 g		16			0
Dairy products									
other products									
ready-to-eat									
- at processing plant (3)	surv., VFB		sample	25 g		244			1
- at retail	surv., HPI		sample	25 g		62			0
ready-to-eat									
- at processing plant - environmental sample	surv., VFB	swab	sample			5			0

cow milk									
raw									
for direct human consumption	surv., VFB		sample	25 g		2			2
heat-treated									
- at processing plant - surveillance	VFB		sample	25 g		21			0
Fishery products									
fish									
smoked									
- at processing plant	surv., VFB		sample	25 g		20			0
- at retail	surv., HPI		sample	25 g		3			0
other									
- at retail	surv., HPI		sample	25 g		2			0
- at processing plant - surveillance	VFB		sample	25 g		84			25
Bakery products									
- at retail - surveillance	HPI		sample	25 g		10			0
Other food									
- at retail - surveillance	HPI		sample	25 g		3			0
- at processing plant - surveillance	VFB		sample	25 g		5			0

(1) : including import
(2) : including import
(3) : including import
(4) : Commission Recommendation 2004/24/EC

Footnote

VFB - Veterinary and Food Board; Surv. VFB - Surveillance Veterinary and Food Board
HPI - Health Protection Inspectorate; Surv. HPI - Surveillance Health Protection Inspectorate

2.4. VEROCYTOTOXIC ESCHERICHIA COLI

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

No human cases of VTEC ever reported.

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

There are no official monitoring or surveillance programmes in regard to Verotoxigenic E.coli in animals and food.
In 2004 10 food samples were examined randomly in the frames of import control. No one was positive.

2.4.2. Verocytotoxic Escherichia coli in humans

A. Verotoxigenic Escherichia coli infections in humans

Reporting system in place for the human cases

GP/Health Care professional report laboratory confirmed cases of Verotoxigenic Escherichia coli infections to Public Health Regional Office. They report data to the Health Protection Inspectorate, where the data are aggregated nationally.

Case definition

Clinical description:
Clinical picture compatible with EHEC infection e.g. diarrhoe (often bloody) and abdominal cramps. Illness may be complicated by haemolytic uremic syndrome (HUS) or thrombotic thrombocytopenic purpura (TTP); asymptomatic infections also may occur.
Hemolytic uremic syndrome (HUS) is characterised by the acute onset of microangiopathic hemolytic anemia, renal injury, and low platelet count. Thrombotic thrombocytopenic purpura (TTP) also is characterized by these features but can include central nervous system (CNS) involvement and fever and may have a more gradual onset. Most cases of HUS (but few cases of TTP) occur after an acute gastrointestinal illness (usually diarrheal).
Laboratory criteria for diagnosis:
Detection of VTEC:
a method - using an enrichment step selective plating (such as CT-SMAC) testing for Verotoxin using phenotypic or genotypic characteristics.
Detection of O157:
a method - testing specifically for O157 or
detected by serotyping VTEC.
Case classification:
HUS clinical case:
a clinically compatible case.
HUS laboratory confirmed case:
a clinical compatible case where verocytotoxic E. coli has been isolated using a method specified above.
HUS laboratory confirmed case caused by 0157.
a clinical compatible case where verocytotoxic E. coli O157 has been isolated using a method specified above
HUS laboratory confirmed case caused by other VTEC.
a clinical compatible case where verocytotoxic E. coli of another serotype than O157 has been isolated using a method specified above.
E. coli infection (except HUS) clinical case.
a clinically compatible case.
E. coli infection (except HUS) laboratory confirmed case:
a clinical compatible case where verocytotoxic E. coli has been isolated using a method specified above.
E. coli infection (except HUS) laboratory confirmed case caused by 0157:
a clinical compatible case where verocytotoxic E. coli O157 has been isolated using a method specified above.

E. coli infection (except HUS) laboratory confirmed case caused by other VTEC:
a clinical compatible case where verocytotoxic E. coli of another serotype than O157 has been isolated using a method specified above.

Diagnostic/analytical methods used

Cultivation according to internationally accepted methods. Manual of clinical microbiology. 2003. 8th ed. Murray, P. R. et al.(eds). Washington, DC: American Society for Microbiology.
Quality assurance procedures:
Internal Quality Assurance (IQA) according to Quality Manual of the laboratory (EVS-EN ISO/IEC 17025:2000).
External Quality Assurance (EQA) from Labquality Helsinki, Finland.

Notification system in place

Notification is in place since 1958.

History of the disease and/or infection in the country

There were no human cases reported.

Results of the investigation

No human cases were notified in 2004.

Table 11.3.A Verocytotoxic Escherichia coli infections in man - species/serotype distribution

Pathogenic Escherichia coli	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
HUS	0	0	0	0	0	0
- clinical cases	0	0	0	0	0	0
- lab. confirmed cases	0	0	0	0	0	0
- caused by O157 (VT+)	0	0	0	0	0	0
- caused by other VTEC	0	0	0	0	0	0
E.coli infect. (except HUS)	0	0	0	0	0	0
- laboratory confirmed	0	0	0	0	0	0
- caused by 0157 (VT+)	0	0	0	0	0	0
- caused by other VTEC	0	0	0	0	0	0

Table 11.3.B Verocytotoxic Escherichia coli infections in man - age distribution

Age Distribution	Verotoxigenic E. coli (VTEC)			VTEC O 157:H7			VTEC non-O 157		
	All	M	F	All	M	F	All	M	F
<1 year	0	0	0	0	0	0	0	0	0
1 to 4 years	0	0	0	0	0	0	0	0	0
5 to 14 years	0	0	0	0	0	0	0	0	0
15 to 24 years	0	0	0	0	0	0	0	0	0
25 to 44 years	0	0	0	0	0	0	0	0	0
45 to 64 years	0	0	0	0	0	0	0	0	0
65 years and older	0	0	0	0	0	0	0	0	0
Age unknown	0	0	0	0	0	0	0	0	0
Total :	0	0	0	0	0	0	0	0	0

2.4.3. Pathogenic Escherichia coli in foodstuffs

Table 11.2 Verocytotoxic Escherchia coli in food

	Source of information	Remarks	Epidemiological unit	Sample weight	Units tested	Units positive	VTEC O 157	VTEC O 157:H7
Vegetables								
- import - surveillance	VFB		sample		4	0		
Mill-products								
- import - surveillance	VFB		sample		1	0		
Processed fruits and vegetables								
- import - surveillance	VFB		sample		5	0		

Footnote

VFB - Veterinary and Food Board

2.4.4. Pathogenic Escherichia coli in animals

2.5. TUBERCULOSIS

2.5.1. General evaluation of the national situation

A. Tuberculosis General evaluation

History of the disease and/or infection in the country

Tuberculosis in animals has been notifiable since 1962.
The last case of bovine Tuberculosis has been detected in Estonia in 1986. Estonia consider the estonian herds tuberculosis free and plan to ask tuberculosis free status from EC.
The incidence rate of human pulmonary tuberculoses due to M.tuberculosis in Estonia is among the highest in Europe. The prevention and surveillance of human Tuberculosis in Estonia is based on the national prevention programme for TB 2004-2007. Tuberculosis Register has been created in 1997.

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

In current legislation the disease is notifiable according to the Regulation on requirements for controlling tuberculosis of bovine animals approved by directive of Minister of Agriculture No 61, 23.04.2004.
According to the abovementioned Regulation if Tuberculosis is suspected in a bovine animal the official veterinarian is obligated to take action to confirm the diagnosis and prevent the spread of the disease.
Holding infected or suspected of being infected with tuberculosis is subjected under official restrictions with effective preventive methods against the spread of the disease. This includes strict prohibition of all movement and transportation of animal and person other than official veterinarians and those concerned with the care of the animals.
The infection is eradicated by stamping out of the entire herd. The prophylaxis of tuberculosis has been carried out by avoiding the infection of a tuberculosis-free herd and finding the infected animals on time by regular tuberculin testing of the herd. Every year the examination for tuberculosis has been based on the State Programme on Monitoring and Surveillance of Animal Infectious Diseases, which is approved by Director General of Veterinary and Food Board.
There were no reported cases of human tuberculosis due to M.bovis in the year 2004. All bacteriologically confirmed cases in humans have been caused by M.tuberculosis. The increased number of multi-drug resistant Mycobacterium Tuberculosis strains and co-infection with HIV becomes a big problem.

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

Since bovine tuberculosis in cattle seems to be eliminated in Estonia, there is no probability of contracting M.bovis infection from domestic animals or domestic animal products.
All bacteriologically confirmed cases in humans have been caused by M.tuberculosis.

2.5.2. Tuberculosis in humans

A. Tuberculosis due to Mycobacterium bovis in humans

Reporting system in place for the human cases

Tuberculosis is a zoonotic infection of statutory monitoring according to the Communicable Diseases Prevention and Control Act (2003) and Regulation 297/2003. It complies with the EU standards as laid down in the Commission Decisions 2119/98/EC, 2003/99/EC and 2002/253/EC.
The surveillance system is based on a double system of obligatory reporting. Clinicians, mainly family physicians (GPs) and laboratories are diagnosing and reporting cases of tuberculosis (under the Communicable Diseases Prevention and Control Act and Ministerial Regulation nr 297/2003.
The notification system is paper-based (with standard forms).
Reports are prepared by GP/med. doctors and sent on standard individual form to the HPI local offices and then in aggregated form sent to the national level.
Finnaly, the data are aggregated nationally within the HPI database.

Case definition

Clinical criteria:
-a clinician`s judgement that clinical and/or symptoms are compatible with tubrculosis and
-a clinician`s decision to treat the patient with a full course anti-tuberculosis therapy
Laboratory criteria:
-isolation of Mycobacterium tuberculosis complex (exept M.bovis BCG) from any clinical specimen by culture
-evidence of acid-fast bacilli (AFB) at microscopic examination of spontaneous or induced sputum.

Diagnostic/analytical methods used

X-ray, clinical symptoms, microbiological confirmation:
- bacterioscopy, staining by Ziel-Neelsen method or fluorochrome method,
- plating to Löwenstein-Jensen egg agar,
- isolation on liquid media (BACTEC MGIT 960 automated system),
- identification by HAIN Lifescience GenoType molecular method,
- drugresistance testing by BACTEC MGIT liquid media system.

Notification system in place

Tuberculosis is a notifiable disease in Estonia since 1950.

History of the disease and/or infection in the country

The prevention and surveillance of tuberculosis in Estonia is based on the national prevention programme for TB 2004-2007. Tuberculosis Registry had been created in 1997. The Register collects data on quality of treatment, disease prevalence, disease distribution by regions, age, gender, occupational status.
The incidence rate of pulmonary tuberculosis in Estonia is among the highest in Europe. The

causative agent of tuberculosis in humans is M.Tuberculosis, since bovine tuberculosis in cattle seems to be eliminated in Estonia.

Results of the investigation

No human cases of bacteriologically confirmed by M.bovis infection was reported in the year 2004. The predominant causal agent of human tuberculosis in Estonia is M.tuberculosis. In 2004 429 human cases of Tuberculosis caused by M.tuberculosis were reported, all of them were autochtone cases.

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

The incidence rate of pulmonary tuberculosis caused by M.tuberculosis rised sharply in 1990s and early 2000s.
In the last years a slight downward trend has been noted in Estonia.
In the years 1997-2004 the number of pulmonary tuberculosis notified cases varied between 407 (31,6 per 100 000 inhab.) and 583 (48 per 100 000 inhab.). The peak incidence was observed in 1998 (48,0 per 100 000 inhab.).
The age distribution shows the highest incidence among 30-59 years old individuals - 65% of total cases.
Infection was clearly more prevalent among prisoners.
A large problem is the increase of multi-drug resistant Mycobacterium tuberculosis (MRD-TB) strains, with maximum level in 1999 - 21,2% of tested tuberculosis isolates. Recent surveys have shown a decrese in newly diagnosed MRD-TB patients. In 2004 16,9% of tested tuberculosis isolates in newly diagnosed cases were MRD-TB.
Co-infection with HIV is an increasing problem among tuberculosis patients.

Relevance as zoonotic disease

The probability of contacting M.bovis infection from Estonian animals or animal products of Estonian origin is close to zero.

Table 1.2.A Tuberculosis in man - species/serotype distribution

Mycobacterium	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
	429	31	429	31	0	0
M. bovis	0	0	0	0	0	0
M. tuberculosis	429	31,6	429	31,6	0	0
reactivation of previous cases	84	6,2	84	6,2	0	0

Table 1.2.B Tuberculosis in man - age distribution

Age Distribution	M. bovis			M. tuberculosis		
	All	M	F	All	M	F
<1 year	0	0	0	0	0	0
1 to 4 years	0	0	0	1	0	1
5 to 14 years	0	0	0	1	0	1
15 to 24 years	0	0	0	23	12	11
25 to 44 years	0	0	0	164	112	52
45 to 64 years	0	0	0	179	132	47
65 years and older	0	0	0	61	38	23
Age unknown	0	0	0	0	0	0
Total :	0	0	0	429	294	135

2.5.3. Mycobacterium in animals

A. Mycobacterium bovis in Bovine Animals

Status as officially free of bovine tuberculosis during the reporting year

Additional information

Estonian bovine herds are not OTF according to the EC legislation. Estonia have not asked the tuberculose free status from EC yet, but we are preparing mentioned documents already.

Monitoring system

Sampling strategy

Sampling is targeted (all milking cows, heifers and bulls used for insemination once a year). All bulls in the artificial insemination centres twice a year, young animals are investigated beginning from 24 months). Official veterinarians of the Veterinary and Food Board and authorised veterinarians are performing sampling, samples are taken from the farms, sampling is part of a permanent monitorning scheme.

Frequency of the sampling

Milking cows, heifers, bulls used for insemination, young animals from 24 months once a year.
Bulls in the artificial insemination centres twice a year.

Type of specimen taken

Other: intradermal tuberculin test

Methods of sampling (description of sampling techniques)

Specimens for bacteriological examination are lymph nodes and internal organs.

Case definition

A positive case is defined as an animal from which Mycobacterium bovis has been isolated.

Diagnostic/analytical methods used

Laboratoy diagnostic method used in the VFL are performed according to OIE Manual of Standards 2000. Diagnostic tests are microscopy, histology, culture. Confirmation by biochemical tests and PCR. Method is accredited by the Estonian Accreditation Centre.

Vaccination policy

Vaccination against tuberculosis is forbidden in Estonia.

Control program/mechanisms

The control program/strategies in place

State Programme on Monitorning and Surveillance of Animal Infectious Diseases is a national programme approved by Director General of Veterinary and Food Board. Since 01.05.2004 the Ministry of Agriculture Regulation No 61 "Prevention against tuberculosis of bovine animals" (made in accordance with Community legislation) is in force.

Measures in case of the positive findings or single cases

Veterinary and Food Board apply following restrictions and measures:
1) declare OTF status invalid
2) organize epidemiological investigation
3) ensure that all at least6 weeks old bovine animals who were native of tuberculose positive herds will be tuberculin tested according to the EC Regulation 1226/2002
4) all ponit 3 mentioned tuberculose positive animals will be slaughtered
5) bovine animals can be taken out from the heard only for slaughter
6) desinfection is required
7) milk has to be heat treated

Notification system in place

Infection with Mycobacterium bovis is notifiable in bovine animals since 1962 and since 2000 it is notifiable according to the Ministry of Agriculture Regulation No 34, "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

All samples have been negative in 2004.

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

Surveillance programme for bovine tuberculose started in 1962. The last positive case was reported in 1986. Consequently thereof we consider our bovine herds free from tuberculose.
From the year 2005 we implemented tuberculose surveillance programme according to the EC legislation.

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

There is no evidence of contracting domestic tuberculosis from animals.

Table 1.1.3 Tuberculosis in animals

	Source of information	Remarks	Epidemiological unit	Units tested	Units positive	M. bovis	M. tuberculosis	M. avium complex
Pigs	VFB		374	6014	1			1

Footnote

374-number of pig herds
6014-number of investigated pigs
2 samples from pigs were investigated bacteriologically in the VFL, both results were negative.
VFB - Veterinary and Food Board

1.1.1 Bovine tuberculosis

MANDATORY	**CATTLE**		
Number of herds under official control:	6548	Number of animals under official control:	145456
	OTF bovine herds	**OTF bovine herds with status suspended**	**Bovine herds infected with tuberculosis**
Status of herds at year end (a):(1)		0	0
New cases notified during the year (b):		0	0
	Units tested	**Units suspected**	**Units positive**
Routine tuberculin test (c) - data concerning herds:	6548	45	0
Routine tuberculin test (c) - data concerning animals:	145456	274	0
	Animals slaughtered	**Animals suspected**	**Animals positive**
Routine post-mortem examination (d):(2)	66486	4	0
		Herds suspected	**Herds confirmed**
Follow up of suspected cases in post-mortem examination (e):		0	0
Follow-up investigation of suspected cases: trace, contacts (f):		0	0
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (g):	741	10	0
Other routine investigations: tests at AI stations (h):	107	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (i):	0	0	0
Animals slaughtered (j):	0	0	0

VOLUNTARY	**CATTLE**		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (k):			
	Herds tested	**Herds suspected**	**Herds positive**
Other investigations: farms at risk (l):			
	Samples tested	***M. bovis*isolated**	
Bacteriological examination (m):	3	0	

(1) : The last tuberculosis positive case was in 1986, thereof we consider our herds tuberculose free and we are planning to ask from EC officialy tuberculosis free status.
(2) : all slaughtered animals examined

1.1.2 Tuberculosis in farmed deer

MANDATORY	FARMED DEER		
Number of herds under official control:	0	Number of animals under official control:	0
	"OTF" herds	**"OTF" herds with status suspended**	**Herds infected with tuberculosis**
Status of herds at year end (a):	0	0	0
New cases notified during the year (b):	0	0	0
	Units tested	**Units suspected**	**Units positive**
Routine tuberculin test (c) - data concerning herds:	0	0	0
Routine tuberculin test (c) - data concerning animals:	0	0	0
	Animals slaughtered	**Animals suspected**	**Animals positive**
Routine post-mortem examination (d):	0	0	0
		Herds suspected	**Herds confirmed**
Follow up of suspected cases in post-mortem examination (e):		0	0
Follow-up investigation of suspected cases: trace, contacts (f):		0	0
	Herds tested	**Herds suspected**	**Herds positive**
Other routine investigations: exports (g):	0	0	0
Other routine investigations: tests at AI stations (h):	0	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (i):	0	0	0
Animals slaughtered (j):	0	0	0

VOLUNTARY	FARMED DEER		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (k):			
	Herds tested	**Herds suspected**	**Herds positive**
Other investigations: farms at risk (l):			
	Samples tested	***M. bovis*isolated**	
Bacteriological examination (m):			

Footnote

In Estonia there are farmed deers only in two zoos, but those animals are not under State Programme concerning investigation of tuberculosis yet.

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 positive B.abortus case in bovine animals was registered in 1961.
B. melitensis in goat and sheep has been never reported in Estonia. There were no cases of human brucellosis in Estonia since 1968.

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

Estonian bovine and sheep herds are not OBF according to the EC legislation. Estonia are preparing documents to be granted a brucellosis-free status.
In 2005 the brucellosis surveillance programme in bovine animals has been implemented according to the EC legislation.
There are no official surveillance programmes for Brucella detection in food in Estonia.
No human cases were recorded during the last 37 years, so the situation seems to be stable.

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

As brucellosis in production animals has not been detected during the last 43 years, the risk of humans obtaining brucellosis from Estonian animal products is negligible.

2.6.2. Brucellosis in humans

A. Brucellosis in humans

Reporting system in place for the human cases

GP/Health Care professional report about laboratory confirmed cases of brucellosis to the Public Health Regional Office. They report data to the Health Protection Inspectorate, where the data are aggregated nationally.

Case definition

Clinical description - clinical picture compatible with brucellosis e.g. acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache and arthralgia.
Laboratory criteria for diagnosis:
-isolation of Brucella sp. from clinical specimen,
-a four fold or greater rise in specific antiserum antibody,
-demonstration by immunofluorescence of Brucella sp. in a clinical specimen
-a single high titre is considered a probable case.
Case classification:
Suspected case:
a case that is compatible with the clinical description and is epidemiologically linked to suspected or confirmed animal cases or contaminated animal products.
Confirmed case:
a clinically compatible case that is laboratory confirmed.

Diagnostic/analytical methods used

Serum agglutination test. Instruction for use of Bacto Brucella Antigens.
Quality assurance procedures:
Internal Quality Assurance (IQA) according to Quality Manual of the laboratory (EVS-EN ISO/IEC 17025:2000).
External Quality Assurance (EQA) from Labquality Helsinki, Finland.

Notification system in place

Compulsory notification is in place since 1947. Under the Regulation of Ministry of Social Affairs No 99 (in force since 01.08.2003) local offices of HPI provide obligatory information to the local Veterinary Centres about all registered cases of human brucellosis.

History of the disease and/or infection in the country

Brucellosis is a zoonotic infection of statutory monitoring according to the Communicable Diseases Prevention and Control Act (2003), Regulation 297/2003 in Estonia and 2003/99/EC Zoonoses Directive.
The last reported case of brucellosis in human was in 1968.

Results of the investigation

No humans cases of Brucellosis have been reported in Estonia in the year 2004.

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

Human brucellosis has not been recorded during 37 years.

Relevance as zoonotic disease

At present time brucellosis is a very rare infection in Estonia.

Table 2.3.A Brucellosis in man - species/serotype distribution

Brucella	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
	0	0	0	0	0	0
B. abortus	0	0	0	0	0	0
B. melitensis	0	0	0	0	0	0
B. suis	0	0	0	0	0	0
occupational cases	0	0	0	0	0	0

Table 2.3.B Brucellosis in man - age distribution

Age Distribution	B. abortus			B. melitensis			Brucella spp.		
	All	M	F	All	M	F	All	M	F
<1 year	0	0	0	0	0	0	0	0	0
1 to 4 years	0	0	0	0	0	0	0	0	0
5 to 14 years	0	0	0	0	0	0	0	0	0
15 to 24 years	0	0	0	0	0	0	0	0	0
25 to 44 years	0	0	0	0	0	0	0	0	0
45 to 64 years	0	0	0	0	0	0	0	0	0
65 years and older	0	0	0	0	0	0	0	0	0
Age unknown	0	0	0	0	0	0	0	0	0
Total :	0	0	0	0	0	0	0	0	0

2.6.3. Brucella in foodstuffs

2.6.4. Brucella in animals

A. Brucella abortus in Bovine Animals

Status as officially free of bovine brucellosis during the reporting year

Additional information

Estonian bovine herds are not OBF according to the EC legislation. Estonia has not asked the brucellosis free status from EC, but we are preparing mentioned documents already.

Monitoring system

Sampling strategy

Compulsory bacteriological investigation of all abortions.
Milking cows are tested serologically once a year, sampling is random - every third milk sample (selected by Veterinary and Food Laboratory from the milk samples for leucosis investigations) is tested.
Sampling is performed by the VFB official veterinarians and authorised veterinarians. Samples are taken from the farm.
Sampling is a part of a permanent monitorning scheme.

Frequency of the sampling

once a year

Type of specimen taken

Milk

Methods of sampling (description of sampling techniques)

Pooled milk samples (10 animals) from cows and pooled blood samples (10 animals) from heifers and bulls.
Abortion - fetuses and fetal membranes

Case definition

A positive case is defined as an animal from which B.abortus has been isolated.

Diagnostic/analytical methods used

Laboratoy diagnostic method used in VFL is performed according to OIE Manual of Standards 2000. Diagnostic test - serology (indirect ELISA) for monitoring purposes. If samples react positively in screening tests, confirmation would be performed by the other serological tests (CFT, CompELISA).
For clinical cases (abortion) - microbiological examination for isolation and identification of bacteria. Confirmation is done by biochemical tests and the slide agglutination test and

sending Brucella strain to a reference laboratory.
Method is accredited by the Estonian Accreditation Centre.

Vaccination policy

Vaccination against brutcellosis is forbidden in Estonia.

Control program/mechanisms

The control program/strategies in place

State Programme on Monitorning and Surveillance of Animal Infectious Diseases is a national programme approved by Director General of Veterinary and Food Board. Ministry of Agriculture Regulation No 120 "Prevention against brucellosis of bovine animals" (made up accordance with Community legislation) is in force since 06.08.2004.

Measures in case of the positive findings or single cases

Veterinary and Food Board apply following restrictions and measures:
1) declare OBF status invalid
2) organize epidemiological investigation
3) all bovine animals and brucellosis susceptible animals in the epidemic point will be destroyed.
Veterinary and Food Board may allow to send clinically healthy animals for slaughter to the appointed slaughterhouse. Slaughter will be performed separately from the other animals. Meat will be heat treated.
4) movement of the people, cars and animals to the epidemic point and out will be allowed only by authority of the Veterinary and Food Board.
5) desinfection is required
6) milk will be heat treated

Notification system in place

Infection with Brucellosis is notifiable in bovine, ovine and swine animals since 1962 and since 2000 it is notifiable according to the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

All samples have been negative in 2004.

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

Surveillanse programme for bovine brucellosis started in 1962. The last positive case has been recorded in 1961. Consequently thereof we consider our bovine herds free from brucellosis.
In the year 2005 brucellosis surveillance programme has been implemented according to the EC legislation.

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

The risk of humans contracting brucellosis from Estonian animal products is considered negligible.

B. Brucella melitensis in Sheep

Status as officially free of ovine brucellosis during the reporting year

Additional information

Estonian sheep herds are not OBF according to the EC legislation.
During 43 years there were no positive B.melitensis cases reported. Consequently thereof we consider our sheep herds free from brucella.

Monitoring system

Sampling strategy

Parent stock of breeding herds serologically once in a year.

Frequency of the sampling

Once in a year.

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Serology - individual blood sample.
Bacteriology - samples from abortion material, udder secretions or from tissues removed at post-mortem.

Case definition

A positive case is defined as an animal from which B.melitensis has been isolated.

Diagnostic/analytical methods used

Laboratory diagnostic method used in the VFL is performed according to OIE Manual of Standards 2000.
For monitoring purposes: serology - Rose Bengal Test (antigen produced by VLA), a further test is a Complement Fixation Test.
For clinical cases: microbiological examination for isolation and identification of bacteria. Confirmation is done by biochemical tests and the slide agglutination test and sending Brucella strain to a reference laboratory.
Method is accredited by the Estonian Accreditation Centre.

Vaccination policy

Vaccination against brucella is forbidden in Estonia.

Control program/mechanisms

The control program/strategies in place

State Programme on Monitorning and Surveillance of Animal Infectious Diseases is a national programme approved by Director General of Veterinary and Food Board.

Measures in case of the positive findings or single cases

There is no special Regulation for Brucella prevention in sheep and goats.
According to the Infectious Animal Disease Control Act of 16. June 1999, Veterinary and Food Board (competent authority) may
1) issue orders relating to infectious animal disease control which arise from this Act and are mandatory for the keepers of animals, persons engaged in the purchase, sale or transport of animals, organisers of animal exhibitions, competitions, fairs or auctions, handlers of animal products, and all persons present at the outbreak site or in the protection zone or surveillance zone;
2) require keepers of animals to mark the animals such that they can be identified and to demand that keepers of animals maintain a list of the animals;
3) require keepers of animals to permit diagnostic testing, immunisation or treatment of suspected or diseased animals, or to prohibit such activities;
4) demand changes to the organisation and conditions of keeping animals in an enterprise or livestock building or construction;
5) establish the procedure for the grazing of animals;
6) establish the procedure for the preservation and use of animal droppings;
7) establish additional veterinary requirements for the activities of an enterprise;
8) establish special requirements for trade in animals, for organisation of animal exhibitions and competitions and for the removal of animals from their permanent location for another reason, or to prohibit such activities;
9) demand that persons present at the outbreak site use protective clothing, and to determine the procedure for the use and disinfection of protective clothing and equipment;
10) issue orders for the maintenance and disinfection of livestock buildings and constructions and for the eradication of insect and rodent vermin therein;
11) issue orders for the rendering harmless of animal droppings and for the rendering harmless or destruction of polluted products or inventory;
12) restrict and prohibit the handling and transport of animals which are susceptible to or which may spread an infectious animal disease and of products originating from such animals;
13) designate animals for slaughter in order to conduct additional diagnostic tests or to prevent the spread of the infectious animal disease;
14) establish the procedure for slaughtering wild animals;
15) establish the procedure for the use, disposal and rendering harmless of animal products and animal waste;
16) involve a veterinarian who holds an activity licence in activities relating to the prevention or control of the infectious animal disease on the basis of an application from or the consent of the veterinarian, and shall indicate the extent and territory of activity in a written agreement.

Notification system in place

Infection with Brucella is notifiable in bovine, ovine and swine animals since 1962 and since

2000 it is notifiable according to the Ministry of Agriculture Regulation No 34,"List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

All samples have been negative in 2004.

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

Surveillanse programme for sheep brucella started from 1962. Till now there are no positive B.melitensis cases reported.

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

As there were no registered cases of brucellosis in sheep since 1962, the risk of obtaining brucellosis in Estonia is negligible.

C. Brucella melitensis in Goat

Status as officially free of caprine brucellosis during the reporting year

Additional information

Estonian goat population is very small. Under the State Monitorning and Surveillance programme are both - sheep and goats, but in reality mostly sheep are investigated.

Monitoring system

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

individual blood sample for serology

Case definition

A positive case is defined as an animal from which B.melitensis has been isolated.

Diagnostic/analytical methods used

Laboratory diagnostic method used in the VFL is done according to OIE Manual of Standards 2000.
For monitoring purposes serology is used: Rose Bengal Test (antigen produced by VLA), a further test is a Complement Fixation Test
For suspected or clinical cases - microbiological examination for isolation and identification of bacteria. Confirmation is performed by biochemical tests and the slide agglutination test and sending Brucella strain to a reference laboratory.
Method is accredited by the Estonian Accreditation Centre.

Results of the investigation

No goats tested during the year 2004.

Table 2.1.3 Brucellosis in animals

	Source of information	Remarks	Epidemiological unit	Units tested	Units positive	B. melitensis	B. abortus	B. suis	B. canis
Pigs	VFB		33	1540	0	0	0	0	0
Pet animals									
dogs	VFL		4	4	0	0	0	0	0
Zoo animals (1)	VFL		84	84	0	0	0	0	0

(1) : bovine animals

Footnote

VFB - Veterinary and Food Board
VFL - Veterinary and Food Laboratory
33 - number of investigated pig herds
1540 - number of investigated pigs

2.1.1 Bovine brucellosis

MANDATORY	**CATTLE**		
Number of herds under official control:	2343	Number of animals under official control:	32905
	OBF bovine herds	**OBF bovine herds with status suspended**	**Bovine herds infected with brucellosis**
Status of herds at year end (a):(3)	applicationin preparation	0	0
New cases notified during the year (b):	0	0	0
	Animals tested	**Animals suspected**	**Animals positive**
Notification of clinical cases, including abortions (c):	4	4	0
	Units tested	**Units suspected**	**Units positive**
Routine testing (d1) - data concerning herds:(1)	2343	0	0
Routine testing (d2) - number of animals tested:	34041	0	0
Routine testing (d3) - number of animals tested individually:	1136	0	0
		Herds suspected	**Herds confirmed**
Follow-up investigation of suspected cases: trace, contacts (e):		0	0
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (f):	452	0	0
Other routine investigations: tests at AI stations (g):	124	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (h):	0	0	0
Animals slaughtered (i):	0	0	0
VOLUNTARY	**CATTLE**		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (k):			
	Herds tested	**Herds suspected**	**Herds positive**
Other investigations: farms at risk (l):			
	Samples tested	**Brucella isolated**	
Bacteriological examination (m):(2)	4	0	

(1) : Diagnostic test used is ELISA from pooled milk sample
(2) : abortion cases
(3) : The last brucellosis positive case was in 1961, thereof we consider our herds brucellosis free and we are planning to ask from EC officialy brucellosis free status.

2.1.2 Ovine and caprine brucellosis

MANDATORY	**SHEEP AND GOATS**		
Number of holdings under official control:	58	Number of animals under official control:	1989
	OBF ovine and caprine holdings	**OBF ovine and caprine holdings with status suspended**	**OBF ovine and caprine holdings infected with brucellosis**
Status of herds at year end (a):(1)		0	0
New cases notified during the year (b):	0	0	0
	Animals tested	**Animals suspected**	**Animals positive**
Notification of clinical cases, including abortions (c):	0	0	0
	Units tested	**Units suspected**	**Units positive**
Routine testing (d) - data concerning holdings:	66	0	0
Routine testing (d) - data concerning animals:	2033	0	0
		Holdings suspected	**Holdings confirmed**
Follow-up investigation of suspected cases: trace, contacts (e):		0	0
	Animals tested	**Animals suspected**	**Animals positive**
Other routine investigations: exports (f):	5	0	0
	All animals	**Positives**	**Contacts**
Animals destroyed (g):			
Animals slaughtered (h):			
VOLUNTARY	**SHEEP AND GOATS**		
	Animals tested	**Animals suspected**	**Animals positive**
Other investigations: imports (i):			
	Holdings tested	**Holdings suspected**	**Holdings positive**
Other investigations: farms at risk (j):			
	Samples tested	**Brucella isolated**	
Bacteriological examination (k):	1	0	

(1) : Disease never reported in Estonia. But we do not have OBF status according to the EC legislation.

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

A. Yersinia entercolitica general evaluation

History of the disease and/or infection in the country

Every year the human yersiniosis cases are reported in Estonia. Since 1986 the incidence rate of human yersiniosis varies from 1,1 in 2004 to 10,3 in 1989.

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

A decrease in number of cases is observed during the last 6 years. A significant part of human infections are of domestic origin. Yersiniosis has it`s greatest potential as a zoonosis in young children.
There are no official surveillance programmes in force for detection Yersinia in animals and food.

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

Yersinia infection in humans is mostly foodborne, zoonotic source is often not defined. In most cases the supposed source of infection in humans is determined on the basis of epidemiological investigation, but not bacteriologically.

2.7.2. Yersiniosis in humans

A. Yersinosis in humans

Reporting system in place for the human cases

Yersiniosis is a zoonotic infection of statutory monitoring according to the Communicable Diseases Prevention and Control Act (2003) and Regulation 297/2003. It complines with the EU standarts as laid down in the Commission Decisions 2119/98/EC, 2003/99/EC and 2002/253/EC.
The surveillance system is based on a double system of obligatory reporting. Clinicians, mainly family physicians (GPs) and laboratories are diagnosing and reporting cases of yersiniosis (under the Communicable Diseases Prevention and Control Act and Ministerial Regulation nr 297/2003).
The notification system is paper-based (with standard forms) and reporting by phone is required for indicated suspicion and clusters with foodborne transmission.
Reports are prepared by GP/med. doctors and sent on standard individual form to the HPI local offices and then in aggregated form sent to the national level.
Finnaly, the data are aggregated nationally within the HPI database.

Case definition

Clinical description:
An illness of variable severity characterized by diarrhea, fever, nausea, cramps and tenesmus. Asymptomatic infection may occur.
Laboratory criteria for diagnosis:
-Isolation of Yersinia enterocolitica or pseudotuberculosis from any clinical specimen.
Case definition:
Probable case: a clinical compatible case with an epidemiological link.
Confirmed case: a case that is laboratory confirmed.

Diagnostic/analytical methods used

Cultivation according to internationally accepted methods. Manual of clinical microbiology. 2003. 8th ed. Murray, P. R. et al.(eds). Washington, DC: American Society for Microbiology.
Quality assurance procedures:
Internal Quality Assurance (IQA) according to Quality Manual of the laboratory (EVS-EN ISO/IEC 17025:2000).
External Quality Assurance (EQA) from Labquality Helsinki, Finland.

Notification system in place

Notification is in place since 1982.

History of the disease and/or infection in the country

During the last six years the number of reported cases of human yersiniosis has decreased.

Year	Incidence rate per 100 000 inhabitants
1986	3,5
1987	3,8

1988	6,3
1989	10,3
1990	4,6
1991	3,6
1992	2,8
1993	3,6
1994	2,7
1995	2,5
1996	1,6
1997	3,3
1998	3,0
1999	7,8
2000	4,3
2001	3,7
2002	1,5
2003	2,3
2004	1,1

The peak of incidence were reported in 1989.

Results of the investigation

15 culture-confirmed cases of Yersinia Enterocolitica infection were registered in the year 2004, all of them were acquired domestically.
The age distribution shows the highest incidence in the age group 5-14 years old - 60% of total cases.
The frequency of infection was the same in urban and rural population.

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

Since 2004, there has been a European case definition for reporting yersiniosis.
Yersinia enterocolitica is the dominating specie occuring in Estonia.
The incidence rates of yersiniosis are fairly stable.

Relevance as zoonotic disease

Yersiniosis is an important zoonotic infection in Estonia. Although the incidence of Yersiniosis has decreased in recent years, the disease is still among most commonly recorded zoonotic infections in Estonia.

Table 8.3.A Yersiniosis in man - species/serotype distribution

Yersinia	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
	15	1	15	1	0	0
Y. enterocolitica	15	1,1	15	1,1	0	0
Y. enterocolitica O:3						
Y. enterocolitica O:9						

Footnote

Data concerning cases Y.enterocolitica O:3 and Y.enterocolitica 0:9 is not available

Table 8.3.B Yersiniosis in man - age distribution

Age Distribution	Y. enterocolitica			Yersinia spp.		
	All	M	F	All	M	F
<1 year	0	0	0	0	0	0
1 to 4 years	2	2	0	0	0	0
5 to 14 years	9	4	5	0	0	0
15 to 24 years	2	1	1	0	0	0
25 to 44 years	1	1	0	0	0	0
45 to 64 years	0	0	0	0	0	0
65 years and older	1	0	1	0	0	0
Age unknown	0	0	0	0	0	0
Total :	15	8	7	0	0	0

Table 8.3.C Yersiniosis in man - seasonal distribution

Month	Y. enterocolitica	Yersinia spp.
	Cases	Cases
January	1	0
February	0	0
March	2	0
April	0	0
May	2	0
June	2	0
July	1	0
August	0	0
September	3	0
October	3	0
November	0	0
December	1	0
not known	0	0
Total :	15	0

2.7.3. Yersinia in foodstuffs

2.7.4. Yersinia in animals

2.8. TRICHINELLOSIS

2.8.1. General evaluation of the national situation

A. Trichinellosis General evaluation

History of the disease and/or infection in the country

The data of previous investigations show that both natural and synanthropic focuses of trichinellosis occur in the Republic of Estonia. Trichinellosis was diagnosed in wolves (Canis lupus), raccoon dogs (Nyctereutes procyonoides), red foxes (Vulpes vulpes), lynxes (Felis lynx), bears (Ursus arctos), pine martens (Martes martes), badgers (Meles meles), wild boars (Sus scrofa), brown rats (Rattus norvegicus), domestic cats (Felis felis), domestic pigs (Sus scrofa) as well in silver foxes (Vulpes vulpes), blue foxes (Alopex lagopus) and minks (Mustela lutreola) from the fur-animal farms (Järvis a. o., 2001).
The last case of Trichinella spiralis was found in domestic pig in the private farm (see part 1.1) in 1999. During years 2000-2004 Trichinella in pigs was not detected.
Investigations concerning Trichinella occurence in horses were not carried out.
During the period from 1985 till 2004 the number of reported cases of human trichinellosis varied from 0 to 43 with the peak in 1993. There is noted a decrease in number of incidence in humans since 1999. Human trichinellosis is relatively rare disease in Estonia.

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

Trichinella infection was detected in lynxes, bears and minks and in 1999 in lynxes, wild boars and badgers. Several epidemiological studies on animal trichinellosis were carried out during some decades in Estonia. During one of them (Järvis a. o., 2001) in 1992 - 1999 muscle samples from 814 sylvatic animals were collected. Trichinella infection was detected in all 8 species of examined animals. The prevalence of infection was highest in wolves (79,4%), raccoon dogs (50,0%), lynxes (47,4%) and red foxes (42,1%). The high prevalence and the worm burden (up to 200 larvae per gram) detected in the raccoon dog suggest that this carnivore is one of the most important reservoirs of Trichinella in Estonia. Comparing the earlier examination periods (1965 - 1969 and 1970 - 1979) one can note an increase of Trichinella infection among raccoon dogs, red foxes and wolves (Miller a. o., 1997). Both T. nativa and T. britovi were identified in wolves, raccoon dogs, lynxes, red foxes and wild boars. Brown bears and one badger were infected with T. nativa.
Muscle samples of different animals were collected throughout the Republic of Estonia for investigations within the framework of the FAO project during the period from November 2000 to February 2002. The total number of the collected and examined samples for Trichinella infection was 1257, including 349 red foxes and 112 raccoon dogs, which were the main object of examination.
Infected with Trichinella was 19,4% of all examined wild animals. The prevalence in wolves was 63,2%, in raccoon dogs 44,6%, in lynxes 44,0% and in foxes 38,3%.
During the last 5 years the number of human cases of Trichinellosis is increased and varies from 3 in 2000 and 0 in the year 2004. The risk of acquiring human trichinellosis from domestic sources is considered to be low because trichinellosis has no been detected in food producing animals since 1999.

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

In most cases the supposed sources of infection in humans were defined on the basis of epidemiological investigation and were associated with consumption of wild animal meat. Most of them were not laboratory confirmed.

Recent actions taken to control the zoonoses

According to the Ministry of Agriculture Regulation No 10 "Prevention of tricinellosis" in Estonia:
Applicable methods against trichinellosis:
1) the muscle samples must be taken from every swine, wild boar, bear, nutria, badger, lynx and horse torso for examination of presence of trichina larvae. Muscle samples will be examined via methods of artificial digestion or compressor method.
2) hunters are required (before returning their hunting permit to the hunting society) to present the torso of the animal for examination and to record the examination results in the hunting permit
3) if trichina larvae is found the whole torso and organs must be utilised or incinerated
4) the hide of the animals may be returned after the removal of the muscle tissue under the skin without restrictions. The removed muscle tissue is utilised or incinerated
5) pork, offal, the torsos of fur animals and carnivores, seal, horse and whale meat meant for animal food must be boiled to a temperature of at least 80°C before it is used for feeding
6) the bodies of swine and other animals receptive to trichinellosis have to be utilised
7) animals breeding buildings must regularly undergo deratization and dogs and cats are not allowed in the buildings
8) it is compulsory to examine annually 20 to 40 animals from fur animals herds for trichinellosis during the skinning period
9) importing the animals examined for trichinellosis, the veterinary sertificate must have a note about negative test result. VFB may allow import of pork without an examination for trichinellosis in case the pork has gone through freezing proccessing method
10) in case trichinellosis has been diagnosed, the reason of infection must be discovered and stopped. Swine can be taken from the herd only to the slaughterhouse and slaughtered separately from the others.

2.8.2. Trichinellosis in humans

A. Trichinellosis in humans

Reporting system in place for the human cases

Trichinella is a zoonotic infection of statutory monitoring according to the Communicable Diseases Prevention and Control Act (2003) and Regulation 297/2003. It complies with the EU standarts as laid down in the Commission Decisions 2119/98/EC, 2003/99/EC and 2002/253/EC.
The surveillance system is based on a double system of reporting. Clinicians, mainly family physicians (GPs) and laboratories are diagnosing and reporting cases of trichinellosis (under the Communicable Diseases Prevention and Control Act and Ministerial Regulation nr 297/2003).
The notification system is paper-based (with standard forms) and reporting by phone is required for indicated suspicion and clusters with foodborne transmission.
Reports are prepared by GP/med. doctors and sent on standard individual form to the HPI local offices and then in aggregated form sent to the national level.
Finnaly, the data are aggregated nationally within the HPI database.

Case definition

Clinical description - clinical picture compatible with trichinellosis fever, myalgia, periorbital edema and eosinophilia.
Laboratory criteria:
-Demonstration of Trichinella larvae in tissue obtained by muscle biopsy, or
-A four fold or greater rise in specific antiserum antibody.
Case definition:
Probable case: a clinically compatible case with an epidemiological link.
Confirmed case: a clinically compatible case that is laboratory confirmed.

Diagnostic/analytical methods used

Diadnosis is confirmed by clinical symptoms, incidence of eosinophiles in a blood sample, results of epidemiological investigation. Antibody testing and muscle biopsia are not used.

Notification system in place

Compulsory notification is in place since 1945. Under Estonian legislation (Regulation of Ministry of Social Affairs No 99, in force since 01.08.2003) cases of human trichinellosis should be reported to the local department of Veterinary and Food Board to recover animal sources and transmission routes of zoonoses.

History of the disease and/or infection in the country

Trichinella is a parasite of carnivore mammals and found nearly everywhere in the world. Once infected, the animals carry infective larvae in their muscles for years following the infection. Trichinella infection in humans may be asymptomatic, produce long-term muscular symptoms or even be fatal. Human infections may, however, be underdiagnosed.
Since 1985 the number of reported human cases of trichinellosis varied from 1-43. A peak incidence of 43 cases had been detected in 1993 (incidence rate 2,8 per 100 000 population).

Year	Cases	No Inc. rate per 100 000 inh.
1985	10	0,6
1986	5	0,3
1987	0	0
1988	0	0
1989	7	0,4
1990	0	0
1991	15	0,9
1992	3	0,2
1993	43	2,8
1994	1	0,1
1995	0	0
1996	2	0,1
1997	3	0,2
1998	0	0
1999	6	0,4
2000	3	0,2
2001	0	0
2002	1	0,1
2003	0	0
2004	0	0

All cases were sporadic, no clusters have been registered.

Results of the investigation

No cases of human trichinellosis were reported in 2004.

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

In 2003 and 2004 there were no registered cases of human trichinellosis.
In 1999 3 cases were associated with product from pig meat and in another three cases the source of infection was not identified. In 2000 and 2002 all cases were associated with consumption of wild boar meat.
One case of trichinellosis was notified in the city and 3 cases were notified in the counties.
The majority of cases were registered in may-august (90% cases).

Relevance as zoonotic disease

The risk to humans of acquiring Trichinellosis from domestic sources is low. The main source of infection is consumption of wild animals meat which is not sufficiently heat-treated.

Table 4.2.A Trichinellosis in man - species/serotype distribution

Trichinella	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
	0	0	0	0	0	0
Trichinella spp.	0	0	0	0	0	0

Table 4.2.B Trichinellosis in man - age distribution

Age Distribution	Trichinella spp.		
	All	M	F
<1 year	0	0	0
1 to 4 years	0	0	0
5 to 14 years	0	0	0
15 to 24 years	0	0	0
25 to 44 years	0	0	0
45 to 64 years	0	0	0
65 years and older	0	0	0
Age unknown	0	0	0
Total :	0	0	0

2.8.3. Trichinella in animals

A. Trichinella in pigs

Monitoring system

Sampling strategy

Samples are taken in the slaughterhouses. Sampling is performed by authorised or official veterinarians in frame of official meat inspection. Sampling is a part of the permanent monitoring scheme.

Frequency of the sampling

Every slaughtered animal is sampled

Type of specimen taken

Diaphragm muscle

Methods of sampling (description of sampling techniques)

Diaphragm muscle is analysed by the compression or the digestion method.
Artificial digestion method for individual samples: 100 g (50 g from both diaphragm pillar) should be taken from one animal, for collective sample technique - multiple samples should be collected from a number of animals to make a pool of up to 100 grams of tissue.
For compression trichinoscopy sample size is 40 grams (20 from both diaphragm pillar).

Case definition

Sample is considered to be positive when the animal is infected with trichina larvae.

Diagnostic/analytical methods used

both compression method and artificial digestion method

Control program/mechanisms

The control program/strategies in place

According to the Minister of Agriculture Regulation Nr 10 " Prevention of Trichinellosis" every swine, wild boar, bear, nutria, badger, lynx and horse torso have to be examined via artificial digestion or compressor method.

Measures in case of the positive findings or single cases

Applicable methods against trichinellosis:
1) the muscle samples must be taken from every swine, wild boar, bear, nutria, badger, lynx and horse torso for examination of presence of trichina larvae. Muscle samples will be examined via methods of artificial digestion or compressor method.
2) hunters are required (before returning their hunting permit to the hunting society) to present

the torso of the animal for examination and to record the examination results in the hunting permit
3) if trichina larvae is found the whole torso and organs must be utilised or incinerated
4) the hide of the animals may be returned after the removal of the muscle tissue under the skin without restrictions. The removed muscle tissue is utilised or incinerated
5) pork, offal, the torsos of fur animals and carnivores, seal, horse and whale meat meant for animal food must be boiled to a temperature of at least 80°C before it is used for feeding
6) the bodies of swine and other animals receptive to trichinellosis have to be utilised
7) animals breeding buildings must regularly undergo deratization and dogs and cats are not allowed in the buildings
8) it is compulsory to examine annually 20 to 40 animals from fur animals herds for trichinellosis during the skinning period
9) importing the animals examined for trichinellosis, the veterinary sertificate must have a note about negative test result. VFB may allow import of pork without an examination for trichinellosis in case the pork has gone through freezing proccessing method
10) in case trichinellosis has been diagnosed, the reason of infection must be discovered and stopped. Swine can be taken from the herd only to the slaughterhouse and slaughtered separately from the others.

Notification system in place

Notification is in place since 2000 according to the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

No cases of trichinellosis were reported in 2004.

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

The number of domestic pigs in 1999 was 285 700. In 1999 335 112 pigs were slaughtered in low and high capasity slaughterhouses. 202 532 pigs were examined for Trichinella by the artificial digestion method and 132 580 pigs by the compressor method. Trichinella was not found.
The number of domestic pigs in 2000 was 300 200. In 2000 there were 319 906 pigs slaughtered in low and high capasity slaughterhouses. 193 462 pigs were examined for Trichinella by the artificial digestion method and 126 444 pigs by the compressor method. Trichinella was not found.
In 2001 325 647 pigs were slaughtered. 200 842 pigs were examined for Trichinella by the artificial digestion and 124 805 pigs by the compressor method. Trichinella was not found.
In 2002 383 752 pigs were slaughtered and all pigs were examined for Trichinella. Trichinella was not found.
In 2003 430 509 pigs were slaughtered and all pigs were examined for Trichinella. Trichinella was not found.
In 2004 444 084 pigs were slaughtered and all pigs were examined for Trichinella. Trichinella was not found.
In 1994 Trichinella was diagnosed in three hogs on the island of Hiiumaa and in 1995 in one sow in the same farm in connection with routine meat inspection (Miller a. o., 1997). This was the first case of finding of sylvatic species T. britovi in domestic pig and the second case of

trichinellosis in domestic pig in Estonia (Järvis a. o., 2002). The first case of trichinellosis was diagnosed in one hog on the island of Hiiumaa in 1994, almost at the same time.
In 1999 Trichinella spiralis was found in domestic pig in the private farm (see part 1.1).

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

The risk of contracting trichinellosis from domestic pigs is close to zero due to extensive surveillance programmes of swine production in place.

B. Trichinella in horses

Monitoring system

Sampling strategy

The muscle samples have to be taken from every swine, wild boar, bear, nutria, badger, lynx and horse torso for examination to find trichina larvae. Swine samples are taken in the slaughterhouse. Sampling is performed by authorised veterinarians. Sampilng is a part of the permanent monitoring scheme.

Frequency of the sampling

Every slaughtered animal is sampled

Type of specimen taken

Diaphragm muscle

Methods of sampling (description of sampling techniques)

Diaphragm muscle analysed with compression or the digestion method.
Artificial digestion method for individual samples: 100 g (50 g from both diaphragm pillar) should be taken from one animal, for collective sample technique: multiple samples should be collected from a number of animals to make a pool of up to 100 grams of tissue.
For compression trichinoscopy the sample size is 40 grams (20 from both diaphragm pillar).
Horses: tongue or the masseter muscle analysed by an approved method (by the ICT Recommendation: minimum 5 grams per animal using pooled sample digestion method)

Case definition

Sample is considered to be positive when the animal is infected with trichina larvae.

Control program/mechanisms

The control program/strategies in place

According to the Minister of Agriculture Regulation Nr 10 "Prevention of Trichinellosis" every swine, wild boar, bear, nutria, badger, lynx and horse torso must be examined via artificial digestion or compressor method.

Measures in case of the positive findings or single cases

Applicable methods against trichinellosis:
1) the muscle samples must be taken from every swine, wild boar, bear, nutria, badger, lynx and horse torso for examination of presence of trichina larvae. Muscle samples will be examined via methods of artificial digestion or compressor method.
2) hunters are required (before returning their hunting permit to the hunting society) to present the torso of the animal for examination and to record the examination results in the hunting permit
3) if trichina larvae is found the whole torso and organs must be utilised or incinerated
4) the hide of the animals may be returned after the removal of the muscle tissue under the skin without restrictions. The removed muscle tissue is utilised or incinerated
5) pork, offal, the torsos of fur animals and carnivores, seal, horse and whale meat meant for animal food must be boiled to a temperature of at least 80°C before it is used for feeding
6) the bodies of swine and other animals receptive to trichinellosis have to be utilised
7) animals breeding buildings must regularly undergo deratization and dogs and cats are not allowed in the buildings
8) it is compulsory to examine annually 20 to 40 animals from fur animals herds for trichinellosis during the skinning period
9) importing the animals examined for trichinellosis, the veterinary sertificate must have a note about negative test result. VFB may allow import of pork without an examination for trichinellosis in case the pork has gone through freezing proccessing method
10) in case trichinellosis has been diagnosed, the reason of infection must be discovered and stopped. Swine can be taken from the herd only to the slaughterhouse and slaughtered separately from the others.

Notification system in place

Infection with Trichina larvae is notifiable since 2000 according to the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

No cases of trichinellosis in horses were reported in 2004.

Table 4.1 Trichinella in animals

	Source of information	Remarks	Epidemiological unit	Animals tested	Animals positive
Pigs (1)	VFB			444084	0
Solipeds	VFB			2	0
Wildlife					
wild boars (2)	VFB			6185	10
foxes				0	0
other (3)	VFB			17	3

(1) : all slaughtered pigs are tested before entering the food chain
(2) : all hunted wild boars, bears and lynxes are tested for trihhinellosis before entering the food chain
(3) : tested 14 wild bears (1 positive) and tested 3 lynxes (2 positive)

Footnote

VFB - Veterinary and Food Board

The following amendments were made :

Date of modification	Species	Column	Old value	New value
2005-12-14	Solipeds	Source of information		VFB
	Solipeds	Animals tested	0	2

2.9. ECHINOCOCCOSIS

2.9.1. General evaluation of the national situation

A. Echinococcus spp general evaluation

History of the disease and/or infection in the country

Since 1986 only 2 cases of human echinococcosis were reported. The situation seems to be stable and the risk for humans to acquire the disease is negligible.

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

Human echinococcosis is not a public health problem in Estonia.
All slaughtered animals are examined visually.

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

The relevance of findings in humans to foodstuffs is usually defined on the basis of epidemiological investigation. In most cases this link is not laboratory confirmed.

2.9.2. Echinococcosis in humans

A. Echinococcus spp in humans

Reporting system in place for the human cases

GP/Health Care professional report laboratory confirmed cases of echinococcosis to Public Health Regional Office. They report data to the Health Protection Inspectorate, where the data are aggregated nationally.

Case definition

Clinical description:
Clinical picture compatible with echinococcosis, which may produce any of several syndromes, varying with cyst size and location.
Laboratory criteria for diagnosis:
-diagnosis is often based on characteristic histopathology,
-a combination of imaging techniques and serological tests (e.g. haemagglutination, immunodiffusion, immunoblot assay).
Case definition:
Confirmed case: a clinicaly compatible case that is laboratory confirmed.

Notification system in place

Notification is in place since 1986. Under Estonian legislation (Regulation of Ministry of Social Affairs No 99, in force since 01.08.2003) cases of human echinococcosis should be reported to the local department of Veterinary and Food Board to discover animal sources and transmission routes of zoonoses.

History of the disease and/or infection in the country

Echinococcosis is a very rarely registered disease in Estonia. During the last 20 years 2 cases of echinococcosis were reported.

Year	Incidence rate per 100 000 inhabitants
1985	0
1986	0
1987	0
1988	0
1989	0
1990	0
1991	0
1992	0
1993	0
1994	0
1995	0
1996	0
1997	0
1998	0
1999	0

2000	0,1 (1 case)
2001	0
2002	0
2003	0,05 (1 case)
2004	0

The incidence is considered to be very low.

Results of the investigation

No reported cases of echinoccccosis in 2004.

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

Human echinococcosis has never been a public health problem in Estonia.

Relevance as zoonotic disease

There is a very low risk of acquiring echinococcosis in Estonia.

Table 9.2.A Echinococcosis in man - species/serotype distribution

	Cases	Cases Inc	Autochtone cases	Autochtone Inc	Imported cases	Imported Inc
Echinococcus	0	0	0	0	0	0
E. granulosus	0	0	0	0	0	0
E. multilocularis	0	0	0	0	0	0
Echinococcus spp.	0	0	0	0	0	0

Table 9.2.B Echinococcosis in man - age distribution

Age Distribution	E. granulosus			E. multilocularis			Echinococcus spp.		
	All	M	F	All	M	F	All	M	F
<1 year	0	0	0	0	0	0	0	0	0
1 to 4 years	0	0	0	0	0	0	0	0	0
5 to 14 years	0	0	0	0	0	0	0	0	0
15 to 24 years	0	0	0	0	0	0	0	0	0
25 to 44 years	0	0	0	0	0	0	0	0	0
45 to 64 years	0	0	0	0	0	0	0	0	0
65 years and older	0	0	0	0	0	0	0	0	0
Age unknown	0	0	0	0	0	0	0	0	0
Total :	0	0	0	0	0	0	0	0	0

2.9.3. Echinococcus in animals

Table 9.1 Echinococcus sp. in animals

	Source of information	Remarks	Epidemiological unit	Units tested	Echinococcus spp.	E. multilocularis	E. granulosus
Cattle (bovine animals)	VFB, offical meat inspection		animal	66486	0		
Sheep	VFB, official meat inspection		animal	3647	0		
Goats	VFB, official meat inspection		animal	11	0		
Pigs (1)	VFB, official meat inspection		animal	444084	3		
Solipeds	VFB, official meat inspection		animal	4	0		
Wildlife							
other (2)	VFB, official meat inspection		animal	6202	8		

(1) : diagnosed by visual examination
(2) : elk, diagnosed by visual examination

Footnote

Note: all positive cases were diagnosed by visual examination.

The following amendments were made :

Date of modification	Species	Column	Old value	New value
2005-11-30	Cattle (bovine animals)	Units tested		66486
	Sheep	Units tested		3647
	Goats	Units tested		11
	Pigs	Units tested		444084
	Solipeds	Units tested		4
	Wildlife - other	Units tested		6202
	Cattle (bovine animals)	Echinococcus spp.		0
	Sheep	Echinococcus spp.		0
	Goats	Echinococcus spp.		0
	Pigs	Echinococcus spp.		3
	Solipeds	Echinococcus spp.		0
	Wildlife - other	Echinococcus spp.		8
2005-11-30	Cattle (bovine animals)	Source of information		VFB, offical meat insp
2005-11-30	Cattle (bovine animals)	Source of information	VFB, offical meat insp	VFB, offical meat inspection
	Cattle (bovine animals)	Epidemiological unit		animal
2005-11-30	Sheep	Source of information		VFB, official meat inspection
2005-11-30	Goats	Source of information		VFB, official meat inspection

	Pigs	Source of information		VFB, official meat inspection
2005-11-30	Solipeds	Source of information		VFB, official meat inspection
	Wildlife - other	Source of information		VFB, official meat inspection
2005-11-30	Sheep	Epidemiological unit		animal
	Goats	Epidemiological unit		animal
	Pigs	Epidemiological unit		animal
	Solipeds	Epidemiological unit		animal
	Wildlife - other	Epidemiological unit		animal

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

Data concerning human cases of toxoplasmosis is available since 1997. During the last 8 years the number of human cases of toxoplasmosis varies from 4 to 18. The highest incidence rate is detected in 1997 and 2004 - 1,2 per 100 000.
No data is available on toxoplasmosis in animals.

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

There is no official surveillance programme in regard to Toxoplasma in animals.
There is no enough information about the most common sources of infection.

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

The supposed source of infection in humans is usually determined by epidemiological investigation, but not bacteriologically.

2.10.2. Toxoplasmosis in humans

A. Toxoplasmosis in humans

Reporting system in place for the human cases

GP/Health Care professional report laboratory confirmed cases of toxoplasmosis to Public Health Regional Office. They report data to the Health Protection Inspectorate, where the data are aggregated nationally.

Case definition

Clinical description:
a protozoan disease, which presents with an acute illness with one or more of the following: lymphadenopathy, encephalitis, chorioretinitis, disfunction of the central nervous system. Conigential and asymptomatic infection may occur.
Laboratory criteria for diagnosis.
-a four fold or greater rise in specific antiserum antibody,
-demonstration of the agent in body tissues or fluids or isolation in animals or cell culture,
-detection of toxoplasma nucleic acid.
Case definition:
Confirmed case: a clinicaly compatible case that is laboratory confirmed.

Diagnostic/analytical methods used

Serological method for detection of IgA, IgM, IgG is used.

Notification system in place

Toxoplasmosis is a notifiable disease since 1997.

History of the disease and/or infection in the country

The incidence rate varies from 0,3 to 1,2 during the last 8 years with the peaks in 1997 and in 2004.
Year Number of cases Incidence rate per 100 000 inhabitants
1997 18 1,2
1998 11 0,8
1999 9 0,6
2000 14 1,0
2001 7 0,5
2002 4 0,3
2003 9 0,7

Results of the investigation

16 (incidence rate 1,2 in 100 000) cases were reported in 2004. The infection was prevalent among young people (15-24 years old) and people 25-44 years old. There were identical distribution of infection among men and women.

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

Cases of human toxoplasmosis are registered in Estonia every year.

Relevance as zoonotic disease

Toxoplasmosis is an important zoonotic disease in Estonia.

Table 10.2.A Toxoplasmosis in man - species/serotype distribution

Toxoplasma	Cases	Cases Inc
	16	1
Toxoplasma spp.	16	1,2
congenital cases	0	0

Table 10.2.B Toxoplasmosis in man - age distribution

Age Distribution	Toxoplasma spp.		
	All	M	F
<1 year	0	0	0
1 to 4 years	0	0	0
5 to 14 years	1	0	1
15 to 24 years	6	4	2
25 to 44 years	4	2	2
45 to 64 years	3	0	3
65 years and older	2	2	0
Age unknown	0	0	0
Total :	16	8	8

2.10.3. Toxoplasma in animals

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 is widely spread all over Estonia which area is 45 227 km². Estonia borders Latvia on the south and Russia on the east, the frequency of rabies infections is also high in these countries. Rabies in Estonia originates from wildlife and its main reservoir are red foxes and racoon dogs.
By reports from Russian tsar-time, Kiev and Livonian districts were places were rabies frequently occurred. In the year 1900 rabies spread all over the country, excluding islands. In 1930 eradicated from North- and Middle Estonia, cases were recorded only in Southern part.
Number of registered rabies cases in animals are available from 1950. See tables below.
There was an urban rabies period in 1950 - 1959, when rabies was diagnosed mainly in domestic animals. Therefore, compulsory vaccination program of dogs and cats got started in 1953. In 1962 - 1967 there was rabies-free period. From 1968 up to the present time sylivatic rabies cases are diagnosed in wild and domestic animals in Estonia.
The structure of rabies infections across species has been relatively stable across the years. During 1968 - 1999 farm animals accounted for 6 %, dogs and cats for 18-23 % and wild animals for 71-76 % of all cases of illness. In 2001 the respective figures were: farm animals 7.2 %, dogs and cats 10.8 % and wild animals 82 %.
Farm animals. The number of infections has increased in bovines: 3 cases of infection in 1998, which accounts for 1.8 % of the total infections in animals, 5 cases in 1999 - 4%, 19 cases in 2000 - 14.5 %, and 11 cases in 2001 - 6.6 %. In the dogs and cats category, the occurrence of rabies has significantly decreased in cats in 1998 - 2001 (however, the number of cases in 2001 increased): 27 cases in 1998 - 16 % of all registered cases in animals, 15 cases in 1999 - 12.5 %, 4 cases in 2000 - 3 %, and 12 cases in 2001 - 7.2 %. This may be due to the improved awareness of pet owners, who have started to vaccinate their cats alongside dogs. Rabies infections have also decreased in dogs: from 10 % in 1998 to 3.6 % in 2001.
Among wild animals, red foxes account for 45.5 %, racoon dogs for 25.5 % and other wild animals (badgers, martens, polecats, squirrels, lynx, roes and elks) for 3.8 % of all the cases of rabies in wild animals during 1998 - 2001.
Although the last mortal case of rabies in humans was registered in Estonia 19 years ago, rabies is still an important zoonotic disease in Estonia. The number of animal attacks of humans has increased continuously over the past five years (1999 - 2003) with the peak in the year 2003.

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

In the last three years the number of rabies cases among animals has grown very quickly, being 167 in 2001, 422 in 2002 and in year 2003 the numbers made a sad record - 814 cases of rabies were diagnosed.
In the year 2004 the number of rabies cases was 314, 255 among wild animals and 59 among domestic animals.
Rabies is widely distributed in all counties, even in the islands Hiiumaa and Saaremaa. In the year 2003, presumably as a result of a very cold winter and the ability of infected animals to move across the frozen sea, rabies has been also diagnosed in small islands near the coast (two

cases in Vormsi island and one in Naissaar). In 2003, most animal cases were recorded in the northern Estonia (Harju county, Lääne-Viru county, Rapla county); however, a high number of cases were also registered in South-Eastern Estonia (Pärnu county) and in southwest (Tartu county). Only in a very few small districts in eastern Estonia rabies cases were not registered in the last year.
Due to good medical aid in the case of injury and free post-exposure immunoprofilaxis for people, which is a part of the National Immunisation Programme financed from the state budget, there were no reported cases of rabies among people. But there is still a high risk of humans being attacked by infected animals.

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

The risk of contracting rabies in Estonia is still high, as the disease is widely spread among domestic animals and there are a lot of human cases of injury from infected animals every year. Although no transmition of rabies to humans has been recorded, people being in contact with wild animals in Estonia should be aware of the risk.

Additional information

The structure of rabies infections across species has been relatively stable over the years. In 2002 farm animals cover 5 %, dogs and cats 11 % and wild animals 84% and in 2003 farm animals 6,65 %, dogs and cats 7,65 % and wild animals 85,7 %. Of farm animals, the number of infections has increased in bovines: 3 cases of infection in 1998, which accounts for 1,8 % of the total infections in animals, 5 cases in 1999 - 4 %, 19 cases in 2000 - 14,5 %, and 11 cases in 2001 - 6,6 %. In 2002 and 2003 the number of cases has been higher, but the percentage of total cases has still remained between 5-6,6 %.
In the dogs and cats category, the occurrence of rabies has significantly decreased in cats in 1998 - 2001 (however, the number of cases in 2001 increased): 23 cases in 2002 - 5,45 % and 28 cases in 2003 - 3,45 %. This may be due to the improved awareness of pet owners, who have started to vaccinate their cats alongside dogs. Rabies infections have also decreased in dogs: from 10 % in 1998 (being in the lowest level of 3,6 % in 2001) 5,68 % in 2002 to 4,2 % in 2003.
Of wild animals, red foxes have traditionally accounted for 45,5 %, raccoon dogs for 25,5 % and other wild animals (badgers, martens, polecats, squirrels, lynx, roes and elks) for 3,8 % of all cases of rabies in wild animals during 1998 - 2001.
In latest years foxes have lost their status as the main rabies reservoir in Estonia and raccoon dogs have covered already nearly half of all the rabies cases.

2.11.2. Rabies in humans

A. Rabies in humans

Reporting system in place for the human cases

Rabies is a zoonotic infection of statutory monitoring according to the Communicable Diseases Prevention and Control Act (2003) and Regulation 297/2003. It complines with the EU standarts as laid down in the Commission Decisions 2119/98/EC, 2003/99/EC, 2002/253/EC and 2160/2003.
The surveillance system is based on a double system of obligatory reporting. Clinicians, mainly family physicians (GPs) and laboratories are diagnosing and reporting cases of rabies (under the Communicable Diseases Prevention and Control Act and Ministerial Regulation nr 297/2003).
The notification system is paper-based (with standard forms) and reporting by phone is required for indicated suspicion and clusters.
Reports are prepared by GP/med. doctors and sent on standard individual form to the HPI local offices and then in aggregated form sent to the national level.
Finnaly, the data are aggregated nationally within the HPI database.

Case definition

Clinical description:
Rabies is an acute encephalomyelitis that almost always progresses to coma or death within 10 days after the first symptom.
Laboratory criteria for diagnosis:
-detection by direct fluorescent antibody of viral antigens in a clinical specimen (preferably the brain of the nerves surrounding hair follicles in the nape of the neck), or
-detection of rabies nucleic acid in clinical specimen, or
-isolation (in cell culture or in a laboratory animal) of rabies virus from saliva, cerebrospinal fluid (CSF), or central nervous system tissue, or
-identification of a rabies -neutralising antibody titre (complete neutralization) in the serum or CSF of an unvaccinated person.
Case definition:
Possible case: a clinical compatible case without laboratory conformation.
Confirmed case: a clinicaly compatible case that is laboratory confirmed.

Diagnostic/analytical methods used

There are no laboratory diagnostic methods for diagnosis of rabies in humans used.
For detection of level of protective immunity of vaccinated persons the assay of rabies virus anti-glycoprotein antibodies (PLATELIA Rabies Kit) is used.

Notification system in place

Compulsory notification is in place since 1946. According to Estonian legislation (Regulation of Ministry of Social Affairs No 99, in force since 01.08.2003) cases of human rabies should be reported to the local department of Veterinary and Food Board to recover animal sources and transmission routes of zoonoses.

History of the disease and/or infection in the country

Epidemiological and epizootological situation of rabies is until now a serious public health problem in Estonia. Rabies cases in wild and domestic animals are registered in all counties in Estonia. The disease is endemic among Estonian wildlife animal population.
The last case of human death from rabies was registrated in Estonia in 1986.

Year	Incidence rate per 100 000 inhabitants
1985	0,1
1986	0,1
1987-2004	0

Results of the investigation

There were no human cases reported in 2004.

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

Every year various wild and domestic animals injure a great number of people. The number of animal attacks of humans has increased continuously over the past five years (1999-2003). The corresponding figures for 2004 were 3763 persons, to whom medical aid due to animals injures were performed and 1216 of them (32,3%) received post-exposure rabies immunoprophylaxis.
Emergency medical aid and immunoprophylaxis against rabies financed through the state budget as the part of National Immunization programme. Rabies immunoprophylaxis and emergency medical aid are provided to all persons injured by identified or unidentified animals and also to persons who are working with animals and in laboratories.

Relevance as zoonotic disease

Human rabies is of very high public health importance in Estonia. The people being in contact with wild animals should be aware of the risk.

2.11.3. Lyssavirus (rabies) in animals

A. Rabies in dogs

Monitoring system

Sampling strategy

Rabies is diagnosed on the basis of clinical symptoms and in the laboratory by determination of the antigenes of the virus from tactile preparations made of brain tissue by immunofluorescence method or by the isolation of the virus from brain tissues of an infected animal in cell cultures or test animals.
After receiving an information about an animal with the suspicion to be infected with rabies or of an animal who has been bitten by an animal with rabies suspicion or in unknown state of health, the authorised veterinarian, who services the region, is obliged to go immediately to the location of the animal, to check the state of the animal and take necessary measures to prevent the spread of infection.

Frequency of the sampling

Every animal with rabies suspicion will be examined

Type of specimen taken

Organs/ tissues: brain

Methods of sampling (description of sampling techniques)

The brain of the animal or its head, in case of small animals the whole carcass, is sent for laboratory analysis. If the brain is damaged, the cervical vertebrae together with the spinal cord have to be sent for analysis.

Case definition

Clinical diagnosis with laboratory confirmation.
Laboratory criteria for diagnosis:
-detection by direct fluorescent antibody of viral antigens in the brain, if FAT test result is suscipious or negative:
-isolation (inoculation in cell culture or in a laboratory animal) of rabies virus from brain tissue, and
-detection of rabies nucleic acid in brain tissue (heminested PCR)

Diagnostic/analytical methods used

Fluorescent Antibody Test (FAT) on smears from hippocampus or medulla oblongata

Vaccination policy

Vaccination of cats and dogs
(1) The animal keeper has to guarantee that his or her cats and dogs are vaccinated.
(2) The first vaccination of dogs and cats takes place when the animal is four months old and the

second vaccination at the age of 12 months. Further on the animal is vaccinated once a year.
(3) At least 30 days has to pass from the vaccination of a hunting dog before it is taken to the forest or placed into the circumstances where it can meet a wild animal.
(4) Animals are vaccinated by veterinary supervisory officials, authorised veterinarians or licenced veterinarians.
(5) The veterinarian keeps record of the vaccinations against rabies and reports to the Veterinary and Food Board by the rules established by the director general of the Veterinary and Food Board.
(6) The veterinarian issues a certificate to the animal keeper on his or her request after the vaccination of the animal or makes an appropriate entrance to the registration document of the animal.
(7) The animal keeper is obliged to present the certificate of the vaccination or the registration document with the appropriate entrance to the veterinary supervisory official or the authorised veterinarian at his or her request.
(8) If the veterinarian finds out that a cat or a dog is not vaccinated or that more than 12 months have passed from its vaccination, the animal has to be vaccinated as soon as possible.
The vaccination of farm animals
(1) It is advisable to vaccinate the farm animals, which graze in woodland pastures and in pastures that are surrounded by woodlands.
(2) The Veterinary and Food Board have the right to carry out obligatory vaccination of the farm animals of endangerd zones determined by the Board at the expense of resources provided for it.

Control program/mechanisms

The control program/strategies in place

According to the Regulation of Minister of Agriculture No 67 "Rules for Rabies Prevention" all animals with the suspicion of rabies or an animal who has been bitten by an animal with rabies suspicion or in unknown state of health, the authorised veterinarian who services the region is obliged to go immediately to the location of the animal, to check the state of the animal and take and send the sample to the laboratory and take necessary measures to prevent the spread of infection.

Recent actions taken to control the zoonoses

In 2004 oral vaccination of wild animals in the small island named Vormsi has been carried out twice in the spring and autumn (about 100 square km).
It is planned to start to start oral vaccination of wild animals in all territory of Estonia at the end of the year 2005.

Measures in case of the positive findings or single cases

If rabies is diagnosed in a cat or a dog on the basis of clinical symptoms or if the animal keeper cannot ensure safe isolation of the animal or the animal keeper cannot be identified, the veterinary supervisory official prescribes compulsory slaughter of the animal. The appropriate slaughter of the animal is arranged by the veterinary supervisory official.
If rabies is not confirmed within 14 days, the veterinary supervisory official or the authorised veterinarian can release the animal from isolation after examining it and if necessary,

vaccinating it.
The cat or dog with rabies or rabies suspicion has to be slaughtered without damaging its head.
The veterinary supervisory official or the authorised veterinarian take samples from the slaughtered animal, also from the animal who has died during the isolation period and send these to the laboratory.
After the sample for analyses has been taken the carcass of the animal has to be burnt.
If rabies is diagnosed in one animal of the herd the authorised veterinarian has to examine all other animals of the herd in order to find typical clinical symptoms of rabies or animals with traces of bites.
The veterinary supervisory official has to issue an order for compulsory slaughter of all animals sick with rabies.
After having taken samples, the carcass of the animal has to be burnt immediately or buried pursuant to the prescriptions of the veterinary supervisory official.
The animals with the suspicion of rabies have to be isolated for at least 14 days into an area surrounded by barriers or into a separate closed room pursuant to the orders of the veterinary supervisory official or the authorised veterinarian.
If the infection source is not known, the authorised veterinarian or the veterinary supervisory official can order the rest of the herd to be vaccinated. The herd has to remain under the supervision of the local authority of the Veterinary and Food Board for at least 30 days. The animal keeper is obliged to notify the authorised veterinarian about all health disturbances of the animals.
Restrictions to the herd are established and abolished by the head of the local authority of the Veterinary and Food Board in writing.
The following restrictions have to be established for the herd in which an animal has been diagnosed with rabies or rabies suspicion:
prohibition to transfer to another herd until the restrictions are abolished;
prohibition to kill the animal for using it for food until the restrictions are abolished;
prohibition to use raw milk and raw milk products for food and for sale until the restrictions are abolished.
The wild animals with suspicious behaviour should be slaughtered pursuant to the orders of the veterinary supervisory official or the authorised veterinarian without damaging the animal's head and samples should be sent to the laboratory After samples have been taken the carcass of the wild animal has to be burnt or buried pursuant to the prescription of the veterinary

Notification system in place

Infection with Rabies is notifiable since 1950 and since 2000 it is notifiable according to the Ministry of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

During the year 2004 96 dog brain tissue were investigated for rabies. 24 of them were positive.

Investigations of the human contacts with positive cases

No data available.

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

Rabies in Estonia originates from wildlife and its main reservoir are red foxes and racoon dogs, whose number has increased in Estonia during the last years according to the data of the Ministry of the Environment. The number of large predators, wolves and lynx, has decreased though, being estimated as 90-100 wolfs, 500-550 bears and 730-800 lynxes in 2004.

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

The highest number of human cases of injury was registered in South-East Estonia as the result of the high number of animal cases of rabies registered in South-Eastern Estonia (Pärnu county) and in southwest (Tartu county). The animal attacks on humans were caused in majority by dogs (74 %), followed by cats (19 %), cows (2%), racoon-dogs (2 %) and foxes (2 %).

Table 5.1 Rabies in animals

	Source of information	Remarks	Animals tested	Animals positive
Cattle (bovine animals)	VFB		69	15
Sheep	VFB		11	0
Goats	VFB		2	0
Pigs	VFB		0	0
Solipeds (1)	VFB		3	0
Wildlife				
bats	VFB		0	0
foxes	VFB		169	92
other (2)	VFB		283	163
Pet animals				
dogs	VFB		96	24
cats	VFB		158	20
other (3)	VFB		2	0

(1) : 3 horses
(2) : 211 racoon dogs and 72 other wildlife animals were investigated and 151 racoon gogs were positive to rabies and 12 other animals were positive.
(3) : 1 rabbit and 1 rat

Footnote

VFB - Veterinary and Food Board

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. E. COLI INDICATORS

3.1.1. General evaluation of the national situation

A. E. coli general evaluation

History of the disease and/or infection in the country

Notification of human E.coli started in 1970. A peak incidence of 1464 cases was detected in 1976 (incidence rate 108,4 per 100 000 population). There is noted a decline in number of cases since 1977 up to present time.

Year	Cases No	Inc. rate per 100 000 inh
2000	59	4,2
2001	34	2,5
2002	28	2,0
2003	33	2,4
2004	24	1,8

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

Since 2004, there has been a European case definition for reporting E.coli in humans. During the last five years the number of reported cases of human E.coli has decreased: in 2000 59 cases were reported and in 2004 - 24 cases. E.coli dominating serotypes in 2003 were O25, O26, O29, O128 and in 2004 were O26, O29, O75, O119, O128.

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

Cattle are the reservoir of Enterohaemorrhagic E.coli strains. Transmission to humans occurs by ingestion of contaminated food, most often inadequately cooked beef (especially ground beef) and also raw milk.

Recent actions taken to control the zoonoses

Reporting to local public health authority. Recognition and reporting of outbreaks is important. Infected persons should not be employed to handle food or to provide child or patient care until 2 successive negative fecal samples. During acute illness patient should be isolated in infectious diseases hospital. Contacts with diarrhea should be excluded from food handling. Bacteriological investigation of contacts cultures should be confined to food handlers, attendants and children in childcare facilities.

3.1.2. Antimicrobial resistance in *Escherichia coli* isolates

Table 13.1 Antimicrobial susceptibility testing of E.coli in animals

	E.coli							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus**		**Turkeys**	
Isolates out of a monitoring program			yes		yes			
Number of isolates available in the laboratory			9		1			
Antimicrobials:	**N**	**%R**	**N**	**%R**	**N**	**%R**	**N**	**%R**
Tetracycline			9	55,6%	1	0%		
Amphenicols								
Chloramphenicol			9	33,3%	1	0%		
Cephalosporin								
Cefotaxim			9	0%	1	0%		
Cefuroxim			9	0%	1	0%		
Fluoroquinolones								
Ciprofloxacin			9	0%	1	0%		
Enrofloxacin			9	0%	1	0%		
Norfloxacin			9	0%	1	0%		
Quinolones								
Nalidixic acid			9	33,3%	1	0%		
Trimethoprim			9	55,6%	1	0%		
Sulfonamides								
Sulfonamide			9	66,7%	1	0%		
Aminoglycosides								
Streptomycin			9	77,8%	1	0%		
Gentamicin			9	22,2%	1	0%		
Trimethoprim + sulfonamides			9	55,6%	1	0%		
Penicillins								
Ampicillin			9	22,2%	1	0%		
Number of multiresistant isolates								
fully sensitives			1	11%	1	100%		
resistant to 1 antimicrobial			1	11%	0	0%		
resistant to 2 antimicrobials			0	0%	0	0%		
resistant to 3 antimicrobials			1	11%	0	0%		
resistant to 4 antimicrobials			0		0	0%		
resistant to >4 antimicrobials			6	67%	0	0%		

Footnote

VFL - these 10 isolates originated from animal clinical samples

Table 13.7 Breakpoints used for antibiotic resistance testing of E.coli in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS
CASFM

Subject to quality control

Escherichia coli	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracycline	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin							5	20		16
Norfloxacin							10	17		12
Quinolones										
Nalidixic acid	NCCLS						30	19		13
Trimethoprim	NCCLS						5	16		10
Sulfonamides										
Sulfonamide	NCCLS						300	17		12
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides(1)	NCCLS							16		10
Cephalosporin										
Cefotaxim	NCCLS						30	23		14
Cefuroxim	NCCLS						30	18		14
3rd generation cephalosporins										
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	NCCLS						300	17		14
Penicillins										
Ampicillin	NCCLS						10	17		13

(1) : disc content 1,25/23,75 mcg

Footnote

VFL

4. FOODBORNE OUTBREAKS

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

A. Foodborne outbreaks

System in place for identification, epidemological investigations and reporting of foodborne outbreaks

Outbreak investigations, an important and challenging component of epidemiology and public health, can help to identify the source of ongoing outbreaks and prevent additional cases.
Foodborne infections are registered in Estonia in the same way as infectious diseases (priority list).
There is reporting system in place, where clinicians, mainly family physicians reporting cases of foodborne outbreaks to the local Public Health Service.
The local Public Health Service is responsible for the investigation of foodborne disease outbreaks. Investigation procedures include epidemiological investigations, food sampling, diagnostic laboratory assays.
Under the regulation of Ministry of Social Affairs (in force since 15.06.2003) local offices of the HPI provide obligatory information to the Veterinary and Food local Services (VFB) about all cases of zoonoses diagnosed in humans (standard form). Obligatory reported zoonoses:
Brucellosis
Echinococcosis
Campylobacter enteritis
Cryptosporodiosis
Leptospirosis
Rabies
Salmonellosis
Antrax
Trichinellosis
Tuberculosis (Mycobasterium bovis)
Tularemia
The HPI and VFB share monitoring data on zoonoses at the local level on a monthly basis, but there is a daily/immediate contact if the need arises and a system for dealing outbreaks.

Description of the types of outbreaks covered by the reporting:

Types of outbreaks: children care facilities, schools, families.
Causative agents:
S.enteritidis,
C.botulinum,
Sh.sonnei II.
Definition of outbreaks:
Outbreak - an incident in which 2 or more persons experience a similar illness after ingestion of

same food, or after ingestion of water from the same source, and where epidemiological evidence implicates the food or water as the source of the illness.
Household outbreak - an outbreak affecting 2 or more persons in the same private household not apparently connected with any other case or outbreak.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

Year	Number of foodborne	Number of outbreaks human cases involved
2000	10	224
2001	6	105
2002	5	127
2003	0	0
2004	1	10

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

S.enteritidis - eggs, curds, cakes, fish, milk.
C.botulinum - canned mushrooms, meat.
Sh.sonnei - milk, liver paste.

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

Restorant, canteen, fast-food producers, private home, kindergarten, school, defence force.

Evaluation of the severity and clinical picture of the human cases

Diarrhea, abdominal pain, vomiting, fever, anorexia, dehydration may be sever. Occasionally - complications in different body dystems.

Descriptions of single outbreaks of special interest

One outbreak of S. Enteritidis involving a total number of 10 cases was registered in Tartu city on 13 - 19 August 2004. Epidemiological investigation of outbreak linked the Salmonella infection with consumption of secondary contaminated food in China fast-food restorant.

Control measures or other actions taken to improve the situation

Improvement of administrative supervision.
Obligatory case report.
Hospitalisation and isolation of a patient.
Concurrent desinfection.
Investigation of contacts and source of infection.
Searching for food handling errors.

Table 12. Foodborne outbreaks in humans

Causative agent	General outbreak	Family outbreak	Total Number in persons			Source			Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital		Suspected	Confirmed			
1	2	3	4	5	6	7			8	9	10
Salmonella	1	0	10	0	2	infected personnel		x	laboratory/ epid	fast-food restaurant	cross-contamination