ZOONOSES MONITORING

ESTONIA

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

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

including information on foodborne outbreaks and antimicrobial resistance in zoonotic agents

IN 2005

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Estonia**

Reporting Year: **2005**

Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
Veterinary and Food Board (VFB)	The Veterinary and Food Board, a governmental agency carrying out its tasks under the government of the Ministry of Agriculture, functions as a supervising body and ensures that the requirements of the legislation that governs animal health, food safety, market regulation, nanimal welfare and farm animal breeding are followed. Coordinates of monitoring of zoonoses in Estonia.	Responsible for reporting on trends and sources of zoonoses. Data on zoonotic agents in animals, food and feed, antimicrobial resistance data on isolates from animals and food.
Veterinary and Food Laboratory (VFL)	Veterinary and Food Laboratory carries out statutory testing under various farm animal disease surveillance and food safety control programmes and laboratory testing of imported and exported animals and relevant goods.	Data on zoonotic agents in animals, food and feed, antimicrobial resistance data on isolates from animals and food.
Estonian Agricultural Registers and Information Board (ARIB)	The Estonian Agricultural Registers and Information Board is a governmental institution subordinated to the Ministry of Agriculture. ARIB`s functions are to maintain the register of farm animals as well as the register of agricultural supports and agricultural parcels and to allocate different agricultural, fishery and rural development supports. ARIB also implements the EU agricultural market regulation measures and milk quota system.	Susceptible animal population data.

Health Protection Inspectorate (HPI)	Health Protection Inspectorate is a governmental institution under the subordination of the Ministry of Social Affairs. The area of its activity includes state supervision over the safety of foodstuffs transferred to the final consumer and their handling on retail establishments; epidemiological surveillance; prevention and control of communicable diseases; investigation of the circumstances of infection transmission; monitoring and supervision over the organization of immunization of population.	Data on zoonotic agents in food at retail level, on human zoonoses and on foodborne outbreaks. Also antimicrobial resistance data on isolates from humans.
Plant Production Inspectorate (PPI)	The Plant Production Inspectorate is an agency under the aegis of the Ministry of Agriculture. It functions as a supervising body and ensures that the requirements of the legislation that governs plant health, plant protection products, feedingstuffs, fertilisers, seeds and plant propagating material, variety listing and plant breeders rights, organic production and fresh fruits and vegetables (external quality standards), are followed.	Data on zoonotic agents in feed.
Health Protection Inspectorate (HPI)laboratories	There are 5 laboratories authorised to perform analysis with regard to official food control. All laboratories are accredited in the field of microbiological examination of food and environmental samples and clinical materials.	Data on zoonotic agents in food at retail level and in humans. Also antimicrobial resistance data on isolates from humans.

PREFACE

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/EC[1]. The information has also been forwarded to the European Food Safety Authority (EFSA).

The report contains information on trends and sources of zoonoses and zoonotic agents in Estonia during the year 2005. The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given.

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

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

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

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

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[1] Directive 2003/99/EC of the European Parliament and of the Council of 12 December 2003 on the monitoring of zoonoses and zoonotic agents, amending Decision 90/424/EEC and repealing Council Directive 92/117/EEC, OJ L 325, 17.11.2003, p. 31

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1. ANIMAL POPULATIONS

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

A. Information on susceptible animal population

Sources of information:

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

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

All the figures provided are from December 31, 2005.

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

The number of susceptible population has been quite stable recently.
The number of herds/flocks of Gallus gallus differs in comparison with the previos year as this year data include backyard poultry.

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 Susceptible animal populations

* Only if different than current reporting year

Animal species	Category of animals	Number of herds or flocks	Year*	Number of holdings	Year*	Livestock numbers (live animals)	Year*	Number of slaughtered animals	Year*
Cattle (bovine animals)	mixed herds	1267		1332		6747		1787	
	dairy cows and heifers	9425		8462		164336		32409	
	meat production animals	1104		1127		7538		2094	
	calves (under 1 year)	6167		6449		71748		12472	
	in total	10738		9707		256185		67165	
Ducks	in total (1)	1151				6810			
Gallus gallus (fowl)	laying hens (2)	14229				1095616		392091	
	broilers (3)	107				1401896		7991402	
	in total (4)	14336		47		2497512		8383493	
Geese	in total	962				3772			
Goats	animals under 1 year	130		130		366		81	
	animals over 1 year	416		365		1520		210	
	in total	426		380		1886		291	
Ostriches	farmed	32				263		25	
Pigs	breeding animals							11417	
	fattening pigs					135967		437851	
	in total					309714		459097	
Rabbits	farmed	362		362		5769		874	
Sheep	animals under 1 year (lambs)	1172		1197		15553		5488	
	animals over 1 year	1876		1748		32263		6321	
	in total	1922		1807		47816		11809	
Solipeds, domestic	horses - in total	610		610		4070		6	
Turkeys	in total	165				809			
unspecified	sows and gilts					30879			

(1): including backyard poultry
(2): including backyard poultry
(3): including backyard poultry
(4): Number of holdings (47) - the number of production sites to which a distinguishing number has been issued in accordance with the Commission Directive 2002/4/EC.

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 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 is 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 is in place. The data received in the frames of this programme shows that the prevalent Salmonella serotypes isolated from cattle were S.Typhimurium and S.Dublin (2004 - S.Dublin and S.group C). S.Typhimurium (2004 - S.Stanleyville) was the predominant serotype isolated from pigs and S.Enteritidis was the only serotype isolated from 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 during years. Samples tested in 2005 as in 2004 were negative.
In 2002 the Estonian Salmonella Monitoring Programme for Food of Animal Origin has been started and is approved annually by the Director General of the Veterinary and Food Board. Food of animal origin is sampled and analysed according to this programme. In addition to this programme food samples are taken in the frames of official surveillance programmes of Veterinary and Food Board and Health Protection Inspectorate.
4236 samples of meat and meat products has been tested in 2005, 60 (1,4 %) of them were positive (2004 - 0,8 %). 58,3 % (2004 - 38,8 %)of all positive samples compose fresh broiler meat. The predominant isolates were S.Enteritidis (43 samples) and S.Typhimurium (6 samples). 0,09 % (3 samples) of 3313 tested samples of milk, milk products and other food products were Salmonella posistive in 2005.
The overall prevalence of Salmonella in foodstuffs is about 0,8 % (2004 - 0,5 %).
Antimicrobial resistance:
Salmonella isolates from foodstuffs tested for antibiotic resistance are collected in the frames of monitoring or surveillance programmes.
In 2005 - 54 Salmonella spp. isolates were tested in the frames of the project Antimicrobial Resistance Monitoring of Zoonotic Agents isolated from animals. 26 isolates originated from animal clinical material, 28 from food of animal origin. Investigations were performed by the Veterinary and Food Laboratory.
The number of human cases of salmonellosis are decreasing since the year 2000. But in the year 2005 the number of human cases increased 2 times in comparison with the previous year. The

predominant causative agent of salmonellosis in humans is S.Enteritidis. Young children are more exposed to the illness in Estonia, especially children from 1 to 4 years old.
One general outbreak and 16 family outbreaks of salmonellosis has been registered in the year 2005. In most of cases Salmonella enteritidis was the causative agent of the outbreak.

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.
Salmonella Enteritidis is the predominant agent discovered in food and humans. Salmonella Typhimurium is on the second position among the other serotypes isolated from food and humans.
Salmonella Dublin and Salmonella Typhimurium are the predominant agents discovered in cattle and pigs. Salmonella Enteritidis is discovered most often in poultry.

2.1.2. Salmonella in foodstuffs

A. Salmonella spp. in eggs and egg products

Monitoring system

Sampling strategy

Eggs at packing centres and egg products at production plants are sampled by the 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 of table aggs and egg products is performed in accordance with the Health Protection Inspectorate annual plan as a part of official food control.
Sampling in the frames of SMPF 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 plans, 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

Mixture of yolk and white

Egg products (at production plant and at retail)

Egg products: .

Methods of sampling (description of sampling techniques)

Eggs at egg packing centres (foodstuff based approach)

Eggs are sampled randomly. Sample taken - 5 eggs, sample analysed - 25 g mixture of yolk and white. Samples are stored at +2+4C and analysed as soon as

possible.

Eggs at retail

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

Raw material for egg products (at production plant)

Sampling is random. Sample analysed - 25 g. 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.

Raw material for egg products (at production plant)

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 No 1 from 07.01.2002 "Regulation on prevention against salmonellosis of farm animals". SMPF started in 2002 and is approved annually by the Director General of Veterinary and Food Board.
In addition to the monitoring programme samples are taken in the frames of official surveillance and by the industry in accordance with their self control programmes.

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 pasteurized products.
When salmonella is detected in food already present 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 investigating the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board about the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or about suspicion of the occurrence of such pathogens in raw food material or products. In addition, such laboratories are obliged to notify the Health Protection Inspectorate about isolation of zoonotic agents.
Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

In the year 2005 Salmonella has not been detected in any of 223 analysed eggs taken at packing centres and at retail.
60 egg products taken from egg production establishments has been analysed with no positive findings.
4 samples of raw material for egg products has been analysed. No Salmonella detected.

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

The Estonian Salmonella Monitoring Programme for Food of Animal Origin 2002-2005 indicate that eggs taken at packaging centres have not been contaminated with Salmonella.
2,9 % of 241 egg product samples tested in the frames of the monitoring programme were positive for Salmonella during these years. At the same time in the years 2004-2005 there were no positive samples of egg products taken in the frames of the monitoring programme.

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

In the year 2005 some cases of human salmonellosis 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 the 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 the frames of official food surveillance at slaughterhouse poultry meat, offal, carcase chilling water and environment are sampled randomly. Targeted sampling is preformed in cases of suspicion.
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 of consignements of the same origin are carried out.
In addition to official monitoring and surveillance plans, every food business operator has the obligation to take samples in the frame of self control programmes.

At meat processing plant

In the frames of official food surveillance programme sampling 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 and minced meat, meat products 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 carcasses at slaughterhouse and meat or scrap cuttings from cutting plants. At slaughterhouses sampling is performed once a week. Samples are taken immediately after veterinary inspection at the final stage of slaughter line before chilling of carcasses. Neck skin pieces of 10 g are taken using sterile instruments. Samples from 10 carcasses 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 the official food surveillance sampling plans sampling is performed as follows:
minced meat, meat preparations plants - raw material is sampled, if it does not originate from the slaughterhouse of the same establishment (sample analysed 25 g); minced meat, meat preparations and meat preparations made from 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),
meat products establishments - meat products are sampled regularly. Analysed sample size - 25 g.

At retail

Sample taken - 200 g, sample analysed - 25 g. 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.

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 salmonellosis of farm animals". SMPF started in 2002 and is approved annually by the Director General of Veterinary and Food Board.
Prevention of salmonellooses is based on analyses made in the frames of salmonella monitoring programme and establishment`s self control programme.

Measures in case of the positive findings or single cases

In case of positive findings in poultry meat at 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 should be destroyed or considered conditionally fit for human consumption and could be destined for manufacturing of heat treated meat products under the supervision of official veterinarian.
When salmonella is detected in food on the market, 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 invstigating the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board about the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or about suspicion of the occurrence of such pathogens in raw food material or products. In addition, such laboratories are obliged to notify the Health Protection Inspectorate about isolation of zoonotic agents.
Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

35 (11,2 %) of 312 investigated samples of broiler meat and broiler meat products were positive for salmonella in the year 2005. S.Enteritidis has been detected in 34 samples, S.Typhimurium - in 1 sample.
Mostly positive samples has been discovered among fresh broiler meat.
Altogether 233 samples of broiler fresh meat have been taken in the year 2005. 34 samples were positive.
Salmonella Monitoring Programme for Food of Animal Origin data show that 5 (8,9 %) of 56 samples of broiler neck skin taken at slauhterhouse and 20 (2,1 %) of 93 samples of fresh broiler meat were Salmonella positive.

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

Data received from Salmonella Monitoring Programme for Food of Animal Origin 2002-2005 show that during these years Salmonella has been detected in 23 (10,9 %) of 210 broiler meat samples taken at cutting plants, in 14 (6,4 %) of 220 neck skin samples taken at slaughter (2002 - 2, 2003 - 5, 2004 - 2, 2005 - 5).
Salmonella Enteritidis is the prevalent serovar in broiler meat. Salmonella Typhimurium is on the second position.

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.
Salmonella Enteritidis and Salmonella Typhimurium are the dominant serovars in humans during many years.

C. Salmonella spp. in turkey meat and products thereof

Monitoring system

Sampling strategy

At retail

Random sampling is performed 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

Methods of sampling (description of sampling techniques)

At retail

Sample taken - 200 g, sample analysed - 25 g. 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

As turkey meat in Estonia is mostly imported, sampling is performed at retail or at border inspection posts. Sampling is random and is performed in the frames of the official food control.

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 invstigating the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board about the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or about suspicion of the occurrence of such pathogens in raw food material or products. In addition, such laboratories are obliged to notify the Health Protection Inspectorate about isolation of zoonotic agents.
Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

There were no positive samples in 2005.

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

It is very difficult to make any evaluation, because only imported turkey meat has been analysed and the amount of the analysed samples is very small.

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

In the year 2005 there were no positive samples of turkey meat. 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 the 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 carcasses 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 suspicion, 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 carcass, fresh meat

At meat processing plant

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

At retail

Other: 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:

at slaughterhouse - swab samples should be taken after the inspection of the carcasses at the final stage of the slaughter line before chilling of the carcass. 2 surface samples should be taken from each carcass, 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 enables to identify an animal, stockbreeder and date of sampling.
at cutting plant - samples should be taken during meat cutting from production line or any other appropriate site in the cutting plant. Samples with size of at least 25 g are stored at 0-4C 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. At cutting plants or their 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:
minced meat, meat preparations (incl. raw sausages) plants - raw material is sampled, if not originating from the slaughterhouse of the same establishment (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).
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 the sample 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 salmonellosis of farm animals". SMPF started in 2002 and is approved annually by the Director General of Veterinary and Food Board.
Prevention of salmonellosis is based on analyses made in the frames of salmonella monitoring programme and establishment`s self control programmes.

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 carcasses should be destroyed or considered as conditionally fit for human consumption and should be 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 invstigating the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board about the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or about suspicion of the occurrence of such pathogens in raw food material or products. In addition, such laboratories are obliged to notify the Health Protection Inspectorate about isolation of zoonotic agents.
Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

Seven (0,5 %) of the 1274 investigated samples of pig meat and pig meat products were posistive for salmonella in 2005. 5 positive samples were taken from fresh meat and 2 from minced meat.
3 S.Typhimurium, 2 S.Dublin, 1 S.Enteritidis and 1 S.Panama has been isolated.
There were no pisitive samples taken in the frames of the Salmonella monitoring programme. 671 swabs taken from carcasses at slaughter and 309 fresh meat samples taken at cutting plants 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 - 2005 altogether 3 (0,3 %) of 1081 pig meat samples taken at cutting plants and 1 (0,04 %) of 2267 swab samples taken from carcasses at slaughter were positive for Salmonella.
In comparison with the previous year the number of positive samples increased in the year 2005: 2004 - 1 and 2005 - 7 positive samples.

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

In the year 2005 the pig meat and product thereof were not epidemiologically or bacteriologically confirmed source of infection in humans. The predominant Salmonella serotype in humans was S.Enteritidis and on the second position was S.Typhimurium.

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 frames of official food surveillance sampling plan. In addition to official monitoring and surveillance, every food business operator is obliged to take samples in the frames of the 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 at the slaughterhouses, all carcasses with infection suspicions and cattles 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 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 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:
at slaughterhouse - swab samples should be taken after inspection of carcasses at the final stage of the slaughter line before chilling of the carcase. 2 surface samples should be taken from each carcass, 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. Samples are sent to the laboratory as soon as possible and should be marked so, that it enables to identify an animal, stockbreeder and date of sampling.
In addition to the monitoring programme, meat is sampled at slaughterhouses according to the official food surveillance sampling plans. The weight of sample analysed is 25 g.
at cutting plants - samples should be taken during meat cutting from production line or any other appropriate site of 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 the official surveillance sampling plans. If appropriate, crushed meat for heat treated meat products production and raw material for minced meat production for retail establishments are sampled. The weight of sample analysed is 25 g.

At meat processing plant

According to the official food surveillance sampling plan:
at minced meat/meat preparation (incl. raw sausages) plants - raw material is sampled, if not originating from the slaughterhouse of the same establishment (sample weight 25 g); minced meat, meat preparations and meat preparations made from 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),
at meat products establishments - meat products are sampled regularly. Weight of the sample analysed is 25 g.

At retail

Sample taken - 200 g, sample analysed - 25 g. 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

Salmonella positive sample/batch - a sample/batch where Salmonella spp. has been isolated.

At meat processing plant

Sample is considered to be 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 spread of illness 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 establishment`s self control programmes.

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 salmonellosis of farm animals". SMPF started in 2002 and is approved annually by the Director General of the Veterinary and Food Board.
Prevention of salmonellosis is based on analyses made in the frames of salmonella monitoring programme and establishment`s self control programmes.

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 carcasses should be destryed or considered as conditionally fit for human consumption and should be 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 invstigating the safety and quality of the products of enterprises which handle food of animal origin are required to notify the Veterinary and Food Board about the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or about suspicion of the occurrence of such pathogens in raw food material or products. In addition, such laboratories are obliged to notify the Health Protection Inspectorate about isolation of zoonotic agents.

Local Veterinary centres notify the local offices of the Health Protection Inspectorate about isolation of Salmonella in food.

Results of the investigation

842 samples has been analysed in the year 2005:
239 samples were tested in the frames of post mortem official meat inspection when there was a suspicion that the slaughtered animal could be infected with Salmonella,
189 fresh meat samples,
388 swab samples from carcasses (at slaughterhouse),
11 minced meat samples (at retail),
15 meat preparation and meat products (at retail).
2 (0,2 %) of the samples analysed were considered to be positive for Salmonella. These 2 fresh meat samples has been taken at the slaughterhouse.
All samples taken in the frames of the monitoring programme were negative for Salmonella.

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

In the year 2005 Salmonella has been isolated only in 0,2 % of the samples analysed, in comparison with the previous year when 1,8 % of the bovine meat has been contaminated with salmonella (mostly fresh and minced meat).
The Salmonella Monitoring Programme for Food of Animal Origin 2002-2005 data document that Salmonella has not been isolated from the samples of fresh 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, 0 of 358 - in 2004 and 0 of 388 - in 2005.

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

In the year 2005 no one case of infection in human was epidemiologically linked to the bovine meat and products thereof.

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from broilers (Gallus gallus)								
fresh								
- at slaughterhouse - animal sample - neck skin - Monitoring	VFB	batch	25 g	56	5	5		
- at cutting plant - Monitoring	VFB	batch	25 g	93	20	20		
- at slaughterhouse - Surveillance (1)	VFB	single	25 g	33	3	2	1	
- at retail - Surveillance	HPI	single	25 g	51	6	6		
meat preparation								
intended to be eaten cooked								
- at retail - Surveillance	HPI	single	25 g	13	1	1		
meat products								
cooked, ready-to-eat								
- at retail - Surveillance	HPI	single	25 g	66	0			
Meat from turkey								
fresh	HPI	single	25 g	2	0			
- at processing plant - Surveillance	VFB	single	25 g	2	0			
minced meat								
intended to be eaten cooked	HPI	single	25 g	1	0			
meat preparation								
intended to be eaten cooked	HPI	single	25 g	1	0			

(1) : including import

Footnote

Monitoring - Salmonella Monitoring Programme for Food of Animal Origin, official sampling, domestic production
Surveillance - official control, official sampling

Table Salmonella spp. in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Milk, cows'								
raw								
- at retail - Surveillance	HPI	single	25	26	0			
raw milk for manufacture								
- at processing plant - Surveillance	VFB	single	25 g	25	0			
pasteurised milk								
- at processing plant - Monitoring	VFB	single	25 g	5	0			
- at processing plant - Surveillance	VFB	single	25 g	26	0			
Milk, goats'								
raw								
- at retail - Surveillance	HPI	single	25 g	1	0			
Cheeses made from cows' milk								
soft and semi-soft								
made from pasteurized milk								
- at processing plant - Monitoring	VFB	single	25 g	9	0			
- at processing plant - Surveillance	VFB	single	25 g	18	0			
hard								
made from pasteurized milk								
- at processing plant - Monitoring	VFB	single	25 g	20	0			
- at processing plant - Surveillance	VFB	single	25 g	48	0			
- at retail - Surveillance	HPI	single	25 g	23	0			
Dairy products (excluding cheeses)								
butter								
made from pasteurized milk								
- at processing plant - Monitoring	VFB	single	25 g	12	0			

- at processing plant - Surveillance	VFB	single	25 g	27	0			
- at retail - Surveillance	HPI	single	25 g	1	0			
cream								
made from pasteurized milk								
- at processing plant - Surveillance	VFB	single	25 g	18	0			
milk powder and whey powder								
- at processing plant - Monitoring	VFB	single	25 g	7	0			
- at processing plant - Surveillance	VFB	single	25 g	22	0			
ice-cream								
made from pasteurized milk								
- at processing plant - Monitoring	VFB	single	25 g	3	0			
- at processing plant - Surveillance	VFB	single	25 g	27	0			
- at retail - Surveillance	HPI	single	25 g	1	0			
dairy products, not specified								
ready-to-eat								
- at processing plant - Monitoring	VFB	single	25 g	38	0			
- at processing plant - Surveillance (1)	VFB	single	25 g	215	0			
- at retail - Surveillance	HPI	single	25 g	58	0			

(1) : including import

Footnote

Monitoring - Salmonella Monitoring Programme for Food of Animal Origin, official sampling, domestic production
Surveillance - official control, official sampling

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Panama	S. Thompson	S. Give	S. Agona	S. Dublin	S. Kingston
Meat from pig														
fresh														
- at slaughterhouse - Surveillance	VFB	single	25 g	141	0									
- at slaughterhouse - Surveillance - official controls (other than control and eradication programmes) - official sampling - suspect sampling	VFB	single	25 g	7	5	1	2						2	
- at cutting plant - Monitoring	VFB	single	25 g	309	0									
minced meat														
intended to be eaten cooked														
- at retail - Surveillance	HPI	single	25 g	46	2		1		1					
meat preparation														

intended to be eaten cooked - at retail - Surveillance	HPI	single	25 g	25	0															
meat products																				
cooked, ready-to-eat - at retail - Surveillance	HPI	single	25 g	75	0															
carcass																				
- at slaughterhouse - Monitoring	VFB	single	swab	671	0															
Meat from bovine animals																				
fresh																				
- at slaughterhouse - Surveillance	VFB	single	25 g	104	2											1	1			
- at slaughterhouse - Surveillance - official controls (other than control and eradication programmes) - official sampling - suspect sampling	VFB	single	25 g	239	0															
- at cutting plant - Monitoring	VFB	single	25 g	85	0															
minced meat																				
intended to be eaten cooked - at retail - Surveillance	HPI	single	25 g	11	0															
meat preparation																				
intended to be eaten cooked - at retail - Surveillance	HPI	single	25 g	6	0															
meat products																				
cooked, ready-to-eat	HPI	single	25 g	9	0															

carcass														
- at slaughterhouse - Monitoring	VFB	single	swab	388	0									
Meat from sheep														
fresh														
- at slaughterhouse - Surveillance	VFB	single	25 g	16	0									
Meat, mixed meat														
minced meat														
- at retail - Surveillance	HPI	single	25 g	35	3		2			1				
- at processing plant - Surveillance	VFB	single	25 g	233	1	1								
meat preparation														
intended to be eaten cooked														
- at retail - Surveillance	HPI	single	25 G	19	0									
meat products														
cooked, ready-to-eat														
- at retail - Surveillance	HPI	single	25 g	99	0									
pâté														
- at retail - Surveillance	HPI	single	25 g	88	0									
raw but intended to be eaten cooked														
- at retail - Surveillance	HPI	single	25 g	1	1						1			
Meat from other animal species or not specified														
fresh														
- at processing plant - Surveillance	VFB	single	25 g	351	5	3		1				1		
offal														
- at slaughterhouse - Surveillance	VFB	single	25 g	4	3	3								

meat preparation														
- at processing plant - Surveillance	VFB	single	25 g	498	3	1							2	
meat products														
- at processing plant - Surveillance	VFB	single	25 g	442	0									
Meat from wild game - land mammals														
fresh														
- at slaughterhouse - Surveillance	VFB	single	25 g	16	0									

Footnote

Monitoring - Salmonella Monitoring Programme for Food of Animal Origin, official sampling
Surveillance - official control, official sampling

Table Salmonella spp. in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Eggs								
table eggs								
- at packing centre	VFB	single	25 g	43	0			
- at retail	HPI	single	25 g	43	0			
- at packing centre - Monitoring	VFB	single	25 g	137	0			
raw material (liquid egg) for egg products	VFB	single	25 g	4	0			
Egg products								
- at packing centre - Monitoring	VFB	single	25 g	60	0			
Crustaceans								
unspecified								
cooked (1)	VFB	single	25 g	5	0			
Fruits and vegetables								
- at processing plant - Surveillance	VFB	single	25 g	20	0			
products								
- at processing plant - Surveillance	VFB	single	25 g	9	0			
Juice								
vegetable juice								
- at retail - Surveillance	HPI	single	25 g	2	0			
Infant formula								
dried								
- at retail - Surveillance	HPI	single	25 g	28	0			
Foodstuffs intended for special nutritional uses								
ready-to-eat								
- at retail - Surveillance	HPI	single	25 g	3	0			
non-ready-to-eat								
- at retail - Surveillance	HPI	single	25 g	4	0			
Fish								
raw								

frozen								
- at retail - Surveillance	HPI	single	25 g	1	0			
- at processing plant - Surveillance	VFB	single	25 g	31	0			
chilled								
- at processing plant - Surveillance	VFB	single	25 g	14	0			
- in total - Surveillance (2)	VFB	single	25 g	66	1		1	
smoked								
- at retail - Surveillance	HPI	single	25 g	28	0			
hot-smoked								
- at processing plant - Surveillance	VFB	single	25 g	4	0			
gravad /slightly salted								
- at retail - Surveillance	HPI	single	25 g	2	0			
marinated								
- at retail - Surveillance	HPI	single	25 g	10	0			
Fishery products, unspecified								
ready-to-eat								
- at retail - Surveillance	HPI	single	25 g	97	0			
- at processing plant - Surveillance	VFB	single	25 g	36	0			
Bakery products								
- at retail - Surveillance	HPI	single	25 g	129	0			
- at processing plant - Surveillance	VFB	single	25 g	10	0			
cakes								
- at retail - Surveillance	HPI	single	25 g	315	1	1		
- at processing plant - Surveillance	VFB	single	25 g	27	0			
ready-to-eat salads								
- at retail - Surveillance	HPI	single	25 g	998	0			
- at processing plant - Surveillance	VFB	single	25 g	66	0			
Sauce and dressings								
- at retail - Surveillance	HPI	single	25 g	25	0			
Water								
bottled water								
- at retail - Surveillance	HPI	single	25 g	43	0			
- at processing plant - Surveillance	VFB	single	25 g	1	0			
Spices and herbs								
dried								
- at retail - Surveillance	HPI	single	25 g	20	0			
Confectionery products and pastes								

- at processing plant - Surveillance	VFB	single	25 g	31	0			
Chocolate								
- at processing plant - Surveillance	VFB	single	25 g	5	0			
Fats and oils (excluding butter)								
- at processing plant - Surveillance	VFB	single	25 g	6	0			
Beverages, non-alcoholic								
- at processing plant - Surveillance	VFB	single	25 g	6	0			
Nuts and nut products								
- at processing plant - Surveillance	VFB	single	25 g	6	0			
Cereals and meals								
- at processing plant - Surveillance	VFB	single	25 g	7	1	1		
Other processed food products and prepared dishes								
unspecified								
ready-to-eat foods								
- at retail - Surveillance	HPI	single	25 g	269	0			
- at processing plant - Surveillance	VFB	single	25 g	45	0			
Other food of non-animal origin								
- at processing plant - Surveillance	VFB	single	25 g	25	0			
Other products of animal origin								
gelatin and collagen								
- at processing plant - Surveillance	VFB	single	25 g	2	0			

(1) : surveillance
(2) : import control

Footnote

Monitoring - Salmonella Monitoring Programme for Food of Animal Origin, official sampling, domestic production
Surveillance - official control, official sampling

2.1.3. Salmonella in animals

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

Monitoring system

Sampling strategy

Laying hens flocks

In order 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 is conducted through the studies on the basis of salmonella monitoring plan and enterprise self control programmes. 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 and 9 weeks prior to slaughter

Type of specimen taken

Laying hens: Day-old chicks

Other: Dead chicks, meconium

Laying hens: Rearing period

Faeces

Laying hens: Production period

Faeces

Laying hens: Before slaughter at farm

Other: Faeces, dust

Methods of sampling (description of sampling techniques)

Laying hens: Day-old chicks

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

Laying hens: Rearing period

The number of faeces samples that should be 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 birds raising enterprises producing hatching eggs, 10 % of the breeding flock birds 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 %.

Laying hens: Production period

See "Laying hens: Rearing period".

Laying hens: Before slaughter at farm

See "Laying hens: Rearing period".

In accordance with the Commission Decision of 22 September 2004 concerning a baseline study on the prevalence of salmonella in laying flocks of Gallus gallus the faeces and dust samples were taken during the period 01.10.2004 - 01.10.2005. Samples had been taken from the 11 holdings (1 holding with 1000 - 2999 laying hens, 1 with 3000 - 4999 laying hens, 5 holdings with 10000 - 29999 laying hens and 5 holdings with >= 30000 laying hens). Sampling had been performed in accordance with the technical specifications for baseline study on the prevalence of Salmonella in laying flocks of Gallus gallus.

Case definition

Laying hens: Day-old chicks

A flock or sample is considered to be positive if the presence of Salmonella spp. is detected in at least one of the samples.

Laying hens: Rearing period

A flock is considered to be positive if the presence of Salmonella spp. is detected in at least one of the samples.

Laying hens: Production period

A flock is considered to be positive if the presence of Salmonella spp. is detected in at least one of the samples.

Laying hens: Before slaughter at farm

A flock is considered to be positive if the presence of Salmonella spp. is detected in at least one of the samples.

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.

Other preventive measures than vaccination in place

Laying hens flocks

The handler should notify the authorised veterinarian servicing the enterprise or the veterinary supervision official about detection of salmonella bacteria in the samples taken in frames of the enterprise self control programme. 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 control plans.
Official samples from imported feedingstuffs should be taken in the course of random inspection of their storing.
Altogether 100 official feedingstuff samples should be taken and studied each year.

Control program/mechanisms

The control program/strategies in place

Laying hens flocks

Sampling is performed in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases, which is approved annually by the Director General of the Veterinary and Food Board and is established according to the Regulation of the Minister of Agriculture No 1 from 07.01.2002 "Prevention against Salmonellosis of farm animals".
In order to monitor salmonellosis in birds, the owner or person responsible for the hatchery or for the birds flock should examine at his expense the flocks and hatcheries once a year in the proportions specified in the table above.
In case of bacteriological studies of breeding flock the samples should be replaced by official samples every 8-th week.

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. All birds flocks (young birds, breeding flock, productive flock), where Salmonella spp. has been diagnosed should be executed or sent immediately for slaughter. After the flock infected by salmonellosis has been sent to the slaughterhouse, the carriage 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. Poultry buildings should be checked on the efficiency of deratisation, disinfection and on protection against wild birds. Empty period is required for 21 day. Disposal of manure is restricted. Feedingstuffs should be destructed or heat-treated. Taking into account the particulars of each case, the Veterinary and Food Board has the right to allow the use of alternative methods like treatment with antibiotics instead slaughter of breeding flock.

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 the year 2005 32183 samples taken from laying and broiler flocks have been tested in the frames of the State Programme on Monitoring and Surveillance of Animal Infectoius Diseases. 316 of the pooled samples analysed were positive for Salmonella Enteritidis.
Additionally 77 samples have been taken in the frames of the Baseline Study on the prevalence of Salmonella in laying flocks of Gallus gallus during 01.10.2004 till 01.10.2005. The sampling frame covered 11 holdings (35 flocks) with at least 1000 laying hens. S.Enteritidis had been

isolated from 2 samples (1 faeces sample and 1 dusty material) taken at 1 holding (Lääne-Virumaa county). S.Bareilly had been isolated from 1 sample (dusty material) taken from the other holding situated in the Lääne-Virumaa county. In conclusion, positive results had been found in 2 out of 35 flocks reared in 11 holdings. The prevalence of Salmonella spp. in these holdings was 16 % (in 1 holding with 1000 - 2999 laying hens and in 1 holding with >= 30000 laying hens). The prevalence of Salmonella enteritidis was 8 % (in 1 holding with 1000 - 2999 laying hens).

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

The overall prevalence of salmonella in poultry is very low.

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)

In order to prevent the spread of salmonellosis in 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 is conducted through the studies on the basis of salmonella monitoring plan and enterprise self control programmes. 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.

Broiler flocks

The same as mentioned above.

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

Young birds of the breeding flock - day-old chicks that have got killed and internal linings of chick boxes (10 samples per flock/lot). Sampling should be performed 3 weeks before hatching.

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

3 weeks before relocation copro samples or cloaca tampon samples from each flock.
The number of faeces samples that should be 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

Broiler flocks: Day-old chicks

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

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 produsing hatching eggs, 10 % of the birds of breeding flock should be studied be the method of blood-drop agglutination, if the egg-laying rate of egg breeds and meat breeds has reached respectively 50 % and 30 %.

Broiler flocks: Before slaughter at farm

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 produsing hatching eggs, 10 % of the birds of breeding flock should be studied be the method of blood-drop agglutination, if the egg-laying rate of egg breeds and meat breeds has reached respectively 50 % and 30 %.

Case definition

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

A positive case is an animal/flock confirmed positive for Salmonella.

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.

Broiler flocks: At slaughter (flock based approach)

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 about detection of salmonella bacteria in the samples taken in frames of the enterprise self control programme. 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 control programmes.
Official samples from imported feedingstuffs should be taken in the frames of random inspection of their storing.
Altogether 100 official feedingstuff samples should be taken and studied each year.

Control program/mechanisms

The control program/strategies in place

Broiler flocks

State Programme on Monitoring and Surveillance of Animal Infectoius Diseases is approved annually by the Director General of the Veterinary and Food Board and is established according to the Regulation of the Minister of Agriculture No 1 from 07.01.2002 "Prevention against Salmonellosis of farm animals".
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 salmonellosis 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 to take them out, except for slaughter.
All birds flocks (young birds, breeding flock, productive flock), where Salmonella spp. has been diagnosed should be executed or sent immediately for slaughter.
After the flock infected by salmonellosis has been sent to the slaughterhouse, the carriage boxes, transport boxes and transport means shall be cleaned, washed and disinfected.
The litter of flocks infected by salmonellosis should 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. Poultry buildings should be checked on the efficiency of deratisation, disinfection and on protection against wild birds. Empty period is required for 21 day.
Disposal of manure is restricted. Feedingstuffs should be destructed or heat-treated.
Taking into account the particulars of each case, the Veterinary and Food Board has the right to allow the use of alternative methods like treatment with antibiotics instead slaughter of breeding flock.

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.

Broiler flocks: At slaughter (flock based approach)

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

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

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

The occurence of salmonella in breeding flocks for meat production is close to zero.

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

S.enteritidis is the most widespread serotype among humans. Poultry meat is supposed to be the source of human infection.

C. Salmonella spp. in pigs

Monitoring system

Sampling strategy

Multiplying herds

In order to monitor salmonellosis 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.
When transferring pigs to artificial fertilisation station or to the breeding herd kept for the purposes of artificial fertilisation, animals 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

Faeces

Multiplying herds

Faeces

Fattening herds at farm

Faeces

Methods of sampling (description of sampling techniques)

Multiplying herds

In order to diagnose salmonellosis in pigs on the basis of a clinical picture or pathologic-anatomical findings the copro samples should be taken from the rectum of animals with the doubt of salmonellosis.
From the rectum of animals under examination a faeces 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

An animal or flock where Salmonella spp. has been isolated.

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

Samples are taken in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases, which is approved annually by the Director General of the Veterinary and Food Board.

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.
In order to discover the origin of infection, samples on presence of salmonellas should be taken also from contact farm animals, while one animal from 5-10 animals should be examined, and from feedstuffs. If any animal has the characteristics of clinical salmonellosis, individual samples should be taken from such animals.
If salmonellosis is detected at farm in animals other than pigs or it is detected in people working at farm, the herds of pigs at farms should be examined.
In case of diagnosing salmonellosis in a pig, animals in the herd of origin, which have not been examined for salmonellosis, should be examined or if salmonellosis has been detected in the course of annual monitoring, samples should be taken from the herd of origin.
The stockbreeder should immediately separate the animals that are clinically ill and salmonella positive from other animals as safely as possible.
The separated animals should be subjected to medical treatment if necessary, and the occurrence of salmonellas should be studied on the basis of individual copro samples every week until receiving two consecutive negative results, or should be sent for slaughter.
Pigs should be kept inside premises so that they cannot be in contact with other animals.
Only the personnel looking after animals are allowed to stay at farm. When looking after the animals, the personnel should wear appropriate protective clothes and in leaving the livestock premises their footwear should be cleaned thoroughly and disinfected.
A stockbreeder has to keep records on salmonella studies concerning all farm animals.
After sending the animals doubted to be infected or actually infected for slaughter, the livestock premises, bedsteads, feeding stands and keeping tools should be cleaned and disinfected according to the prescriptions of veterinarian.
Manure and used litter of pigs should be handled according to the prescriptions of authorised veterinarian so that the spread of salmonella should be prevented.
Deratisation, disinfection and protection against wild birds should be organised.
The access of dogs and cats to livestock premises should be precluded.

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 2005 562 samples were tested in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases. Salmonella Typhimurium was isolated in the Veterinary and Food Laboratory in eight samples (1,4 %).
Salmonella Stanleyville was isolated in three samples taken in the frames of clinical investigations. The number of units tested is not avaliable.

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

Salmonella Stanleyville and Salmonella Typhimurium were isolated from pigs in 2005. In the previous year (2004) there were no S.Stanleyville isolated and S.typhimurium composes 0,4 % (2 of the 532 samples) of the samples tested.

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 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.
From cattle less than one year old copro samples should be taken by age groups or keeping groups, a copro sample of one animal per 5-10 animals.
The copro samples from animals under examination should 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, animals should 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 on the basis of a clinical picture or pathologic-anatomical findings the copro samples should be taken from the rectum of animals with the doubt of salmonellosis.
From the rectum of animals under examination a faeces sample at least 10 grams should be taken by an individual plastic glove or bag, the inside of which should be turned out then and marked for identification of the sample.
The individual copro samples should be halved in the laboratory. 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 should be examined again on the basis of individual samples.
To diagnose salmonellosis in cattle, becides copro samples also organ samples should be taken from dead animals.
Animals tissue samples of at least 25 grams should be taken from liver, spleen and from lymph nodes in small intestine and caecum area (3-5 pieces), each sample should 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 should be homogenised and pre-enriched in buffered peptone water.
The following samples should be taken from the herd infected by salmonellosis detected during the studies or monitoring:
- individual copro samples from all cattles over one year old. The samples may be accumulated by five into an additional package;
- individual copro samples from the cattle less than one year old, that have clinical characteristics referring to salmonellosis;
- copro samples from the cattle without clinical characteristics, breakdown by age groups or keeping groups, a sample from one animal per 5-10 animals;
- samples of feedingstuffs or their components.

Case definition

Animals at farm

An animal or flock where Salmonella spp. has been isolated.

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.

Other preventive measures than vaccination in place

Vaccination against salmonella is forbidden in Estonia.

Control program/mechanisms

The control program/strategies in place

Sampling is performed in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases, which is approved annually by the Director General of the Veterinary and Food Board.

Measures in case of the positive findings or single cases

In a herd infected with Salmonella the infection sources and spreading ways should be detected and then removed or blocked.
To find out the origin of infection, samples on presence of Salmonella 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 should be taken from such animals.
If salmonellosis is diagnosed at farm in animals other than cattle or it is detected in people working at farm, the cattle herds at farms should be examined.
In case of diagnosing salmonellosis in cattle, the animals in the herd of origin which have not been examined for salmonellosis, should be examined or if salmonellosis has been detected in the course of annual monitoring, samples should be taken from the herd of origin.
The stockbreeder should immediately separate the animals that are clinically ill and salmonella positive from other animals as safely as possible.
The separated animals should be subjected to medical treatment if necessary, and the occurrence of salmonellas should be tested on the basis of individual copro samples every week until receiving two consecutive negative results, or animals should be sent for slaughter.
Cattles should be kept inside premises so that they cannot be in contact with the other animals.
Only the personnel looking after animals is allowed to stay at farm. When looking after the animals, the personnel should wear appropriate protective clothes and in leaving the livestock premises their footwear should be cleaned thoroughly and disinfected.
A stockbreeder has to keep records on salmonella studies concerning all farm animals.
After sending the animals doubted to be infected or actually infected for slaughter, the livestock premises, bedsteads, feeding stands and keeping tools should be cleaned and disinfected according to the prescriptions of veterinarian.
Manure and used litter of cattle should be handled according to the prescriptions of authorised veterinarian so that the spread of salmonella should be prevented.

Deratisation, disinfection and protection against wild birds should be organised.
Dogs and cats access to livestock premises should be precluded.

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 2005 15 (0,9 %) cattle samples were positive for Salmonella (S.typhimurium was isolated 10 times, in 3 samples S.Dublin was isolated and in 2 samples S.enteritidis was isolated). Samples have ben taken in the frames of the State Programme on Monitorning and Surveillance of Animal Infectious Diseases.
In connection with clinical investigations 18 animals were positive (12 S.Typhimurium, 5 S.Dublin and 1 Salmonella spp. were isolated). The number of units tested is not available.

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

The existing control programmes and investigation document that S.Typhimurium and S.Dublin are the prevalent serovars detected in estonian food production animals.

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

S.Typhimurium is on the second place among Salmonella serovars isolated from humans in the year 2005. S.Dublin has not been detected in humans during the years 2004-2005.

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Isangi
Gallus gallus (fowl)								
laying hens (1)	VFB	flock	11	2	1			1
unspecified								
- at farm - Control or eradication programmes	VFB	animal	32183	316	316			

(1) : Baseline study on the prevalence of Salmonella in laying flocks of Gallus gallus. 35 flocks reared in 11 holdings were investigated. 77 samples had been taken, 3 of them were positive. 2 samples were positive for S.enteritidis in 1 holding and 1 sample was positive for S.Isangi in another holding.

Footnote

Control programme at farm - the number in columns "total units positive for salmonella spp." and "S.Enteritidis" - means the number of positive pooled samples taken from 10 birds.

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Stanleyville	S. Dublin
Cattle (bovine animals) (1)	VFL	animal	1581	15	2	10			3
- Clinical investigations - suspect sampling (2)	VFL	animal	x	18		12	1		5
Pigs									
- Clinical investigations - suspect sampling (6)	VFL	animal	x	3				3	
- Monitoring	VFL	animal	562	8		8			
Dogs (3)	VFL	animal	x	1	1				
Guinea pigs									
pet animals (4)	VFL	animal	x	1	1				
Fur animals									
farmed (5)	VFL	animal	x	1	1				

(1) : sample is a pooled sample from 5-10 animals
(2) : data concerning units tested is not available.
(3) : data concerning units tested is not available.
(4) : data concerning units tested is not available.
(5) : data concerning units tested is not available.
(6) : data concerning units tested is not available.

Footnote

Cattle: S.Enteritidis- 2 positive findings from pooled faecal sample. S.Typhimurium - 10 individual faecal samples were positive. S.Dublin - 2 pooled sample were examined, for one positive finding 1 positive cattle have been identified by individual sampling, the second pooled faecal sample was positive, but additional samples have not been received by the laboratory.
Pig: 8 positive samples, S.Typhimurium strains were isolated from pooled faecal samples.

2.1.4. Salmonella in feedingstuffs

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of marine animal origin								
fish meal	PPI	batch	25 g	3	0			

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified
Feed material of cereal grain origin								
maize	PPI	batch	25 g	1	0			
Feed material of oil seed or fruit origin								
palm kernel derived	PPI	batch	25 g	1	0			
soya (bean) derived	PPI	batch	25 g	11	0			

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified
Compound feedingstuffs for cattle								
final product	PPI	batch	25 g	4	0			
Compound feedingstuffs for pigs								
final product	PPI	batch	25 g	5	0			
Compound feedingstuffs for poultry (non specified)								
final product	PPI	batch	25 g	1	0			
Compound feedingstuffs for poultry - laying hens								
final product	PPI	batch	25 g	2	0			
Compound feedingstuffs, not specified								
final product	VFB	single	25 g	10	0			

2.1.5. Salmonella serovars and phagetype distribution

Table Salmonella serovars in animals

Serovars		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Dogs		Guinea pigs		Fur 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=	15	18	8	3	319					1		1		1
Number of isolates serotyped	N=	15	18	8	3	319					1		1		1
Number of isolates per type															
S. Dublin		3	5												
S. Enteritidis		2				318					1		1		1
S. Isangi						1									
S. Stanleyville					3										
S. Typhimurium		10	12	8											
S. group B			1												
Total of typed *Salmonella* isolates															

Footnote

(*) M : Monitoring, C : Clinical
VFL

Table Salmonella serovars in food

Serovars	Meat from other animal species or not specified		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin		Cereals and meals		Meat, mixed meat		Fish		Bakery products	
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Sources of isolates																				
Number of isolates in the laboratory N=	11		2		7		38						1		5		1		1	
Number of isolates serotyped N=	11		2		7		38						1		5		1		1	
Number of isolates per type																				
S. Agona	1																			
S. Dublin	2		1		2															
S. Enteritidis	7				1		37						1		1				1	
S. Give															1					
S. Kingston			1																	
S. Panama					1															
S. Thompson															1					
S. Typhimurium					3		1								2		1			
Total of typed *Salmonella* isolates																				

Footnote

(*) M : Monitoring, C : Clinical
Data from the Veterinary and Food laboratory and the Health Protection Inspectorate`s laboratory

2.1.6. Antimicrobial resistance in Salmonella isolates

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

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Frequency of the sampling

The isolates originate from samples that routinely come to the lab, e.g Salmonella control programme, clinical samples.

Type of specimen taken

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

Methods of sampling (description of sampling techniques)

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

Procedures for the selection of isolates for antimicrobial testing

One isolate from each herd is included to the present report.

Methods used for collecting data

All isolates and data concerning isolates were collected from local laboratories and tested in the Central Laboratory of the VFL.

Laboratory methodology used for identification of the microbial isolates

Details of laboratory methodology are described in the text Salmonella spp. in bovine animals. Serotyping is performed in the VFL Central Lab.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Resistance testing performed according to NCCLS M2-A7 (2000) using disc diffusion method in Mueller-Hinton agar plates. Quality control according to the NCCLS standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole, nalidixic acid, streptomycin, tetracyclin,

nitrofurantoin.

Breakpoints used in testing

Details of breakpoints are described in the table Breakpoints for antimicrobial susceptibility testing of Salmonella in Animals

Results of the investigation

In 2005 18 Salmonella cultures isolated from cattle were tested (9 S.Typhimurium, 6 S.Dublin, 2 S.Enteritidis, 1 Salmonella spp. group B)
5 (28 %) were fully sensitive,
6 (33 %) were resistant to 1 antimicrobial,
1 (6 %) was resistant to 2 antimicrobials,
6 (33 %) were resistant to 3 antimicrobials.
Detailed information about 2005 can be found in the resistance tables.

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

The results were the same as in the previous years.

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

S.Enteritidis isolated from bovine animals was resistant to nalidixic acid and nitrofurantoin. S.Enteritidis isolated from humans was resistant to sulfonamides and nalidixic acid.
S.Typhimurium isolated from cattle was resistant to tetracyclines, sulfonamide and streptomycin. S.Typhimurium isolated from humans was resistant to tertacycline, ampicillin and chloramphenicol.

B. Antimicrobial resistance in Salmonella in pigs

Sampling strategy used in monitoring

Frequency of the sampling

The isolates originate from samples that routinely come to the lab, e.g control programmes, clinical samples.

Type of specimen taken

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

Methods of sampling (description of sampling techniques)

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

Procedures for the selection of isolates for antimicrobial testing

One isolate from each positive herd was included in present report.

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

Details of laboratory methodology are described in the text Salmonella spp. in pigs. Serotyping is performed in the VFL Central Lab.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Resistance testing is performed according to NCCLS M2-A7 (2000) using disc diffusion method in Mueller-Hinton agar plates. Quality control is performed according to the NCCLS standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole, nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Details of breakpoints are described in the table Breakpoints for antibiotic resistance testing of Salmonella.

Results of the investigation

2 Salmonella strains originated from pigs were tested in VFL in 2005.
S. Stanleyville isolated from clinal sample was fully sensitive.
S.Typhimurium isolate was resistant to tetracycline, sulfonamide, streptomycin.

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

In comparison with S.Typhimurium derived from pig that was resistant to tetracycline, sulfonamide and streptomycin, S.Typhimurium isolated from humans was resistant to tetracycline in 63 % of the isolates analysed on tetracycline, to ampicillin in 53 % and to chloramphenicol in 30 %.

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Frequency of the sampling

The isolates originate from samples that routinely come to the lab, e.g control programmes, clinical samples.

Type of specimen taken

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

Methods of sampling (description of sampling techniques)

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

Procedures for the selection of isolates for antimicrobial testing

One isolate from each flock was 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

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

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Resistance testing is performed according to NCCLS M2-A7 (2000) using disc diffusion method in Mueller-Hinton agar plates. Quality control is performed according to the NCCLS standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole, nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Details of breakpoints are described in the table Breakpoints for antibiotic resistance testing of Salmonella.

Results of the investigation

In 2005 6 (5 S.Enteritidis and 1 S.Isangi)isolates were tested.
Resistance was discovered to nalidixic acid (67 %), nitrofurantoin (67 %) and tetracycline (33 %).

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

An increase in the incidence of strains that are resistant to nalidixic acid is noted among isolates from poultry.

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

S.Enteritidis discovered in human isolates was resistant to sulfonamides in 39 % (from the isolates tested on sulfonamides) and to nalidixic acid in 35 % (from the isolates tested on nalidixic acid).

D. Antimicrobial resistance in Salmonella in foodstuff derived from cattle

Sampling strategy used in monitoring

Frequency of the sampling

The isolates originate from samples that routinely come to the lab, e.g Salmonella control programme.

Type of specimen taken

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

Methods of sampling (description of sampling techniques)

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

Procedures for the selection of isolates for antimicrobial testing

One isolate from each positive batch is included to the present report.

Methods used for collecting data

Isolates and data concerning isolates were collected from local laboratories and tested in the VFL Central Lab.

Laboratory methodology used for identification of the microbial isolates

Details of laboratory methodology are described in the text Salmonella spp. in bovine meat and products thereof.
Serotyping is performed in the VFL Central Lab.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Resistance testing performed according to NCCLS M2-A7 (2000) using disc diffusion method in Mueller-Hinton agar plates. Quality control according to the NCCLS standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole, nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Details of breakpoints are described in the table Breakpoints for antibiotic resistance testing of Salmonella

Results of the investigation

5 Salmonella isolates originated from beef were tested:
4 isolates (80 %) - S.Typhimurium (2 isolates), S.Kingston, S.Dublin - were fully sensitive,
1 isolate (20 %) - (S.Enteritidis) - was resistant to nitrofurantoin and nalidixic acid.

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

The overall resistance situation of salmonella isolates in bovine meat and products thereof is quite favourable.

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

S.Enteritidis isolated from humans was resistant to sulfonamides and to nalidixic acid.
S.Typhimurium isolated from humans was resistant to tetracycline in 63 %, to ampicillin in 53 % and to chloramphenicol in 30 %.

E. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Results of the investigation

There were no Salmonella isolates from pig meat tested in 2005.

F. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Sampling strategy used in monitoring

Frequency of the sampling

The isolates originated from samples that routinely come to the lab, e.g Salmonella control programme.

Type of specimen taken

Details of sampling are described in the text Salmonella spp. in broiler meat and products thereof

Methods of sampling (description of sampling techniques)

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

Procedures for the selection of isolates for antimicrobial testing

One isolate from each positive batch is included to the present report.

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

Details of laboratory methodology are described in the text Salmonella spp. in poultry.
Serotyping is performed in the VFL Central Lab.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Resistance testing is performed according to NCCLS M2-A7 (2000) using disc diffusion method in Mueller-Hinton agar plates. Quality control is performed according to the NCCLS standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, enrofloxacin, norfloxacin, chloramphenicol, cefuroxim, cefotaxime, trimethoprim, sulfonamide, trimethoprim/sulfamethoxazole, nalidixic acid, streptomycin, tetracyclin, nitrofurantoin.

Breakpoints used in testing

Details of breakpoints are described in the table Breakpoints for antibiotic resistance testing of Salmonella.

Results of the investigation

22 strains originated from poultry meat were tested:
21 strains of S.Enteritidis, 1 S.Typhimurium. Resistance was found to nalidixic acid (86 %), nitrofurantoin (65 %), tetracycline (9 %), and sulfonamide (5 %), streptomycin (16 %), ampicillin (8 %).

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

An increase in the incidence of strains that are resistant to nalidixic acid is noted among isolates from poultry meat.

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

S.Enteritidis isolated from humans was resistant to sulfonamides in 39 % (from the isolates tested on sulfonamides) and to nalidixic acid in 35 % (from the isolates tested on nalidixic acid). S.Typhimurium isolated from humans was resistant to tetracycline in 63 % of the isolates analysed on tetracycline, to ampicillin in 53 % and to chloramphenicol in 30 %.

Table Antimicrobial susceptibility testing of S. Dublin - qualitative data

n = Number of resistant isolates

	S. Dublin	
	Cattle (bovine animals)	
Isolates out of a monitoring programme	no	
Number of isolates available in the laboratory	6	
Antimicrobials:	**N**	**n**
Tetracyclines	6	0
Amphenicols		
Chloramphenicol	6	0
Cephalosporins		
Cefotaxim	6	0
Cefuroxim	6	0
Fluoroquinolones		
Ciprofloxacin	6	0
Enrofloxacin	6	0
Norfloxacin	6	0
Quinolones		
Nalidixic acid	5	0
Trimethoprim	6	0
Sulfonamides		
Sulfonamide	6	0
Aminoglycosides		
Streptomycin	6	0
Gentamicin	6	0
Trimethoprim + sulfonamides	6	0
Nitroimidazoles and Nitrofurans		
Nitrofurantoin	6	3
Penicillins		
Ampicillin	6	0
Fully sensitive	6	3
Resistant to 1 antimicrobial	6	3

Footnote

VFL

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

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

	S. Dublin
	Cattle (bovine animals)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	6

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	6	0													1		2	1	1	1												
Amphenicols																																
Chloramphenicol	6	0																			2	1	1	1	1							
Cephalosporins																																
Cefotaxim	6	0																										2	2		1	1
Cefuroxim	6	0															1	2		1	1	1										
Fluoroquinolones																																
Ciprofloxacin	6	0																										1	2	1	1	1
Enrofloxacin	6	0																									1		1	2		1
Norfloxacin	6	0																									1	2	3			
Quinolones																																
Nalidixic acid	5	0																		1			1		2	1						
Trimethoprim	6	0																							3	2	1					
Sulfonamides																																
Sulfonamide	6	0																1	1	1	1	1			1							
Aminoglycosides																																
Streptomycin	6	0										2	1		2	1																
Gentamicin	6	0																1	2	3												
Trimethoprim + sulfonamides	6	0																							1	1	2	1	1			
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	6	3									3	1					1		1													
Penicillins																																
Ampicillin	6	0																1				3		2								
Fully sensitive	6	3																														
Resistant to 1 antimicrobial	6	3																														

Footnote

VFL - 2 isolates from monitoring programme, 4 isolates from clinical material (suspected sample).

Table Antimicrobial susceptibility testing of S. Dublin in Meat from bovine animals - at slaughterhouse - Surveillance - quantitative data [Diffusion method]

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

	S. Dublin
	Meat from bovine animals - at slaughterhouse - Surveillance
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	1	0																			1											
Amphenicols																																
Chloramphenicol	1	0																									1					
Cephalosporins																																
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						

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Dublin in Meat, mixed meat - meat products - Surveillance - quantitative data [Diffusion method]

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

	S. Dublin
	Meat, mixed meat - meat products - Surveillance
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	1	0															1															
Amphenicols																																
Chloramphenicol	1	0																				1										
Cephalosporins																																
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											
Resistant to 1 antimicrobial	1	1																														

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Dublin - qualitative data

n = Number of resistant isolates

	S. Dublin			
	Meat from bovine animals		**Meat, mixed meat - meat products**	
Isolates out of a monitoring programme	no		no	
Number of isolates available in the laboratory	1		1	
Antimicrobials:	**N**	**n**	**N**	**n**
Tetracyclines	1	0	1	0
Amphenicols				
Chloramphenicol	1	0	1	0
Cephalosporins				
Cefotaxim	1	0	1	0
Cefuroxim	1	0	1	0
Fluoroquinolones				
Ciprofloxacin	1	0	1	0
Enrofloxacin	1	0	1	0
Norfloxacin	1	0	1	0
Quinolones				
Nalidixic acid	1	0	1	0
Trimethoprim	1	0	1	0
Sulfonamides				
Sulfonamide	1	0	1	0
Aminoglycosides				
Streptomycin	1	0	1	0
Gentamicin	1	0	1	0
Trimethoprim + sulfonamides	1	0	1	0
Nitroimidazoles and Nitrofurans				
Nitrofurantoin	1	0	1	1
Penicillins				
Ampicillin	1	0	1	0
Fully sensitive	1	1	1	0
Resistant to 1 antimicrobial	1	0	1	1

Footnote

VFL

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

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

	S. Enteritidis
	Cattle (bovine animals)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	2	0																1			1											
Amphenicols																																
Chloramphenicol	2	0																							1	1						
Cephalosporins																																
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	2	2																													
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	1							1					1																		
Penicillins																																
Ampicillin	2	0																					1	1								
Resistant to 1 antimicrobial	2	1																														

Resistant to 2 antimicrobials [2]	[1]

Footnote

VFL - 2 isolates from monitoring program

Table Antimicrobial susceptibility testing of S. Enteritidis in laying hens - Gallus gallus (fowl) - sampling in the framework of the laying hen baseline study - quantitative data [Diffusion method]

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

	S. Enteritidis
	Gallus gallus (fowl) - laying hens - sampling in the framework of the laying hen baseline study
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	2	0														1			1													
Amphenicols																																
Chloramphenicol	2	0																				1	1									
Cephalosporins																																
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	1	1																					1								
Trimethoprim	2	0																						1	1							
Sulfonamides																																
Sulfonamide	2	0															1	1														
Aminoglycosides																																
Streptomycin	2	0														2																
Gentamicin	2	0																	2													
Trimethoprim + sulfonamides	2	0																							1			1				
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	2	1							1			1																				
Penicillins																																
Ampicillin	2	0																					1	1								
Resistant to 1 antimicrobial	2	2																														

Footnote

VFL - 1 strain from faecal sample, 1 isolate from dust sample (originated from the same flock)

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

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

	S. Enteritidis
	Gallus gallus (fowl)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	3

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	3	1							1						2																	
Amphenicols																																
Chloramphenicol	3	0																				2	1									
Cephalosporins																																
Cefotaxim	3	0																								1	1		1			
Cefuroxim	3	0																	2	1												
Fluoroquinolones																																
Ciprofloxacin	3	0																					2	1								
Enrofloxacin	3	0																			1	2										
Norfloxacin	3	0																	1	1	1											
Quinolones																																
Nalidixic acid	3	3	3																													
Trimethoprim	3	0																				1			1	1						
Sulfonamides																																
Sulfonamide	3	0												1			1		1													
Aminoglycosides																																
Streptomycin	3	0													3																	
Gentamicin	3	0															1	1	1													
Trimethoprim + sulfonamides	3	0																						2	1							
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	3	3							2	1																						
Penicillins																																
Ampicillin	3	0																		2	1											
Resistant to 2 antimicrobials	3	2																														

Resistant to 3 antimicrobials [3]	[1]

Footnote

VFL

Table Antimicrobial susceptibility testing of S.Enteritidis in animals

n = Number of resistant isolates

	S. Enteritidis							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	no				no			
Number of isolates available in the laboratory	2				5			
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines	2	0			5	1		
Amphenicols								
Chloramphenicol	2	0			5	0		
Cephalosporins								
Cefotaxim	2	0			5	0		
Cefuroxim	2	0			5	0		
Fluoroquinolones								
Ciprofloxacin	2	0			5	0		
Enrofloxacin	2	0			5	0		
Norfloxacin	2	0			5	0		
Quinolones								
Nalidixic acid	2	2			5	4		
Trimethoprim	2	0			5	0		
Sulfonamides								
Sulfonamide	2	0			5	0		
Aminoglycosides								
Streptomycin	2	0			5	0		
Gentamicin	2	0			5	0		
Trimethoprim + sulfonamides	2	0			5	0		
Nitroimidazoles and Nitrofurans								
Nitrofurantoin	2	1			5	4		
Penicillins								
Ampicillin	2	0			5	0		
Resistant to 1 antimicrobial	2	1			5	2		
Resistant to 2 antimicrobials	2	1			5	2		
Resistant to 3 antimicrobials	2	0			5	1		

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from broilers (Gallus gallus) - Monitoring - quantitative data [Diffusion method]

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

	S. Enteritidis
	Meat from broilers (Gallus gallus) - Monitoring
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	12

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	12	1							1				1	2	1	4	2															
Amphenicols																																
Chloramphenicol	12	0															1				1	2	2	1	3	1	1					
Cephalosporins																																
Cefotaxim	12	0																							1	1	5	1	3		1	
Cefuroxim	12	0											1				1	1	4	3	1	1										
Fluoroquinolones																																
Ciprofloxacin	12	0																			1	1	4	1	4	1						
Enrofloxacin	12	0																1		1		7	1	2								
Norfloxacin	12	0																	1	1	1	5	1	2	1							
Quinolones																																
Nalidixic acid	12	12	12																													
Trimethoprim	12	0													1								1	1	3	4	1	1				
Sulfonamides																																
Sulfonamide	12	0													1		2	2	1	4		1	1									
Aminoglycosides																																
Streptomycin	12	0												1	5	3	1	2														
Gentamicin	12	0														1	4	3	4													
Trimethoprim + sulfonamides	12	0																					1		3	4	4					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	12	7					2	2	2		1	2	2	1																		
Penicillins																																
Ampicillin	12	2	2															1	1		2	6										
Resistant to 1 antimicrobial	12	4																														

Resistant to 2 antimicrobials	12	6
Resistant to 3 antimicrobials	12	2

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from broilers (Gallus gallus) - Surveillance - quantitative data [Diffusion method]

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

	S. Enteritidis
	Meat from broilers (Gallus gallus) - Surveillance
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	7

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	7	1									1	2	1		1		2															
Amphenicols																																
Chloramphenicol	7	0																3						2	2							
Cephalosporins																																
Cefotaxim	7	0																						1		2	1			3		
Cefuroxim	7	0													1		2		2	2												
Fluoroquinolones																																
Ciprofloxacin	7	0																			1				2	2	1	1				
Enrofloxacin	7	0																				3	2			1			1			
Norfloxacin	7	0																	1	1			2		1	2						
Quinolones																																
Nalidixic acid	7	5	5																			1	1									
Trimethoprim	7	0																					3		1	3						
Sulfonamides																																
Sulfonamide	7	1				1											1	1	2	1												
Aminoglycosides																																
Streptomycin	7	0										1		3	1	2																
Gentamicin	7	0															1	3	3													
Trimethoprim + sulfonamides	7	0																					1		3	2	1					
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	7	6						4	2			1																				
Penicillins																																
Ampicillin	7	1	1																		1	2	2	1								
Resistant to 1 antimicrobial	7	1																														

Resistant to 2 antimicrobials	7	5
Resistant to 3 antimicrobials	7	1

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from bovine animals - at slaughterhouse - Surveillance - quantitative data [Diffusion method]

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

	S. Enteritidis
	Meat from bovine animals - at slaughterhouse - Surveillance
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	1	0												1																		
Amphenicols																																
Chloramphenicol	1	0																				1										
Cephalosporins																																
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	1	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	1								1																						
Penicillins																																
Ampicillin	1	0																		1												

Resistant to 2 antimicrobials [1]
1

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Enteritidis - qualitative data

n = Number of resistant isolates

	S. Enteritidis			
	Meat from broilers (Gallus gallus)		**Meat from bovine animals**	
Isolates out of a monitoring programme	no		no	
Number of isolates available in the laboratory	21		1	
Antimicrobials:	**N**	**n**	**N**	**n**
Tetracyclines	21	2	1	0
Amphenicols				
Chloramphenicol	21	0	1	0
Florfenicol	2	0		
Cephalosporins				
Cephalothin	2	0		
Cefotaxim	21	0	1	0
Cefuroxim	19	0	1	0
Fluoroquinolones				
Ciprofloxacin	21	0	1	0
Enrofloxacin	19	0	1	0
Norfloxacin	19	0	1	0
Quinolones				
Nalidixic acid	21	19	1	1
Trimethoprim	19	0	1	0
Sulfonamides				
Sulfonamide	21	1	1	0
Aminoglycosides				
Streptomycin	21	0	1	0
Gentamicin	21	0	1	0
Kanamycin	2	0		
Trimethoprim + sulfonamides	21	0	1	0
Nitroimidazoles and Nitrofurans				
Nitrofurantoin	19	13	1	1
Penicillins				
Ampicillin	21	3	1	0
Resistant to 1 antimicrobial	21	7	1	0
Resistant to 2 antimicrobials	21	11	1	1
Resistant to 3 antimicrobials	21	3	1	0

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Enteritidis in fresh - Meat from broilers (Gallus gallus) - chilled - at retail - Surveillance - quantitative data [Diffusion method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																																	
	S. Enteritidis																																
	Meat from broilers (Gallus gallus) - fresh - chilled - at retail - Surveillance																																
Isolates out of a monitoring programme	no																																
Number of isolates available in the laboratory	2																																
Antimicrobials:	**N**	**n**	**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**	
Tetracyclines	2	0													2																		
Amphenicols																																	
Chloramphenicol	2	0																				1	1										
Florfenicol	2	0																															
Cephalosporins																																	
Cephalothin	2	0																			2												
Cefotaxim	2	0																									1	1					
Fluoroquinolones																																	
Ciprofloxacin	2	0																					1	1									
Quinolones																																	
Nalidixic acid	2	2	1	1																													
Sulfonamides																																	
Sulfonamide	2	0																			1	1											
Aminoglycosides																																	
Streptomycin	2	0													2																		
Gentamicin	2	0															2																
Kanamycin	2	0																		2													
Trimethoprim + sulfonamides	2	0																								2							
Penicillins																																	
Ampicillin	2	0																		1	1												
Resistant to 1 antimicrobial	2	2																															

Footnote

isolated by the HPI, tested in the VFL

Table Antimicrobial susceptibility testing of S. Isangi in laying hens - Gallus gallus (fowl) - sampling in the framework of the laying hen baseline study - quantitative data [Diffusion method]

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

	S. Isangi
	Gallus gallus (fowl) - laying hens - sampling in the framework of the laying hen baseline study
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	1	1									1																					
Amphenicols																																
Chloramphenicol	1	0																									1					
Cephalosporins																																
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															
Resistant to 1 antimicrobial	1	1																														

Footnote

VFL - dust sample

Table Antimicrobial susceptibility testing of S. Isangi - qualitative data

n = Number of resistant isolates

	S. Isangi	
	Gallus gallus (fowl) - laying hens - sampling in the framework of the laying hen baseline study	
Isolates out of a monitoring programme	no	
Number of isolates available in the laboratory	1	
Antimicrobials:	**N**	**n**
Tetracyclines	1	1
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Cefuroxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Enrofloxacin	1	0
Norfloxacin	1	0
Quinolones		
Nalidixic acid	1	0
Trimethoprim	1	0
Sulfonamides		
Sulfonamide	1	0
Aminoglycosides		
Streptomycin	1	0
Gentamicin	1	0
Trimethoprim + sulfonamides	1	0
Nitroimidazoles and Nitrofurans		
Nitrofurantoin	1	0
Penicillins		
Ampicillin	1	0

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Kingston - qualitative data

n = Number of resistant isolates

	S. Kingston	
	Meat from bovine animals	
Isolates out of a monitoring programme	no	
Number of isolates available in the laboratory	1	
Antimicrobials:	**N**	**n**
Tetracyclines	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Cefuroxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Enrofloxacin	1	0
Norfloxacin	1	0
Quinolones		
Nalidixic acid	1	0
Trimethoprim	1	0
Sulfonamides		
Sulfonamide	1	0
Aminoglycosides		
Streptomycin	1	0
Gentamicin	1	0
Trimethoprim + sulfonamides	1	0
Nitroimidazoles and Nitrofurans		
Nitrofurantoin	1	0
Penicillins		
Ampicillin	1	0
Fully sensitive	1	1

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Kingston in Meat from bovine animals - Surveillance - quantitative data [Diffusion method]

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

	S. Kingston
	Meat from bovine animals - Surveillance
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	1	0													1																	
Amphenicols																																
Chloramphenicol	1	0																						1								
Cephalosporins																																
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									

Footnote

VFL

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

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

	S. Stanleyville
	Pigs
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	1	0															1															
Amphenicols																																
Chloramphenicol	1	0																			1											
Cephalosporins																																
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								
Fully sensitive	1	1																														

Footnote

VFL - clinical sample

Table Antimicrobial susceptibility testing of S. Stanleyville - qualitative data

n = Number of resistant isolates

	S. Stanleyville	
	Pigs	
Isolates out of a monitoring programme	no	
Number of isolates available in the laboratory	1	
Antimicrobials:	**N**	**n**
Tetracyclines	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Cefuroxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Enrofloxacin	1	0
Norfloxacin	1	0
Quinolones		
Nalidixic acid	1	0
Trimethoprim	1	0
Sulfonamides		
Sulfonamide	1	0
Aminoglycosides		
Streptomycin	1	0
Gentamicin	1	0
Trimethoprim + sulfonamides	1	0
Nitroimidazoles and Nitrofurans		
Nitrofurantoin	1	0
Penicillins		
Ampicillin	1	0

Footnote

VFL

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

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

	S. Typhimurium
	Pigs
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	1	1	1																													
Amphenicols																																
Chloramphenicol	1	0																			1											
Cephalosporins																																
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	1	1																													
Aminoglycosides																																
Streptomycin	1	1	1																													
Gentamicin	1	0														1																
Trimethoprim + sulfonamides	1	0																				1										
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0																									1					
Penicillins																																
Ampicillin	1	0																				1										
Resistant to 3 antimicrobials	1	1																														

Footnote

VFL

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

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

	S. Typhimurium
	Cattle (bovine animals)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	9

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	9	7	5								2			1		1																
Amphenicols																																
Chloramphenicol	9	0															1			1	1	2		2		1	1					
Cephalosporins																																
Cefotaxim	9	0																							1		5	2			1	
Cefuroxim	8	0															1	2	2		2	1										
Fluoroquinolones																																
Ciprofloxacin	9	0																							1		3		1		3	1
Enrofloxacin	9	0																							1	2		3		2	1	
Norfloxacin	9	0																					1		1		5	2				
Quinolones																																
Nalidixic acid	9	0																	1		2	3	2	1								
Trimethoprim	9	0																				1	1	1	1		1	2		1		1
Sulfonamides																																
Sulfonamide	9	5	5															1	1		1						1					
Aminoglycosides																																
Streptomycin	9	5	5									2		1	1																	
Gentamicin	9	0												2		2	3	1	1													
Trimethoprim + sulfonamides	9	0																			2	2	1	2		1		1				
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	9	0												1		1		2	1	2	2											
Penicillins																																
Ampicillin	9	0																1	1	2	2	1	1		1							
Fully sensitive	9	2																														

Resistant to 1 antimicrobial	9	2
Resistant to 3 antimicrobials	9	5

Footnote

VFL - 2 strains were isolated from samples of monitoring programme, 7 strains from suspected samples

Table Antimicrobial susceptibility testing of S.Typhimurium in animals

n = Number of resistant isolates

	S. Typhimurium							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	no		no					
Number of isolates available in the laboratory	9		1					
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines	9	7	1	1				
Amphenicols								
Chloramphenicol	9	0	1	0				
Cephalosporins								
Cefotaxim	9	0	1	0				
Cefuroxim	8	0	1	0				
Fluoroquinolones								
Ciprofloxacin	9	0	1	0				
Enrofloxacin	9	0	1	0				
Norfloxacin	9	0	1	0				
Quinolones								
Nalidixic acid	9	0	1	0				
Trimethoprim	9	0	1	0				
Sulfonamides								
Sulfonamide	9	5	1	1				
Aminoglycosides								
Streptomycin	9	5	1	1				
Gentamicin	9	0	1	0				
Trimethoprim + sulfonamides	9	0	1	0				
Nitroimidazoles and Nitrofurans								
Nitrofurantoin	9	0	1	0				
Penicillins								
Ampicillin	9	0	1	0				
Fully sensitive	9	2	1	0				
Resistant to 1 antimicrobial	9	2	1	0				
Resistant to 3 antimicrobials	9	5	1	1				

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Typhimurium - qualitative data

n = Number of resistant isolates

	S. Typhimurium			
	Meat from broilers (Gallus gallus)		**Meat from bovine animals**	
Isolates out of a monitoring programme	no		no	
Number of isolates available in the laboratory	1		2	
Antimicrobials:	**N**	**n**	**N**	**n**
Tetracyclines	1	0	2	0
Amphenicols				
Chloramphenicol	1	0	2	0
Cephalosporins				
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	0
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	0	2	0
Penicillins				
Ampicillin	1	0	2	0
Fully sensitive	1	1	2	2

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Typhimurium in fresh - Meat from broilers (Gallus gallus) - frozen - Surveillance - quantitative data [Diffusion method]

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

S. Typhimurium

Meat from broilers (Gallus gallus) - fresh - frozen - Surveillance

Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	1	0												1																		
Amphenicols																																
Chloramphenicol	1	0																					1									
Cephalosporins																																
Cefotaxim	1	0																								1						
Cefuroxim																		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										

Footnote

VFL

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from bovine animals - at slaughterhouse - Surveillance - quantitative data [Diffusion method]

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

	S. Typhimurium
	Meat from bovine animals - at slaughterhouse - Surveillance
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	2	0												1			1															
Amphenicols																																
Chloramphenicol	2	0																		1	1											
Cephalosporins																																
Cefotaxim	2	0																									1			1		
Cefuroxim	2	0																			2											
Fluoroquinolones																																
Ciprofloxacin	2	0																										1			1	
Enrofloxacin	2	0																										2				
Norfloxacin	2	0																									2					
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																			2											

Footnote

VFL

Table Antimicrobial susceptibility testing of Salmonella in animals

n = Number of resistant isolates

	Salmonella spp.							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	no		no		no			
Number of isolates available in the laboratory	18		2		6			
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines	18	8	2	1	6	2		
Amphenicols								
Chloramphenicol	18	0	2	0	6	0		
Cephalosporins								
Cefotaxim	18	0	2	0	6	0		
Cefuroxim	17	0	2	0	6	0		
Fluoroquinolones								
Ciprofloxacin	18	0	2	0	6	0		
Enrofloxacin	18	0	2	0	6	0		
Norfloxacin	18	0	2	0	6	0		
Quinolones								
Nalidixic acid	17	2	2	0	6	4		
Trimethoprim	18	0	2	0	6	0		
Sulfonamides								
Sulfonamide	18	6	2	1	6	0		
Aminoglycosides								
Streptomycin	18	6	2	1	6	0		
Gentamicin	18	0	2	0	6	0		
Trimethoprim + sulfonamides	18	0	2	0	6	0		
Nitroimidazoles and Nitrofurans								
Nitrofurantoin	18	4	2	0	6	4		
Penicillins								
Ampicillin	18	0	2	0	6	0		
Fully sensitive	18	5	2	1	6	0		
Resistant to 1 antimicrobial	18	6	2	0	6	3		
Resistant to 2 antimicrobials	18	1	2	0	6	2		
Resistant to 3 antimicrobials	18	6	2	1	6	1		

Footnote

VFL

Table Antimicrobial susceptibility testing of Salmonella spp. in food

n = Number of resistant isolates

	Salmonella spp.									
	Meat from broilers (Gallus gallus)		**Meat from other poultry species**		**Meat from pig**		**Meat from bovine animals**		**Meat, mixed meat**	
Isolates out of a monitoring programme	no						no		no	
Number of isolates available in the laboratory	22						5		1	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines	22	2					5	0	1	0
Amphenicols										
Chloramphenicol	22	0					5	0	1	0
Florfenicol	2	0								
Cephalosporins										
Cephalothin	2	0								
Cefotaxim	22	0					5	0	1	0
Cefuroxim	20	0					5	0	1	0
Fluoroquinolones										
Ciprofloxacin	22	0					5	0	1	0
Enrofloxacin	20	0					5	0	1	0
Norfloxacin	20	0					5	0	1	0
Quinolones										
Nalidixic acid	22	19					5	1	1	0
Trimethoprim	20	0					5	0	1	0
Sulfonamides										
Sulfonamide	22	1					5	0	1	0
Aminoglycosides										
Streptomycin	22	0					5	0	1	0
Gentamicin	22	0					5	0	1	0
Kanamycin	2	0								
Trimethoprim + sulfonamides	22	0					5	0	1	0
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	20	13					5	1	1	1
Penicillins										
Ampicillin	22	3					5	0	1	0
Fully sensitive	22	1					5	4	1	0
Resistant to 1 antimicrobial	22	7					5	0	1	1
Resistant to 2 antimicrobials	22	11					5	1	1	0
Resistant to 3 antimicrobials	22	3					5	0	1	0

Footnote

VFL

Table Antimicrobial susceptibility testing of S. group B in Cattle (bovine animals) - Clinical investigations - suspect sampling - quantitative data [Diffusion method]

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

	S. group B Cattle (bovine animals) - Clinical investigations - suspect sampling
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	1	1	1																													
Amphenicols																																
Chloramphenicol	1	0																	1													
Cephalosporins																																
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	1	1																													
Aminoglycosides																																
Streptomycin	1	1	1																													
Gentamicin	1	0														1																
Trimethoprim + sulfonamides	1	0																								1						
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	1	0													1																	
Penicillins																																
Ampicillin	1	0																		1												

Resistant to 3 antimicrobials [1]	[1]

Footnote

VFL

Table Antimicrobial susceptibility testing of S. group B - qualitative data

n = Number of resistant isolates

	S. group B	
	Cattle (bovine animals)	
Isolates out of a monitoring programme	no	
Number of isolates available in the laboratory	1	
Antimicrobials:	**N**	**n**
Tetracyclines	1	1
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Cefuroxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Enrofloxacin	1	0
Norfloxacin	1	0
Quinolones		
Nalidixic acid	1	0
Trimethoprim	1	0
Sulfonamides		
Sulfonamide	1	1
Aminoglycosides		
Streptomycin	1	1
Gentamicin	1	0
Trimethoprim + sulfonamides	1	0
Nitroimidazoles and Nitrofurans		
Nitrofurantoin	1	0
Penicillins		
Ampicillin	1	0
Resistant to 3 antimicrobials	1	1

Footnote

VFL

Table Breakpoints for antibiotic resistance testing of Salmonella in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol	comment 1						30	18		12
Cephalosporins										
Cephalothin	NCCLS						30	18		14
Cefotaxim	NCCLS						30	23		14
Cefuroxim	NCCLS						30	18		14
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin	comment 2						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
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin										
Kanamycin	NCCLS						30	18		13
Trimethoprim + sulfonamides	NCCLS						25	16		10
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	NCCLS						300	17		14
Penicillins										
Ampicillin	NCCLS						10	17		13

Footnote

VFL: comment 1 - Ninth CRL Salmonella Interlaboratory Comparison Study (2004) on typing of Salmonella spp. RIVM, Report 330300006/2005 H.Korver et al.;
comment 2 - data originated From EELA (National Veterinary and Food Research Institute of Finland).

Table Breakpoints for antibiotic resistance testing of Salmonella in Food

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol	comment 1						30	18		12
Cephalosporins										
Cephalothin	NCCLS						30	18		14
Cefotaxim	NCCLS						30	23		14
Cefuroxim	NCCLS						30	18		14
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin	comment 2						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
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin										
Kanamycin	NCCLS						30	18		13
Trimethoprim + sulfonamides	NCCLS						25	16		10
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	NCCLS						300	17		14
Penicillins										
Ampicillin	NCCLS						10	17		13

Table Breakpoints for antibiotic resistance testing of Salmonella in Feedingstuff

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol	comment 1						30	18		12
Cephalosporins										
Cephalothin	NCCLS						30	18		14
Cefotaxim	NCCLS						30	23		14
Cefuroxim	NCCLS						30	18		14
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin	comment 2						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
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin										
Kanamycin	NCCLS						30	18		13
Trimethoprim + sulfonamides	NCCLS						25	16		10
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	NCCLS						300	17		14
Penicillins										
Ampicillin	NCCLS						10	17		13

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. This disease is on the second position according to the number of cases behind salmonellosis in Estonia.
The number of cases in the year 2005 was the same as in the previous year. The Campylobacter jejuni is the pahtogen most frequenly discovered in humans and in poultry meat.
No outbreaks were reported.

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

According to the State Programme on Monitoring and Surveillance of Animal Infectoius Diseases the herds as well as animals sent to the artificial fertilisation stations should be examined on the presence of Campylobacter in semen. As official samples the herds should be examined in the quantities provided by the monitoring plan of the Veterinary and Food Board. In the year 2005 199 samples have been investigated with no positive results.
There are no official monitoring programmes in regard to Campylobacter in feedingstuffs.
Food samples are taken in the frames of official food surveillance and in the frames of the monitoring programme performed at retail and slaughterhouses level. 407 food samples have been tested in 2005, 21 (5,5 %) of them were positive. All positive samples originate from poultry meat. Studies indicate that the vast majority of positive samples were due to the presence of C.jejuni.

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 were not laboratory confirmed. C.jejuni is a predominant isolate in foodstuffs and in humans.

2.2.2. Campylobacter, thermophilic in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

Fresh refrigerated poultry meat has been sampled and tested for the presence of thermophilic Campylobacter. Sampling has been performed by the officials of Veterinary and Food Board and samples have been analysed in Veterinary and Food Laboratory (VFL).

At retail

Official sampling has been performed in the frames of official food surveillance programme of the Health Protection Inspectorate. Samples have been analysed in the Health Protection Inspectorate`s laboratories of Microbiology.

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

At meat processing plant

Fresh meat

At retail

Fresh meat

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

5 sub-samples (sub-sample weight is 10 g of neck skin, n = 5, c = 0) has been

taken from each batch. Sub-samples have been analysed individually.

At retail

The samples (n = 5), 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 retail

A sample where Thermofilic Campylobacter was isolated.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 10272:1995

At meat processing plant

Bacteriological method: ISO 10272:1995

At retail

Bacteriological method: NMKL 119:1990

Control program/mechanisms

The control program/strategies in place

Sampling has been performed randomly at slaugterhouse and retail level in the frames of the ofiicial food surveillance plans.

Measures in case of the positive findings or single cases

The own check plan of the food handling establishment should be improved.

Notification system in place

Campylobacter jejuni is a pathogen subject to registration 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 about the isolation of pathogens which may cause infectious animal diseases subject to notification or registration or about suspicion of the occurrence of such pathogens in raw food material or products. In addition, such laboratories are obliged to notify the Health Protection Inspectorate about

isolation of zoonotic agents.
Laboratories report quaterly the list of registered pathogens in food to the Veterinary and Food Board.

Results of the investigation

Altogether 21 (7,5 %) of 278 poultry meat samples tested in the year 2005 against Campylobacter were positive. Mostly meat from broiler was contaminated.
C.jejuni was detected in 10 (47,6 % of the positive samples) samples, C.coli - in 6 samples and C.lari - in 2 samples. 3 samples positive for Campylobacter spp. were not typed.

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

The occurence of Campylobacter in fresh broiler meat is quite high. But in comparison with the previous year the percent of positive samples decreased 3 times (2004 - 56 samples taken and 26,8 % of them were positive). The prevalence of C.jejuni is obvious, but the number of positive samples where C.coli was detected increased: 2005 - 6 samples, 2004 - 1 positive sample.

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

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. coli	C. lari	C. jejuni	C. upsaliensis	thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus)										
fresh										
- at slaughterhouse - animal sample - neck skin - Monitoring - official sampling (1)	VFB	single	10 g	225	5	2		3		
- at slaughterhouse - Surveillance	VFB	single	25 g	10	6		2	4		
- at retail - Surveillance	HPI	single	10 g	19	5	4				1
- at retail - Surveillance (other method)	HPI	single	25 g	13	2			2		
meat preparation										
intended to be eaten cooked										
- at retail - Surveillance (other method)	HPI	single	25 g	2	1					1
- at retail - Surveillance	HPI	single	10 g	1	1					1
- at processing plant - Surveillance	VFB	single	25 g	1	0					
meat products										
- at processing plant - Surveillance	VFB	single	25 g	2	0					
Meat from turkey										
fresh										
- at processing plant - Surveillance	VFB	single	25 g	1	1			1		
- at retail - Surveillance	HPI	single	25 g	2	0					
minced meat										

- at processing plant - Surveillance	VFB	single	25 g	1	0					
meat preparation										
- at processing plant - Surveillance	VFB	single	25 g	1	0					

(1) : 45 batches (5 sub-samples taken from each batch and analysed separately) had been examined

Table Campylobacter in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. upsaliensis	C. lari	thermophilic Campylobacter spp., unspecified
Meat from pig										
meat products										
cooked, ready-to-eat										
- at retail - Surveillance	HPI	single	10 g	2	0					
Fruits and vegetables										
- at processing plant - Surveillance	VFB	single	25 g	8	0					
products										
- at processing plant - Surveillance	VFB	single	25 g	4	0					
Meat, mixed meat										
meat products										
cooked, ready-to-eat										
- at retail - Surveillance	HPI	single	25 g	1	0					
pâté										
- at retail - Surveillance	HPI	single	10 g	40	0					
- at retail - Surveillance (other method)	HPI	single	25 g	28	0					
Dairy products (excluding cheeses)										
dairy products, not specified										
ready-to-eat										
- at retail - Surveillance	HPI	single	10 g	12	0					
- at retail - Surveillance (other method)	HPI	single	25 g	16	0					
Cheeses made from cows' milk										
- at retail - Surveillance	HPI	single	25 g	7	0					

- at retail - Surveillance (other method)	HPI	single	10 g	11	0					

2.2.3. Campylobacter, thermophilic in animals

2.2.4. Antimicrobial resistance in Campylobacter, thermophilic isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from poultry

Sampling strategy used in monitoring

Frequency of the sampling

Campylobacter isolates were collected in connection to the Campylobacter control programme (monitoring at slaughterhouse and cutting plant).

Type of specimen taken

Details of sampling are described in the part Thermophilic Campylobacter in broiler meat and products thereof.

Methods of sampling (description of sampling techniques)

Details of sampling are described in the part Thermophilic Campylobacter in broiler meat and products thereof.

Procedures for the selection of isolates for antimicrobial testing

One isolate from each batch was included. A total 7 Campylobacter jejuni strains and 2 Campylobacter coli strains were obtained for sensitivity testing. The antimicrobial resistance testing of 4 Campylobacter jejuni and 1 Campylobacter coli was performed.

Methods used for collecting data

One isolate from each batch was included. A total 7 Campylobacter jejuni strains and 2 Campylobacter coli strains were obtained for sensitivity testing. The antimicrobial resistance testing of 4 Campylobacter jejuni and 1 Campylobacter coli was performed.

Laboratory methodology used for identification of the microbial isolates

Details of the laboratory methodology are described in the part Thermophilic Campylobacter in Broiler meat and products thereof.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

VetMIC Camp for antimicrobial susceptibility testing of Campylobacter jejuni and hippurate-negative thermophilic Campylobacer spp. SVA Dept. of antiobiotics, SE-75189 Uppsala, Sweden.
The inoculum density in the panels was 50-250 CFU/ml. The panels were incubated in a microaerophilic atmosphere +37 +/- 1,0 for 40-48 h.
Control strain: Campylobacter jejuni ATCC 33560.

The antimicrobials included in monitoring are oxytetracycline, enrofloxacin, streptomycin, gentamicin, erythromycin, ampicillin.

Breakpoints used in testing

Cut-off values originated from Nordic Suggestions "Microbiological cut-off values" Meeting in Oslo 13.02.2004.

Results of the investigation

Resistance of C.jejuni isolated from broiler meat was detected to nalidixic acid (2 from 3) and oxytetracycline (2 from 3).
Resistance of C.jejuni (1 isolate) isolated from turkey meat was detected to ampicillin, nalidixic acid and enrofloxacin.
1 isolate of C.coli from broiler meat was fully sensitive.

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

Data concerning previous years is not available as the testing of antimicrobial resistance of Campylobacter stated in the year 2005. Due to the small amount of Campylobacter isolates it is very difficult to make any decission.

Table Antimicrobial susceptibility testing of C. coli in Meat from broilers (Gallus gallus) - quantitative data [Dilution method]

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

	C. coli
	Meat from broilers (Gallus gallus)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	1	0				1																
Fluoroquinolones																						
Enrofloxacin	1	0			1																	
Quinolones																						
Nalidixic acid	1	0									1											
Aminoglycosides																						
Gentamicin	1	0						1														
Penicillins																						
Ampicillin	1	0									1											
Fully sensitive	1	1																				

Footnote

VFL

Table Antimicrobial susceptibility testing of C. coli - qualitative data

n = Number of resistant isolates

	C. coli	
	Meat from broilers (Gallus gallus)	
Isolates out of a monitoring programme	no	
Number of isolates available in the laboratory	1	
Antimicrobials:	**N**	**n**
Tetracyclines	1	
Fluoroquinolones		
Enrofloxacin	1	
Quinolones		
Nalidixic acid	1	
Aminoglycosides		
Gentamicin	1	
Penicillins		
Ampicillin	1	
Fully sensitive	1	1

Footnote

VFL

Table Antimicrobial susceptibility testing of C. jejuni in Meat from broilers (Gallus gallus) - quantitative data [Dilution method]

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

	C. jejuni Meat from broilers (Gallus gallus)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	3

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	3	2						1		1	1											
Fluoroquinolones																						
Enrofloxacin	3	0			1	1	1															
Quinolones																						
Nalidixic acid	3	2								1			2									
Aminoglycosides																						
Gentamicin	3	0					1	2														
Macrolides																						
Erythromycin	3	0			1				2													
Penicillins																						
Ampicillin	3	0					2			1												
Resistant to 1 antimicrobial	3	2																				
Resistant to 2 antimicrobials	3	1																				

Footnote

VFL

Table Antimicrobial susceptibility testing of C. jejuni in Meat from turkey - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																						
	C. jejuni																					
	Meat from turkey																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	1																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	1	0						1														
Fluoroquinolones																						
Enrofloxacin	1	1								1												
Quinolones																						
Nalidixic acid	1	1												1								
Aminoglycosides																						
Gentamicin	1	0					1															
Macrolides																						
Erythromycin	1	0						1														
Penicillins																						
Ampicillin	1	1												1								
Resistant to 3 antimicrobials	1	1																				

Footnote

VFL

Table Antimicrobial susceptibility testing of C. jejuni - qualitative data

n = Number of resistant isolates

	C. jejuni			
	Meat from broilers (Gallus gallus)		**Meat from turkey**	
Isolates out of a monitoring programme	no		no	
Number of isolates available in the laboratory	3		1	
Antimicrobials:	**N**	**n**	**N**	**n**
Tetracyclines	3	2	1	
Fluoroquinolones				
Enrofloxacin	3		1	1
Quinolones				
Nalidixic acid	3	2	1	1
Aminoglycosides				
Gentamicin	3		1	
Macrolides				
Erythromycin	3		1	
Penicillins				
Ampicillin	3		1	1
Resistant to 1 antimicrobial	3	2	1	
Resistant to 2 antimicrobials	3	1	1	
Resistant to 3 antimicrobials	3		1	1

Footnote

VFL

Table Antimicrobial susceptibility testing of Campylobacter in food

n = Number of resistant isolates

	Campylobacter spp.							
	Meat from broilers (Gallus gallus)		**Meat from other poultry species**		**Meat from pig**		**Meat from bovine animals**	
Isolates out of a monitoring programme	no		no					
Number of isolates available in the laboratory	4		1					
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines	4	2	1	0				
Fluoroquinolones								
Enrofloxacin	4	0	1	1				
Quinolones								
Nalidixic acid	4	2	1	1				
Aminoglycosides								
Gentamicin	4	0	1	0				
Macrolides								
Erythromycin	4	0	1	0				
Penicillins								
Ampicillin	4	0	1	1				
Fully sensitive	4	1	1	0				
Resistant to 1 antimicrobial	4	2	1	0				
Resistant to 2 antimicrobials	4	1	1	0				
Resistant to 3 antimicrobials	4	0	1	1				

Footnote

VFL

Table Breakpoints used for antimicrobial susceptibility testing of Campylobacter in Food

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

see_footnote

Campylobacter, thermophilic	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines				2	0,25	32				
Amphenicols										
Chloramphenicol										
Florfenicol										
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin				0,5	0,03	4				
Quinolones										
Nalidixic acid				16	1	128				
Trimethoprim										
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin										
Gentamicin				4	0,25	8				
Neomycin										
Kanamycin										
Macrolides										
Erythromycin				8	0,12	16				
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins										
Penicillins										
Ampicillin				16	0,5	64				

Footnote

VFL -Breakpoints used in testing based on Nordic suggestions "Microbiological cut-off values", meeting in Oslo 13.04.2004

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

During years the number of laboratory confirmed cases of Listeriosis in Estonia has been very low.
There were 2 cases of human listeriosis recorded in the year 2005 (the same number as in the year 2004).
No outbreaks involving Listeria were reported.

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

There were 6 (19,3 % of cattle samples analysed) cattle samples and 10 (29,4 % of sheep samples analysed) sheep samples positive for Listeria monocytogenes in the year 2005. 1 (3,2 % of cattle samples analysed) cattle was positive for Listeria Ivanovii.
In 2005 2,5 % of 2244 analysed samples have been positive for Listeria. 30 positive samples were ready-to-eat products and 28 samples have been taken from the fresh meat or fish and products intended to be eaten cooked. 15 ready-to-eat products (1,4 %) of 1083 samples taken at retail were Listeria positive.
The prevalent presence of Listeria was determined in fishery products. 8 (13,3%) of 60 investigated ready-to-eat fishery products contained Listeria monocytogenes. No milk and milk products were positive in 2005.

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

The number of human cases of listeriosis is very small and in all cases Listeria monocytogenes has been detected. Foodborne transmission is believed to be more important than transmission from animals.

2.3.2. Listeria in foodstuffs

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Definition used	Units tested	=<100 cfu/g	>100 cfu/g	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g
Milk, cows'									
pasteurised milk									
- at processing plant - Surveillance	VFB	single	25 g		24			0	
Cheeses made from cows' milk									
soft and semi-soft									
made from pasteurized milk									
- at processing plant - Surveillance	VFB	single	25 g		26			0	
hard									
made from pasteurized milk									
- at processing plant - Surveillance	VFB	single	25 g		66			0	
- at retail - Surveillance	HPI	single	25 g		22			0	
Dairy products (excluding cheeses)									
butter									
- at retail - Surveillance	HPI	single	25 g		1			0	
made from pasteurized milk									
- at processing plant - Surveillance	VFB	single	25 g		23			0	
cream									
made from pasteurized milk									
- at processing plant - Surveillance	VFB	single	25 g		17			0	
ice-cream									
- at retail - Surveillance	HPI	single	25 g		1			0	

- at processing plant - Surveillance	VFB	single	25 g		19			0	
milk powder and whey powder									
- at processing plant - Surveillance	VFB	single	25 g		14			0	
dairy products, not specified									
ready-to-eat									
- at retail - Surveillance	HPI	single	25 g		57			0	
- at processing plant - Surveillance	VFB	single	25 g		227			0	

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Definition used	Units tested	=<100 cfu/g	>100 cfu/g	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g
Meat from broilers (Gallus gallus)									
fresh									
- at retail - Surveillance	HPI	single	25 g		1			0	
- at slaughterhouse - Surveillance	VFB	single	25 g		2			0	
meat products									
cooked, ready-to-eat									
- at retail - Surveillance	HPI	single	25 g		32			1	1
meat preparation									
intended to be eaten cooked									
- at retail - Surveillance	HPI	single	25 g		3			0	
Meat from pig									
fresh									
- at slaughterhouse - Surveillance	VFB	single	25 g		16			3	3
meat products									
cooked, ready-to-eat									
- at retail - Surveillance	HPI	single	25 g		50			0	
meat preparation									
intended to be eaten cooked									
- at retail - Surveillance	HPI	single	25 g		2			0	
Meat from bovine animals									
fresh									
- at slaughterhouse - Surveillance	VFB	single	25 g		10			3	3
meat products									
cooked, ready-to-eat									
- at retail - Surveillance	HPI	single	25 g		3			0	
Fish									

smoked									
cold-smoked									
- at retail - Surveillance	HPI	single	25 g		1			0	
- at processing plant - Surveillance	VFB	single	25 g		11			4	4
hot-smoked									
- at processing plant - Surveillance	VFB	single	25 g		14			1	1
gravad /slightly salted									
- at retail - Surveillance	HPI	single	25 g		1			0	
- at processing plant - Surveillance	VFB	single	25 g		2			1	1
raw									
frozen									
- at processing plant - Surveillance	VFB	single	25 g		12			5	5
Crustaceans									
unspecified									
cooked	VFB	single	25 g		3			1	1
Fishery products, unspecified									
ready-to-eat									
- at retail - Surveillance	HPI	single	25 g		1			0	
- at processing plant - Surveillance	VFB	single	25 g		30			2	2
Meat from turkey									
meat preparation									
intended to be eaten cooked									
- at retail - Surveillance	HPI	single	25 g		1			0	
Meat, mixed meat									
meat products									
cooked, ready-to-eat									
- at retail - Surveillance	HPI	single	25 g		34			0	
pâté									
- at retail - Surveillance	HPI	single	25 g		80			1	1
minced meat									
- at processing plant - Surveillance	VFB	single	25 g		5			5	5
Fruits and vegetables									
- at processing plant - Surveillance	VFB	single	25 g		2			0	
products									
- at processing plant - Surveillance	VFB	single	25 g		4			0	
ready-to-eat salads									
- at retail - Surveillance	HPI	single	25 g		858			13	13
- at processing plant - Surveillance	VFB	single	25 g		57			6	6
Bakery products									

- at retail - Surveillance	HPI	single	25 g		1			0	
cakes									
- at retail - Surveillance	HPI	single	25 g		2			0	
Other processed food products and prepared dishes									
unspecified									
ready-to-eat foods									
- at retail - Surveillance	HPI	single	25 g		13			0	
- at processing plant - Surveillance	VFB	single	25 g		35			0	
Meat from sheep									
fresh									
- at slaughterhouse - Surveillance	VFB	single	25 g		2			0	
Meat from wild game - land mammals									
fresh									
- at slaughterhouse - Surveillance	VFB	single	25 g		1			0	
Meat from other animal species or not specified									
fresh									
- at processing plant - Surveillance	VFB	single	25 g		15			8	8
meat preparation									
- at processing plant - Surveillance	VFB	single	25 g		10			1	1
meat products									
- at processing plant - Surveillance	VFB	single	25 g		433			3	3

2.3.3. Listeria in animals

Table Listeria spp. in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria	L. monocytogenes	Listeria spp., unspecified	L. ivanovii
Cattle (bovine animals)	VFL	animal	31	7	6		1
Sheep	VFL	animal	34	10	10		

Footnote

VFL - type of specimens taken were brain, abortion material, internal organs. Brain samples from cattle and sheep were investigated after receiving negative results in the frames of investigations on rabies and BSE .

2.4. E. COLI INFECTIONS

2.4.1. General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

History of the disease and/or infection in the country

There were no human cases reported in 2004. In the year 2005 15 human cases of VTEC O157 were reported. All of them were autochtone cases and all were laboratory confirmed.

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

In the year 2005 the monitoring programme of VTEC O157 started in dairy cows at farm. This monitoring is a part of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases. 200 animals from 50 farms with more than 100 dairy cows were tested. The investigations show that there is no Verotxigenic E.coli present in dairy cows.
There is no official monitoring or surveillance programme in regard to Verotoxigenic E.coli in food.

Recent actions taken to control the zoonoses

In 2005 the monitoring of VTEC O157 in animals started in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases. The programme is approved by the Director general of the Veterinary and Food Board.

2.4.2. Escherichia coli, pathogenic in foodstuffs

2.4.3. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

Faecal samples should be taken from dairy cows representing farms with more than 100 animals. Sampling is random and farms are located in different counties of Estonia. Sampling is performed by the officials from Veterinary and Food Board in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases. 4 samples should be taken at each farm, one sample per animal. Pooling of samples take place in the laboratory.

Frequency of the sampling

Animals at farm

Once a year

Type of specimen taken

Animals at farm

Faeces

Methods of sampling (description of sampling techniques)

Animals at farm

Samples should be taken from the rectum of dairy cows. 1 sample should be taken per animal, 4 samples per farm. Samples are pooled in the laboratory and sample weight analysed is 20 g (5 g x 4).

Case definition

Animals at farm

An animal where VTEC O157 has been isolated.

Diagnostic/analytical methods used

Animals at farm

With following modifications: Bacteriological method EVS-EN ISO 16654:2003

Control program/mechanisms

The control program/strategies in place

Samples are taken in the frames of State Programme on Monitoring and Surveillancce of Animal Infectious Diseases which is approved annually by the Director General of the Veterinary and Food Board.

Measures in case of the positive findings or single cases

In case of detection VTEC O157 among live animals the local veterinary officer, Veterinary and Food Board and the Health Protection Inspectorate county department should be notified. An epidemiological investigation should be started. Restrictions may be imposed on livestock holdings where VTEC O157 is detected. Follow-up testing will also be conducted.

Notification system in place

VTEC O157 and other verotoxigenic strains are notifiable since the year 2000 according to the Regulation of the Ministry of Agriculture No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

200 dairy cows from the 50 farms had been tested with no positive results.

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

In the year 2005 the investigation of VTEC O157 presence in dairy cows started in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases. No positive samples have been detected.

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

A total of 19 cases of E.coli infections were reported in the year 2005. 15 of the cases were caused by the VTEC O157. As the investigations in live animals have been started only in the year 2005 and there is no food sampling programme present, it is too early to make any decision.

Table VT E.coli in animals

	Source of information	Sampling unit	Units tested	Total units positive for Escherichia coli, pathogenic	E. coli spp., unspecified	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC O157:H7
Cattle (bovine animals)							
dairy cows							
- at farm - Monitoring	VFB	animal	200	0			

Footnote

200 dairy cows representing 50 milk production farms with more than 100 animals has been tested. 4 faecal samples had been taken from each farm, one sample per animal.

2.5. TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1. General evaluation of the national situation

A. Tuberculosis General evaluation

History of the disease and/or infection in the country

Tuberculosis in animals is notifiable since 1962.
The last case of bovine tuberculosis had been detected in Estonia in 1986. Estonia consider the estonian herds tuberculose-free and applied for tuberculose-free status from EC at the end of the year 2005 but unfortunately not all specific requirements are fulfilled for the sufficient period of time set out in Directive 64/432/EEC.
Tuberculosis Register has been created in 1997. No cases of human tuberculosis caused by M.bovis has been ever reported. The incidence rate of human pulmonary tuberculosis 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.

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

The disease is notifiable according to the Regulation on requirements for controlling tuberculosis of bovine animals approved by the Regulation of the Minister of Agriculture No 61 (in force since 23.04.2004).
According to the abovementioned Regulation if Tuberculosis is suspected in a bovine animal the official veterinarian is obliged to take an action to confirm the diagnosis and to prevent the spread of the disease.
Holding infected or suspected of being infected with tuberculosis is subjected under official restrictions for effective preventive methods against the spread of the disease. This includes the strict prohibition of all movement and transportation of animals and persons other than official veterinarians and persons 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 tuberculose-free herd and finding out the infected animals in time by regular tuberculin testing of the herd. Every year the examination on tuberculosis has been based on the State Programme on Monitoring and Surveillance of Animal Infectious Diseases, which is approved by the Director General of the Veterinary and Food Board.
There were no reported cases of human tuberculosis due to M.bovis in the year 2005. 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.

Additional information

Since the year 2005 according to the State Programme on Monitoring and Surveillance of Animal Infectiuos Diseases and in accordance with Council Directive 97/12 all over 6 weeks old cattle (except fattening bulls who are not used for breeding and will be slaughtered after rearing period) are subject for routine serological testing on tuberculosis at yearly intervals.

2.5.2. 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 EC legislation. Estonia has applied for tuberculose-free status from EC at the end of the year 2005 but unfortunately not all specific requirements are fulfilled for the sufficient period of time set out in Directive 64/432/EEC.

Monitoring system

Sampling strategy

Since the year 2005 according to the State Programme on Monitoring and Surveillance of Animal Infectiuos Diseases and Council Directive 97/12 all over 6 weeks old cattle (except fattening bulls who are not used for breeding and will be slaughtered after rearing period) are subject for routine serological testing on tuberculosis at yearly intervals.

Frequency of the sampling

All over 6 weeks old cattle (except fattening bulls who are not used for breeding and will be slaughtered after rearing period) are subject for routine serological testing on tuberculosis in accordance with Council Directive 97/12 at yearly intervals.

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 where Mycobacterium bovis has been isolated.

Diagnostic/analytical methods used

Laboratoy diagnostic method used in the VFL is performed according to OIE Manual for Diagnostic Tests and Vaccines for Terrestrial Animals 2004. Diagnostic tests are tuberculin skin test and microscopy, histology, culture. Confirmation is performed 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

The State Programme on Monitorning and Surveillance of Animal Infectious Diseases is a national programme approved annually by the Director General of the 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:
declare OTF status invalid,
organize epidemiological investigation,
ensure that all at least 6 weeks old bovine animals native of tuberculose positive herds should be tuberculin tested according to the EC Regulation 1226/2002,
all in point 3 mentioned tuberculose positive animals should be slaughtered,
bovine animals could be taken out from the herd only for slaughter,
desinfection is required,
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 2005.

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

Surveillance programme for bovine tuberculose started in 1962. The last positive case had been reported in 1986. Consequently thereof we consider our bovine herds free from tuberculose.
Since the year 2005 tuberculose 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)

There is no evidence of contracting domestic tuberculosis from animals. There were no human cases of tuberculosis caused by M.bovis reported during years.

B. Mycobacterium bovis in farmed deer

Additional information

There is no farmed deer in Estonia.

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Pigs	VFB	animal	3162	0			

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
EESTI	8149	253223	0	0	0	0	1	206248	0	63	0
Total	8149	253223	0	0	0	0	1	206248	0	63	0

Footnote

Interval between routine tuberculin tests is one year (1).

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 had been registered in 1961.
B. melitensis in goat and sheep has never been 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 has applied for brucellosis free status from EC at the end of the year 2005 but unfortunately not all specific requirements are fulfilled for the sufficient period of time set out in the Directive 64/432/EEC.
In 2005 the brucellosis surveillance programme in bovine animals has been implemented according to the EC legislation.
No official surveillance programmes for Brucella detection in food exists 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. Brucella in foodstuffs

2.6.3. Brucella in animals

A. Brucella abortus in Bovine Animals

Status as officially free of bovine brucellosis during the reporting year

Additional information

Estonian bovine herds are not OBF according to the EC legislation. Estonia has applied for brucellosis free status from EC at the end of the year 2005 but unfortunately not all specific requirements are fulfilled for the sufficient period of time set out in to Directive 64/432/EEC.

Monitoring system

Sampling strategy

Compulsory bacteriological investigation of all abortions.
All over 24 month old cattle are subject to routine serological testing for brucellosis (except fattening bulls who are not used for breeding and will be slaughtered after rearing period).
Dairy cows: milk samples are tested serologically.
Other cattles: blood samples are tested serologically.
Bulls in the artificial insemination centres: blood samples are tested serologically once a year.
Sampling is performed by the VFB official veterinarians and authorised veterinarians. Samples are taken at farm.
Sampling is a part of a permanent monitorning scheme.

Frequency of the sampling

All over 24 month old cattle (except fattening bulls who are not used for breeding and will be slaughtered after rearing period).
Bulls in the artificial insemination centres tested serologically - blood samples are taken once a year.

Type of specimen taken

Other: milk, blood

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

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 for Diagnostic Tests and Vaccines for Terrestrial Animals 2004. Diagnostic test - serology (indirect ELISA) for monitoring purposes. If samples react positively in screening tests, confirmation should 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 the 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

Sampling is performed in the frames of the State Programme on Monitorning and Surveillance of Animal Infectious Diseases - the national programme approved annually by the Director General of the 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:
declare OBF status invalid,
organize epidemiological investigation,
all bovine animals and brucellosis susceptible animals in the epidemic point should be destroyed,
Veterinary and Food Board may allow to send clinically healthy animals for slaughter to the appointed slaughterhouse. Slaughter should be performed separately from the other animals. Meat should be heat treated,
movement of the people, cars and animals to the epidemic point and out could be allowed only by authority of the Veterinary and Food Board,
desinfection is required,
milk should 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 2005.

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.
No human cases registered since 1968.

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

Blood samples are taken from parent stock of breeding herds once a year and analysed serologically.

Frequency of the sampling

Once 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

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 for Diagnostic Tests and Vaccines 2004.
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

Sampling is performed in the frames of the State Programme on Monitorning and Surveillance of Animal Infectious Diseases. It is a national programme which is approved annually by the Director General of the 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 June 16, 1999 Veterinary and Food Board (competent authority) have the right to:
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;
require the keepers of animals to mark the animals such that they could be identified and to demand that keepers of animals maintain a list of the animals;
require keepers of animals to permit diagnostic testing, immunisation or treatment of suspected or diseased animals, or to prohibit such activities;
demand to perform changes in the organisation and conditions of keeping animals at the enterprise or livestock building or construction;
establish the procedure for the grazing of animals;
establish the procedure for the preservation and use of animal droppings;
establish additional veterinary requirements for the enterprise activities;
establish special requirements for trade of 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;
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;
issue orders for the maintenance and disinfection of livestock buildings and constructions and for the eradication of insect and rodent vermin therein;
issue orders for the harmless rendering of animal droppings and for the harmless rendering or destruction of polluted products or inventory;
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;
designate animals for slaughter in order to conduct additional diagnostic tests or to prevent the

spread of the infectious animal disease;
establish the procedure for slaughtering of wild animals;
establish the procedure for the use, disposal and harmless rendering of the animal products and animal waste;
involve a veterinarian who holds an activity licence in relation to the prevention or control of the infectious animal disease on the basis of an application from or the consent of the veterinarian, the extent and the territory of the activity should be indicated 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 2005.

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

Surveillance programme for Brucella in sheep started since 1962. Untill now no positive B.melitensis cases were 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 human brucellosis in Estonia is negligible.

C. Brucella melitensis in Goat

Monitoring system

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Individual blood sample for serology.

Case definition

Laboratory diagnostic method used in the VFL is performed according to OIE Manual of Diagnostic Tests and Vaccines 2004.
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

During 2005 40 goats were tested with negative results.

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

Brucellosis in animals and in humans is very rare disease in Estonia.
B.melitensis in goats has never been reported.
Human cases of brusellosis had not be diagnosed during 38 years.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Pigs	VFB	animal	1784	0				
Zoo animals, all	VFB	animal	2	0				

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk samples			Information about abortions			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds tested	Number of bovine herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals		Number of animals examined microbio logically	Number of animals positive microbio logically
																		Serologically	BST		
EESTI	8149	253223	0	0	0	0	1049	15925	0	6696	0	10	0	0	0	107393	0	0	0	0	0
Total	8149	253223	0	0	0	0	1049	15925	0	6696	0	10	0	0	0	107393	0	0	0	0	0

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

Region	Total number of existing ovine / caprine		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of animals	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbio logically	Number of animals positive microbio logically	Number of suspended herds
EESTI	747	24479	0	0	0	0	47	1619	0	1619	0	0	0	0
Total	747	24479	0	0	0	0	47	1619	0	1619	0	0	0	0

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

History of the disease and/or infection in the country

Human cases of yersiniosis are reported in Estonia every year. The number of cases varied during the years 1999-2005. The peak was mentioned in 1999 (113 cases), then the number of cases decreased and composed 60 cases in 2000 and 51 case in 2001. Since the year 2002 the number of cases is unstable: 2002 - 20 cases, 2003 - 31, 2004 - 15 and 2005 - 31.

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

There is no special programme for monitoring of Yersinia spp. in Estonia. In 2005 Yersinina spp. was isolated from faeces samples and isolation of Yersinia was related to the confirmation of the presence of cross-reacting antibody in case of positive brucellosis serological reaction. 3 sheep and 3 cattle were positive for Yersinia enterocolitica.
The number of human cases is unstable and varies during years. A significant part of human infections is of domestic origin. Yersiniosis has it`s greatest potential as a zoonosis in young children.

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. Yersinia in foodstuffs

2.7.3. Yersinia in animals

Table Yersinia spp. in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia	Y. enterocolitica	Yersinia unspecified	Y. enterocolitica - Y. enterocolitica O:9	Y. enterocolitica - Y. enterocolitica O:3
Cattle (bovine animals)	VFL	animal	x	3	3			
Sheep	VFL	animal	x	3	3			

Footnote

VFL - There are no special programme for monitoring Yersinia spp. Data concerning units tested is not available. Isolations of Yersinia spp. from faeces were related to confirmation presence of cross-reacting antibody, in case if brucellosis serological reaction was positive.

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 the previous investigations show that trichinellosis had been diagnosed both in wild and in farmed domestic animals in Estonia.
The last case of trichinellosis in domestic pig had been diagnosed in 1999. During the last 5 years there were no cases of trichinellosis found in farmed animals.
Among wild animals there are still some cases of trichinellosis diagnosed per year.
Human trichinellosis is relatevely rare disease in Estonia. The number of human cases per year is very small and in the years 2000-2005 it varied from 0 to 3 cases per year. The peak of incidence was noted in the year 1993, when 43 human cases of trichinellosis had been detected.

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

Investigations show that during years no Trichinella found in domestic farmed animals. At the same time Trichinellosis was diagnosed in wild animals: wild boars, lynxes and bears.
The risk of acquiring human trichinellosis from domestic sources is considered to be very low as Trichinella has not been detected in animals that are usually used as food in Estonia.

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

In most human cases the supposed source of infection is associated with consumption of wild animals meat.

2.8.2. Trichinella in animals

A. Trichinella in pigs

Number of officially recognised Trichinella-free holdings

There are no officially recognized Trichinella-free holdings in Estonia.

Monitoring system

Sampling strategy

General

Samples are taken at the slaughterhouse. Sampling is performed by authorised or official veterinarians at post mortem inspection in accordance with the Directive 64/433/EEC requirements.

Frequency of the sampling

General

All slaughtered animals should be examined.

Type of specimen taken

General

Diafragm muscle.
In the absence of both diafragm pillars the samples from the rib part or brastbone part of the diafragm or tongue muscle or the jaw muscle, abdominal muscle should be taken.

Methods of sampling (description of sampling techniques)

General

For compression method: one sample size should be 40 g.
For artificial digestion method: one sample size should be 50 g.

Case definition

General

An animal where Trichinella spp. has been detected.

Diagnostic/analytical methods used

General

Sampling and diagnostic methods described in Directives 64/433/EEC and 77/96/EEC are used:
- compression method

- artificial digestion method.

Control program/mechanisms

The control program/strategies in place

According to the Minister of Agriculture Regulation No 10 "Prevention of Trichinellosis" every swine have to be examined at post mortem inspection.
Fresh meat derived from domestic swine imported from the third countries should be examined for trichinae in accordance with the Directive 77/96/EEC.

Measures in case of the positive findings or single cases

In case of discovering of Trichina larvae the animal carcass and the viscera are declared to be unfit for human consumption and should be directly disposed.

Notification system in place

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

Results of the investigation including description of the positive cases and the verification of the Trichinella species

No positive cases were reported in the year 2005.

Fattening pigs raised under controlled housing conditions in integrated production system

No positive cases reported.

Breeding sows and boars

No positive cases reported.

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

The last case of trichinellosis in pigs had been discovered at the private farm in the year 1999. Since that time no Trichinella has been found in domestic pigs.

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

Samples are taken at the slaughterhouse. Sampling is performed by authorised or official

veterinarians at post mortem inspection.

Frequency of the sampling

Every slaughtered animal intended for human consumption is sampled.

Type of specimen taken

Tongue muscle or masseters. In case of their absence diafragm muscle should be sampled.

Methods of sampling (description of sampling techniques)

See part "Trichinella in pigs".

Case definition

See part "Trichinella in pigs".

Diagnostic/analytical methods used

See part "Trichinella in pigs".

Results of the investigation including the origin of the positive animals

In 2005 there were no positive cases reported.

Control program/mechanisms

The control program/strategies in place

According to the Regulation of the Minister of Agriculture No 10 "Prevention of Trichinellosis" every horse carcass intended for human consumption should be examined.

Measures in case of the positive findings or single cases

See part "Trichinella in pigs".

Notification system in place

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

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total animals positive for Trichinella	T. spiralis	Trichinella spp., unspecified
Pigs (1)	VFB	animal	459097	0		
fattening pigs						
raised under controlled housing conditions in integrated production system	VFB	animal	437851	0		
breeding animals						
unspecified						
sows and boars	VFB	animal	11417	0		
Solipeds, domestic						
horses (3)	VFB	animal	6	0		
Wild boars						
wild (2)	VFB	animal	1570	0		
- in total (4)	VFL	animal	1098	3		3
Bears	VFL	animal	24	4		4
Lynx	VFL	animal	6	5		5
Wolves	VFL	animal	1	1		1

(1) : at post mortem inspection
(2) : at post mortem inspection, official sampling
(3) : at post mortem inspection
(4) : samples analysed in the VF laboratory (483 of 1570 official samples + samples taken by the private persons, hunters). Samples that have been Trichinella positive had not been taken in the frames of the official control.

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

There were no reported cases of echinococcosis in farmed animals in the years 2004-2005. In 2005 2 cases of wild reindeer echinococcosis had been diagnosed at post mortem inspection.
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

Surveillance and control of Echinococcus is carried out by the meat inspectors according the the Council Directive 64/433/EEC. Mandatory meat inspection covers all known potential intermediate host species. All carcasses intended for human consumption are inspected for incidence of hydatid cysts. The prevalence of echinococcus in animals intended for human consumption is close to zero.
Human echinococcosis is not a public health problem in Estonia.

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. Echinococcus in animals

Table Echinococcus spp. in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals)	VFB	animal	56035	0			
Sheep	VFB	animal	4274	0			
Goats	VFB	animal	5	0			
Pigs	VFB	animal	459097	0			
Solipeds, domestic	VFB	animal	6	0			
Reindeers	VFB	animal	1787	2			2

Footnote

All animals have been examined at post mortem inspection.
Positive cases were not laboratory confirmed.

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 9 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. In 2005 there were 5 human cases of toxoplasmosis registered.
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. 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.
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. Farm animals compose 6-7 %, dogs and cats 10-20 % and wild animals for 70-80 % of all cases.
The number of infections of farm animals has increased in bovines: 19 cases of infection in 2005 (2004 - 15 cases), which accounts for 7,1 % (2004 - 4,8 %) of the total number of rabies cases in animals. In the years 2002 - 2003 rabies cases in farm animals composed 5-6,6 %.
In the dogs and cats category, the occurrence of rabies has significantly decreased in 2005: 23 cases in 2002 (5,5 %), 28 cases in 2003 (3,5 %), 20 cases in 2004 - 6,3 %, 8 cases in 2005 - 5,4 % of all registered rabies cases in animals. This may be due to the improved awareness of pet owners, who vaccinate their cats alongside dogs. Rabies cases increased in dogs: 2002 - 5,7 %, 2003 - 4,2 %, 2004 - 7,6 % and 7,4 % in 2005.
Among wild animals, red foxes account for 35,7 % (2004 - 29,3 %), racoon dogs for 47,4 % (2004 - 48 %) and other wild animals (badgers, deer, rabbits, hedgedogs, ferrets, squirrels, lynx, minks, weasel, hares, martens, mices etc) for 3 % (2004 - 3,8 %) of all the cases of rabies in wild animals in the year 2005.
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 increased continuously over the years 1999 - 2003 with the peak in the year 2003. There is noted a decrease in number of attacks in the years 2004 and 2005.

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

During the years 2001-2005 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. The the decrease in number of cases has been noted: 314 in 2004 and 266 in the year 2005.
In the year 2004 255 rabies cases was diagnosed in wild animals and 59 in domestic animals. In 2005 there was 230 rabies positive cases diagnosed in wild animals (mostly in foxes and raccoon-dogs) and 37 in domestic animals.
Rabies is widely distributed in all counties in Estonia, even in the islands Hiiumaa and

Saaremaa. Thus the oral vaccination program of wildlife had been carried out in the frames of Transition Facility program in Autumn 2005. Bait drop area covered 25 540 km² of Northen part of Estonia. Total quantity of vaccine baits per vaccinated area was 505600 baits. Vaccine baits were distributed by aircraft Cessna-172. Number of baits distributed in vaccination area was 20 baits per km2, distance between dropping lines is ~ 500-600 m. The analyses showed that the 74 % of vaccine had been eaten by the animals.
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 animals. 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.

Recent actions taken to control the zoonoses

The risk of contracting rabies in Estonia is still high, as the disease is widely spread among animals. 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.
The oral vaccination program of wildlife had been carried out in the frames of Transition Facility program in Autumn 2005 (10.10.2005- 3.11.2005).

2.11.2. 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 virus antigens from tactile preparations made from 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 the information about an animal with the suspicion to be infected with rabies or an animal who has been bitten by animal with rabies suspicion or in unknown state of health, the authorised veterinarian, who services the region, is obliged to check as soon as possible the state of the animal and to take necessary measures to prevent the spread of infection.

Frequency of the sampling

Each animal with rabies suspicion should 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 to the laboratory for analysis.
If the brain is damaged, the cervical vertebrae together with the spinal cord have to be sent for analysis.

Case definition

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

Diagnostic/analytical methods used

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

Vaccination policy

Vaccination of cats and dogs:
The animal keeper has to guarantee that his or her cats and dogs are vaccinated.
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.
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.
Animals are vaccinated by the veterinary supervisory officials, authorised veterinarians or licenced veterinarians.
The veterinarian keeps record of the vaccinations against rabies and reports to the Veterinary and Food Board according to the rules established by the Director General of the Veterinary and Food Board.
The veterinarian issues a certificate after animal vaccination at animal keeper request or makes an appropriate entrance on the animal registration document.
The animal keeper is obliged to present the vaccination certificate or the registration document with the appropriate entrance to the veterinary supervisory official or the authorised veterinarian at his or her request.
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.
Vaccination of farm animals:
It is advisable to vaccinate farm animals, which graze in woodland pastures and in pastures that are surrounded by woodlands.
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 rabies suspicion 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 check the state of the animal as soon as possible. The sample should be taken and sent to the laboratory. Necessary measures to prevent the spread of infection should be provided.

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 animal`s examination and if necessary, its vaccination.
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 has to take samples from the slaughtered animal, also from the animal who has died during the isolation period and to send these samples 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 in 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 to vaccinate the rest animals in the herd. 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 for the herd are established and abolished by the head of the local authority of the Veterinary and Food Board in a written form.
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 as a food until restrictions are abolished;
prohibition to use raw milk and raw milk products for food and for sale until the restrictions are abolished.
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 veterinarian.

Notification system in place

Rabies is a notifiable disease 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 2005 81 dog brain tissue have been tested for rabies. 6 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 red foxes and racoon dogs are its main reservoir. The number of these animals 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, decreased though, being estimated as 85 (90 in 2004) wolfs, 530 (550 in 2004) bears and 700 (700-900 in 2004) lynxes in 2005.

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 in the year 2005 was registered in Tallin city, Ida-Virumaa and Tartumaa counties.

2407 dog bites have been registered in the year 2005.
The animal attacks on humans were caused in majority by dogs (72,2 %), followed by cats (17,8 %), racoon-dogs (2,9 %), foxes (1,7 %), horces (1,7 %) and cows (1,1 %).

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	unspecified lyssavirus
Cattle (bovine animals)	VFB	animal	49	19	
Sheep	VFB	animal	18	1	
Solipeds, domestic	VFB	animal	6	3	
Dogs	VFB	animal	81	6	
Cats	VFB	animal	147	8	
Foxes					
wild	VFB	animal	202	95	
Raccoon dogs					
wild	VFB	animal	195	126	
Badgers					
wild	VFB	animal	6	3	
Marten					
wild	VFB	animal	9	1	
Wild boars					
wild	VFB	animal	3	0	
Deer	VFB	animal	11	0	
Rabbits	VFB	animal	2	0	
Lynx	VFB	animal	3	1	
Ferrets	VFB	animal	16	3	
Minks	VFB	animal	2	0	
Weasel	VFB	animal	3	0	
Hares	VFB	animal	3	0	
Beavers	VFB	animal	1	0	
Squirrels	VFB	animal	5	0	
Hedgehogs	VFB	animal	3	0	
Mice	VFB	animal	3	0	
Birds					
wild	VFB	animal	2	0	

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ESCHERICHIA COLI, NON-PATHOGENIC

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. The peak incidence (1464) of cases has been detected in 1976. After that there is noted a decline in a number of cases.
There is no monitoring programme on ingvestigation of E.coli in animals.

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

Since 2001 the investigations of E.coli antimicrobial resistance are performed in the frames of the project on Monitoring of Antimicrobial Resistance of Zoonotic Agents Detected in Animals funded by the Ministry of Agriculture. Project leaders are from the Estonian University of Life Sciences. Analyses are performed by the Veterinary and Food Board.
There is no special programme for sampling of faeces for this project. The isolates are collected from samples that are coming routinely to the laboratory in the frames of State Programme on Monitoring and Surveillance of Animal Diseases. Samples are taken from the clinically healthy animals.
In the year 2005 antimicrobial resistance of E.coli had been investigated in:
21 isolate discovered in samples taken from laying hens:
14 (67 %) isolates were fully sensitive,
6 (29 %) isolates were resistant to 1 antimicrobial,
1 (5 %) was resistant to 6 antimicrobials.
Isolates were resistant to tetracycline (5), ampicillin (2), nalidic acid (1), sulfonamide (1), trimethoprim+sulfonamides (1), trimethoprim (1) and streptomycin (1).
40 isolates discovered in samples taken from pigs:
22 (55 %) isolates were fully sensitive,
9 (23 %) were resistant to 1 antimicrobial,
5 (13 %) were resistant to 2 antimicrobials,
2 (5 %) were resistant to 3 antimicrobials,
2 (5 %) were resistant to 4 antimicrbials.
Isolates were resistant to tetracycline (10), streptomycin (9), ampicillin (4), sulfonamide (4), trimethoprim (3), chloramphenicol (1) and trimethoprim+sulfonamides (1).
49 isolates discovered in samples taken from cattle:
38 (78 %) isolates were fully sensitive,
4 (8 %) were resistant to 1 antimicrobial,
2 (4 %) were resistant to 2 antimicrobials,
3 (6 %) were resistant to 3 antimicrobials,
1 (2 %) was resistant to 5 antimicrobials,
1 (2 %) was resistant to 8 antimicrobials.
Isolates were resistant to tetracycline (7), sulfonamide (6), streptomycin (6), ampicillin (4), nitrofurantoin (2), trimethoprim+sulfonamides (2), trimethoprim (2) and chloramphenicol (1).

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

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

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

	E. coli
	Cattle (bovine animals)
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	49

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	49	7	5						1		1	2	1	1		5	10	10	9	3			1									
Amphenicols																																
Chloramphenicol	49	1	1														1	2	4	5	14	5	3	2	9	2			1			
Cephalosporins																																
Cefotaxim	49	0																								2	6	8	8	6	9	10
Cefuroxim	49	0															2	9	7	11	9	9		1		1						
Fluoroquinolones																																
Ciprofloxacin	49	0																				1			1	1	9	1	6	5	6	19
Enrofloxacin	49	0																					1			4	5	6	9	7	3	14
Norfloxacin	47	0																		2	1	2	1	3	4	9	4		1	3	4	13
Quinolones																																
Nalidixic acid	49	0																		3	5	17	9	3	6	2	1	1		1	1	
Trimethoprim	49	2	2								1										1	6	4	11	4	8	7	3	1	1		
Sulfonamides																																
Sulfonamide	49	6	6													1			1	3	2	7	5		3	5	8		2		4	2
Aminoglycosides																																
Streptomycin	49	6	1		1	1		3			2	3	4	15	10	5	3	1													
Gentamicin	49	0									1	1			1	8	11	14	5	5	1	1			1							
Trimethoprim + sulfonamides	49	2	2														1		1	2		2		7	8	7	4	3	5	5	1	1
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	49	2	1									1		1		1	1	4	8	17	6	4	3		1		1					
Penicillins																																
Ampicillin	49	4	4									2		2	9	10	8	3	6		2	3										

Footnote

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Table Antimicrobial susceptibility testing of E. coli in Pigs - quantitative data [Diffusion method]

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

	E. coli
	Pigs
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	40

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	40	10	9								1	2	1		6	5	6	4	5	1												
Amphenicols																																
Chloramphenicol	40	1						1									1	4	6	6	6	6	2	3	1	1		1	1	1		
Cephalosporins																																
Cefotaxim	40	0																								3	4	6	9	5	8	5
Cefuroxim	40	0														1	4	4	6	8	8	5	4									
Fluoroquinolones																																
Ciprofloxacin	40	0																							1	3	4	2	6	8	8	8
Enrofloxacin	40	0																								1	7	6	12	7	4	3
Norfloxacin	40	0																					3	1	6	5	10	2	2	5	1	5
Quinolones																																
Nalidixic acid	40	0																1		6	6	10	8	6	3							
Trimethoprim	40	3	3																		5	7	5	5	2	6	3	2	1	1		
Sulfonamides																																
Sulfonamide	40	4	4																	3	8	2	5	5	5	2	2	3				1
Aminoglycosides																																
Streptomycin	40	9	1			1	5	2	3			7	5	8	6	1	1														
Gentamicin	40	0										2			2	7	12	11	4	1	1											
Trimethoprim + sulfonamides	40	1	1											1	1	1	1				1	2	4	3	6	7	5	3	3		1	
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	40	0													1	3	3	6	7	9	7	3		1								
Penicillins																																
Ampicillin	40	4	4									1	2	3	4	8	5	5		4	2	1	1								

Footnote

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Table Antimicrobial susceptibility testing of E. coli in Gallus gallus (fowl) - quantitative data [Diffusion method]

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

	E. coli
	Gallus gallus (fowl)
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	21

Antimicrobials:	**N**	**n**	**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**
Tetracyclines	21	5	5												3	4	3	3	2	1												
Amphenicols																																
Chloramphenicol	21	0																	2	5	1	9	2	2								
Cephalosporins																																
Cefotaxim	21	0																	1		1				2	1	3	2	4		3	4
Cefuroxim	21	0													1		2	1	5	1	5	3	1	1					1			
Fluoroquinolones																																
Ciprofloxacin	21	0																								4	4	5	1	1		6
Enrofloxacin	21	0																					2	1	1	2	2	3	4	1	2	3
Norfloxacin	21	0																					3	2	5	1	2		1		1	6
Quinolones																																
Nalidixic acid	21	1			1															5	4	3	5	1	2							
Trimethoprim	21	1	1										1							1	1	5		2	7	2	1					
Sulfonamides																																
Sulfonamide	21	1	1																	1	4	2	4	3	2	2	1	1				
Aminoglycosides																																
Streptomycin	21	1	1									3	5	10	2																	
Gentamicin	21	0													2	4	8	4	2	1												
Trimethoprim + sulfonamides	21	1	1																			1	2	1	3	4	5	2	2			
Nitroimidazoles and Nitrofurans																																
Nitrofurantoin	21	0												1		2	4	1	5	4	3											1
Penicillins																																
Ampicillin	21	2	2										1		2	5	4	3	3	1												

Footnote

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Table Antimicrobial susceptibility testing of E. coli in animals

n = Number of resistant isolates

	E. coli							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	yes		yes		yes			
Number of isolates available in the laboratory	49		40		21			
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines	49	7	40	10	21	5		
Amphenicols								
Chloramphenicol	49	1	40	1	21	0		
Cephalosporins								
Cefotaxim	49	0	40	0	21	0		
Cefuroxim	49	0	40	0	21	0		
Fluoroquinolones								
Ciprofloxacin	49	0	40	0	21	0		
Enrofloxacin	49	0	40	0	21	0		
Norfloxacin	47	0	40	0	21	0		
Quinolones								
Nalidixic acid	49	0	40	0	21	1		
Trimethoprim	49	2	40	3	21	1		
Sulfonamides								
Sulfonamide	49	6	40	4	21	1		
Aminoglycosides								
Streptomycin	49	6	40	9	21	1		
Gentamicin	49	0	40	0	21	0		
Trimethoprim + sulfonamides	49	2	40	1	21	1		
Nitroimidazoles and Nitrofurans								
Nitrofurantoin	49	2	40	0	21	0		
Penicillins								
Ampicillin	49	4	40	4	21	2		
Fully sensitive	49	38	40	22	21	14		
Resistant to 1 antimicrobial	49	4	40	9	21	6		
Resistant to 2 antimicrobials	49	2	40	5	21	0		
Resistant to 3 antimicrobials	49	3	40	2	21	0		
Resistant to 4 antimicrobials	49	0	40	2	21	0		
Resistant to >4 antimicrobials	49	2	40	0	21	1		

Footnote

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Table Breakpoints used for antimicrobial susceptibility testing of E. coli in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		14
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
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides	NCCLS						25	16		10
Cephalosporins										
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

Footnote

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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 No 99 (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:

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 outbreaks	Number of human cases involved
2000	10	224
2001	6	105
2002	5	127
2003	0	0
2004	7	25
2005	20	115

In 2000-2003 - only general outbreaks were reported (with 10 or more cases), in 2004-2005 - general outbreaks and family clusters (with 2 or more cases).

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

Salmonella - chicken meat, eggs
Tick-borne encephalitis - raw goats milk

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

Kindergarten and amusement fair in a supermarket.

Evaluation of the severity and clinical picture of the human cases

Diarrhoeal diseases - diarrhoea, abdominal pain, vomiting, fever, anorexia, dehydration may be sever. Occasionally - complications in different body systems.
Tick-borne encephalitis - each laboratory confirmed case of encephalitis with typical clinical picture.

Descriptions of single outbreaks of special interest

One outbreak of Salmonella enteritidis PT 1 salmonellosis involving a total number of 26 persons was registered in the kindergarten in Harjumaa county on 4-18 April 2005. Source of infection and food relation have not been detected. Contributing factor was deficiencies in the food handling.
One outbreak of Tick-borne encephalitis involving a total number of 37 persons was registered in Tallinn city on 9 May - 1 June 2005. Outbreak is related to raw goats milk consumption, which was served for a tasting purpose to the visitors of amusement fair in a supermarket on the 7-9 May 2005. Serum specimens from 5 goats from the private breeding farm were investigated, one specimen was clearly positive and one specimen showed borderline neutralisation.

Control measures or other actions taken to improve the situation

Improvement of administrative supervision.
Searching for food handling errors.
Obligatory case report.
Concurrent disinfection.

Contact tracing and investigation of source of infection.
Collaboration and information exchange between Health Protection Inspectorate and Veterinary Food Board.

Suggestions to the community for the actions to be taken

Information to public via mass media about current situation and preventive measures.

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 - S. Enteritidis		8	21		11	eggs	x		epidemiological	private household	consumption of raw egg-based dishes
Salmonella - S. Enteritidis		3	11		5	unknown				private household	deficiencies in the food handling
Salmonella - S. Enteritidis		1	2			chicken meat	x		epidemiological	private household	deficiencies in the food handling
Salmonella - S. Infantis		1	2		1	unknown				private household	deficiencies in the food handling
Salmonella - Salmonella spp.		1	3		3	unknown				private household	deficiencies in the food handling
Flavivirus - Tick-borne encephalitis virus (TBE)		2	9		8	raw goats milk		x	laboratory confirmed	private household	consumption of raw goats milk
Flavivirus - Tick-borne encephalitis virus (TBE)	1		37		25	raw goats milk		x	laboratory confirmed	supermarket, Tallinn city	tasting of raw goats milk during the amusement fair
Salmonella - S. Typhimurium		2	4		4	unknown				private household	deficiencies in the food handling
Salmonella - S. Enteritidis - PT 1	1		26		2	unknown				kindergarten, Harjumaa county	deficiencies in the food handling