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, antimicrobial resistance in zoonotic agents and some pathogenic microbiological agents

IN 2007

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Estonia**
Reporting Year: **2007**
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, animal welfare and farm animal breeding are followed. Veterinary and Food Board is responsible for state control of all food chain in Estonia since July 1, 2007. VFB coordinates the 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 programs 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 until July 1, 2007; 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 until July 1, 2007. Data on human zoonoses and food-borne outbreaks. 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 2007. The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given.
The information given covers both zoonoses that are important for the public health in the whole European Community as well as zoonoses, which are relevant on the basis of the national epidemiological situation.
The report describes the monitoring systems in place and the prevention and control strategies applied in the country. For some zoonoses this monitoring is based on legal requirements laid down by the Community Legislation, while for the other zoonoses national approaches are applied.
The report presents the results of the examinations carried out in the reporting year. A national evaluation of the epidemiological situation, with special reference to trends and sources of zoonotic infections, is given. Whenever possible, the relevance of findings in foodstuffs and animals to zoonoses cases in humans is evaluated.
The information covered by this report is used in the annual Community Summary Report on zoonoses that is published each year by EFSA.

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[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, 2007.

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

The number of susceptible population has been quite stable recently.
The data presented in the table includes backyard animals.

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 slaughtered animals	Year*	Livestock numbers (live animals)	Year*	Number of holdings	Year*
Bears	wild			46					
Cattle (bovine animals)	dairy cows and heifers	6244		35208		154412		6790	
	mixed herds	998		2297		6541		1169	
	meat production animals	876		1440		7346		1037	
	calves (under 1 year)	4629		7816		65995		5166	
	in total	7224		62288		242462		7812	
Deer	wild			75					
	wild - roe deer			1873					
Gallus gallus (fowl)	parent breeding flocks for meat production line	3				20400		3	
	laying hens			298452					
	broilers			7188436					
	in total			7486888		1153806		89	
Goats	animals under 1 year	87		62		276		92	
	animals over 1 year	415		257		1776		435	
	in total	421		319		2052		441	
Pigs	fattening pigs					115145			
	breeding animals - unspecified - sows and gilts					29107			
	in total	129		452239		277469		158	
Reindeers	wild			1942					
Sheep	animals over 1 year	1814		7171		43900		1934	
	animals under 1 year (lambs)	1073		8739		18463		1150	
	in total	1863		15910		62363		1983	
Solipeds, domestic	horses - in total			12					
Wild boars	wild			2717					

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.
The number of foodborne outbreaks, where Salmonella was detected as a causative agent is on the first place among other outbreaks during years.

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.Lexington (in 2006 - S.Typhimurium, S.Reading and S.Dublin; in 2005 - S.Typhimurium and S.Dublin; in 2004 - S.Dublin and S.group C). S.Inganda (in 2006 - S.Enteritidis; in 2005 - S.Typhimurium; in 2004 - S.Stanleyville) was the predominant serotype isolated from pigs.
S.Enteritidis is the only serotype isolated from poultry (Gallus gallus) during years.
No turkey, geese and duck flocks are present in Estonia.
Salmonella was found in 10,7 % of samples of feed materials and feedingstuffs in 2007. S.Lexington (4), S.Inganda (2) and S.spp unspecified (2) were found.
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 analyzed according to the requirements of the programme. In addition food samples are taken in the frames of official surveillance programmes of Veterinary and Food Board and Health Protection Inspectorate.
2348 samples of meat and meat products has been tested in 2007. 15 (0,6 %) of the meat samples tested were positive (2006 - 1,1 %; 2005 - 1,4 %; 2004 - 0,8 %). 13 % (2006 - 60 %; 2005 - 58,3 %; 2004 - 38,8 %) of all positive meat samples compose fresh broiler meat. The predominant isolates were S.Enteritidis (4 samples).
There were no positive samples of milk, milk products in 2007 and in 2006.
The overall prevalence of Salmonella in foodstuffs is about 0,5 % (2006 - 0,79 %; 2005 - 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 2007 60 (in 2006 - 54) Salmonella spp. isolates were tested in the frames of the Antimicrobial

Resistance Monitoring of Zoonotic Agents. 51 isolate originated from animals, 9 from food of animal origin. Investigations were performed by the Veterinary and Food Laboratory.
The number of human cases of salmonellosis are increasing since the year 2004. 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.
4 general outbreaks and 21 family outbreaks of salmonellosis has been registered in the year 2007 (in 2006 - 2 general and 14 family outbreaks; in 2005 - 1 general outbreak and 16 family outbreaks). In approximately all 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 Typhimurium is the predominant agent discovered in cattle and Salmonella Enteritidis is the predominant agent isolated from pigs in 2007. Salmonella Enteritidis is the only serovar discovered in poultry.

2.1.2. Salmonellosis in humans

2.1.3. 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 eggs and egg products is performed in accordance with the Veterinary and Food Board and 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: dried egg products etc.

Methods of sampling (description of sampling techniques)

Eggs at egg packing centres (foodstuff based approach)

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

Eggs at retail

Sample analyzed - 25 g mixture of egg yolk and white. Samples are stored at +2+4C and analyzed as soon as possible.

Raw material for egg products (at production plant)

Sampling is random. Sample analyzed - 25 g. Samples are stored at +2+4C and analyzed as soon as possible.

Egg products (at production plant and at retail)

Egg products are sampled randomly. Sample analyzed - 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 6579:2003 Cor.1 2004

Eggs at retail

Bacteriological method: ISO 6579:2003

Raw material for egg products (at production plant)

Bacteriological method: ISO 6579:2003 Cor.1 2004

Egg products (at production plant and at retail)

Bacteriological method: ISO 6579:2003

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 46 from 29.03.2007 "Regulation on prevention against salmonellosis". 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.

Recent actions taken to control the zoonoses

Salmonella monitoring Programme for Food of Animal origin is in place since the year 2002.

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 on 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 2007 Salmonella has not been detected in any of 96 analyzed eggs samples taken at packing centres and at retail.
21 egg products taken from egg production establishments has been analyzed with no positive findings.

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

The Estonian Salmonella Monitoring Programme for Food of Animal Origin 2002-2007 indicate that eggs taken at packaging centres are not contaminated with Salmonella.
2,3 % of 302 egg product samples tested in the frames of the monitoring programme were positive for Salmonella during last 6 years.
At the same time since the year 2004 there were no positive egg products samples 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 2007 there were 2 verified general outbreaks of human salmonellosis epidemiologically linked to the consumption of eggs (bakery product with raw egg cream).
There were 5 possible outbreaks where eggs and egg products were suspected to be the source of infection.

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 poultry meat, offal, carcase chilling water are sampled randomly at slaughterhouse. 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 consignments 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 Veterinary and Food Board and 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 analyzes 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 15 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 analyzed 10 g);
minced meat, meat preparations and meat preparations made from minced meat are sampled (sample consists of 5 subsamples, which are examined individually; sample size - 10 g),
meat products establishments - meat products are sampled regularly. Analyzed sample size - 25 g.

At retail

Sample analyzed - 10 or 25 g according to the Commission Regulation 2073/ 2005. Number of subsamples is 5. Samples are stored at +2+4C and analyzed 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 6579:2003 Cor.1 2004

At meat processing plant

Bacteriological method: ISO 6579:2003 Cor.1 2004

At retail

Bacteriological method: ISO 6579:2003

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 46 from 29.03.2007 "Regulation on prevention against salmonellosis". SMPF started in 2002 and is approved annually by the Director General of Veterinary and Food Board.
Prevention of salmonelloosis is based on analyzes made in the frames of salmonella monitoring programme, official control plans 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 effectiveness 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 investigating the safety and quality of the products on 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

Altogether 4 (1,3 %) of 295 investigated samples of broiler meat and broiler meat products were positive for salmonella in the year 2006 (in 2005 - 11,2 %; in 2006 - 5,4 %). S.Enteritidis has been detected in 3 samples (in 2005 - 34 samples; in 2006 - 17 samples), S.Koenigstuhl in 1 sample.
143 samples of broiler fresh meat have been taken in the year 2007. 1,4 % of tested samples were positive.
Salmonella Monitoring Programme for Food of Animal Origin data show that 0 of 49 broiler neck skin samples taken at slauhterhouse and 1 (1,1 %) of 94 samples of fresh broiler meat taken at cutting plant 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 2002-2006 and analyzes of samples taken in the frames of official control show that during years Salmonella has been detected mostly in fresh broiler meat samples taken at cutting plants and at slaughterhouse and in neck skin samples taken at slaughter.
Salmonella Enteritidis is the prevalent serovar in broiler meat.

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

In the year 2007 broiler meat and products thereof were supposed to be the source of infection in 5 human outbreaks. 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 is the main serovar detected in humans during many years.

C. Salmonella spp. in turkey meat and products thereof

Monitoring system

Sampling strategy

At meat processing plant

Random sampling is performed as a part of official food control. Targeted sampling is preformed in cases of suspicion, consumer complains and etc.

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 meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At meat processing plant

Other: fresh meat, meat products

At retail

Other: fresh meat, meat products

Methods of sampling (description of sampling techniques)

At meat processing plant

Sample analyzed - 10 or 25 g. Number of subsamples is 5. Samples are stored at +2+4C and analyzed as soon as possible.

At retail

Sample analyzed - 10 or 25 g. Number of subsamples is 5. Samples are stored at +2+4C and analyzed as soon as possible.

Definition of positive finding

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 meat processing plant

Bacteriological method: ISO 6579:2003 Cor.1 2004

At retail

Bacteriological method: ISO 6579:2003

Control program/ mechanisms

The control program/ strategies in place

As turkey meat in Estonia is mostly imported, sampling is performed at meat processing plants, 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 investigating the safety and quality of the products on 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 2007.

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

The consumption of turkey meat is very small in Estonia.
It is very difficult to make any evaluation, as only imported turkey meat has been analyzed and the amount of the analyzed samples is very small.

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

No positive samples were detected in 2007. 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 analyzes of randomly sampled swabs from pig carcasses at

slaughterhouse and meat or scrap cuttings from cutting plants. The number of carcass 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

Raw material, minced meat, meat preparations and meat products are sampled randomly in the frame of official food surveillance 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 the Veterinary and Food Board and the Health Protection Inspectorate in accordance with the annual plans as a part of official food control. Targeted sampling is performed 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: carcass swabs, fresh meat

At meat processing plant

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

At retail

Other: minced meat, meat preparations, 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 pre-hydrated with 10 ml of buffered peptone water hydrasponges 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 analyzed - 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 analyzed 10 or 25 g); minced meat, meat preparations and meat preparations made of minced meat are sampled (each sample consists of 5 subsamples, which are examined individually; subsample weight analyzed - 10 g each).
meat products establishments - meat products are sampled regularly. Sample analyzed - 25 g.

At retail

Sample analyzed - 10 or 25 g according to the Commission Regulation 2073/ 2005. Number of subsamples taken are 5. Samples are stored at +2+4C and analyzed 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 Salmonella spp. was isolated in one of subsamples.

At retail

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

Diagnostic/ analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2003 Cor.1 2004

At meat processing plant

Bacteriological method: ISO 6579:2003 Cor.1 2004

At retail

Bacteriological method: ISO 6579:2003

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 the Minister of Agriculture no 46 from 29.03.2007 "Regulation on prevention against salmonellosis". SMPF started in 2002 and is approved annually by the Director General of Veterinary and Food Board.
Prevention of salmonellosis is based on analyzes made in the frames of salmonella monitoring programme, official control sampling 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 effectiveness 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 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

4 (0,27 %) of the 1434 investigated samples of pig meat and pig meat products were positive for salmonella in 2006 (2006 - 0,27 %; 2005 - 0,5 %).
2 S.Typhimurium and 1 S.Cholerasuis and 1 S.London has been isolated (in 2006 - 2 S.Typhimurium and 1 S.group B; in 2005 - 3 S.Typhimurium, 2 S.Dublin, 1 S.Enteritidis and 1 S.Panama).

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 - 2007 altogether 4 (0,2 %) of 1755 pig meat samples taken at cutting plants and 2 (0,06 %) of 3573 swab samples taken from carcasses at slaughter were positive for Salmonella.
In comparison with the previous year the number of positive pig meat samples was the same in the year 2007:
2004 - 1
2005 - 7
2006 - 4
2007 - 4 positive samples.

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

In the year 2007 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 analyzes 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 cattle slaughtered under special conditions should be sampled.
Sampling in the frame of official food control is performed randomly. Targeted sampling is preformed in cases of suspicion, consumer complains etc.

At meat processing plant

In the frame of official food control 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 in accordance with the Veterinary and Food Board and 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 hydrasponges pre-hydrated in 10 ml of buffered pepton water 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 10 or 25 g according to the Commission Regulation 2073/ 2005.

At meat processing plant

According to the official food control 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 (sample consists of 5 subsamples, which are examined individually; sample weight - 10 g),
at meat products establishments - meat products are sampled regularly. Weight of the sample analyzed is 25 g.

At retail

Sample analyzed - 10 or 25 g. Number of subsamples is 5. Samples are stored at +2+4C and analyzed 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 was isolated or if Salmonella spp was isolated in any of subsamples (minced meat, meat preparations).

At retail

A sample where Salmonella spp. has been isolated. Sample is considered to be positive, if Salmonella spp was isolated in any of subsamples.

Diagnostic/ analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2003 Cor.1 2004

At meat processing plant

Bacteriological method: ISO 6579:2003 Cor.1 2004

At retail

Bacteriological method: ISO 6579:2003

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 46 from 29.03.2007 "Regulation on prevention against salmonellosis". SMPF started in 2002 and is approved annually by the Director General of the Veterinary and Food Board.
Prevention of salmonellosis is based on analyzes made in the frames of salmonella monitoring programme, official control plans 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 effectiveness 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 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

649 samples were analyzed in the year 2007.
6 carcass swab samples taken in the frames of the monitoring programme were positive for Salmonella: 1 S.Lexington, 3 S.enterica and 2 S.spp were detected.
Altogether 8 samples (1,2 %) of the samples analyzed were considered to be positive for Salmonella.

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

In the year 2007 Salmonella has been isolated in 1,2 % of the samples analyzed, in comparison with the previous years when 0,38 % in 2006 and 0,2 % in 2005 of the bovine meat has been contaminated with salmonella (mostly fresh and minced meat).
The Salmonella Monitoring Programme for Food of Animal Origin 2002-2006 data document that Salmonella has not been isolated from the samples of fresh bovine meat taken at cutting plants. Salmonella was detected in 1 swab sample taken from carcasses at slaughter in 2002, in 2 samples in 2003, in 1 swab sample in 2006 and in 6 samples in 2007.

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

In the year 2007 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 spp.	S. Koenigstuhl	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from broilers (Gallus gallus)									
fresh									
- at slaughterhouse	VFB	single	25 g	8	0				
- at processing plant	VFB	single	25 g	11	0				
- at retail	VFB	single	25 g	9	0				
- at cutting plant - domestic production - Monitoring - official sampling	VFB	batch	25 g	94	1		1		
- at retail (official sampling)	HPI	single	10 g	21	1		1		
meat preparation									
intended to be eaten cooked									
- at processing plant	VFB	single	10 g	15	1	1			
- at retail	VFB, HPI	single	10 g	14	1		1		
meat products									
cooked, ready-to-eat									
- at retail	HPI	single	10 g	31	0				
- at processing plant	VFB	single	10 g	28	0				
- at retail	VFB	single	10 g	8	0				
mechanically separated meat (MSM)	VFB	single	25 g	2	0				
- at slaughterhouse - animal sample - neck skin - Monitoring - official sampling	VFB	batch	25 g	49	0				
offal									
- at slaughterhouse	VFB	single	25 g	4	0				
- at processing plant	VFB	single	25 g	1	0				
Meat from turkey									
fresh									
- at processing plant	VFB	single	25 g	1	0				
meat products									
- at processing plant	VFB	single	10 g	3	0				

- at retail	VFB	single	10 g	2	0				
Meat from other poultry species									
fresh									
- at slaughterhouse (1)	VFB	single	25 g	1	0				
Meat from poultry, unspecified									
meat products									
cooked, ready-to-eat									
- at retail	HPI	single	10 g	2	0				

(1) : Ostrich meat

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Stanleyville	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Milk, cows'									
raw									
intended for direct human consumption									
- at retail	HPI	single	25 g	11	0				
raw milk for manufacture									
intended for manufacture of pasteurised/ UHT products									
- at processing plant - domestic production - Monitoring - official sampling	VFB	single	25 g	3	0				
pasteurised milk									
- at processing plant	VFB	single	25 g	4	0				
- at processing plant - domestic production - Monitoring - official sampling	VFB	single	25 g	5	0				
Cheeses made from cows' milk									
soft and semi-soft									
made from pasteurised milk									
- at processing plant	VFB	single	25 g	6	0				
- at processing plant - domestic production - Monitoring - official sampling	VFB	single	25 g	14	0				
hard									
made from pasteurised milk									
- at processing plant - domestic production - Monitoring - official sampling (1)	VFB	single	25 g	16	0				
- at processing plant	VFB	single	25 g	12	0				
Dairy products (excluding cheeses)									
butter									

made from pasteurised milk									
- at processing plant	VFB	single	25 g	8	0				
cream									
made from pasteurised milk									
- at processing plant	VFB	single	25 g	8	0				
milk powder and whey powder									
- at processing plant	VFB	single	25 g	15	1	1			
- at processing plant - domestic production - Monitoring - official sampling	VFB	single	25 g	5	0				
ice-cream									
- at processing plant	VFB	single	25 g	2	0				
- at retail	VFB, HPI	single	25 g	11	0				
made from pasteurised milk									
- at processing plant - domestic production - Monitoring - official sampling	VFB	single	25 g	5	0				
dairy desserts									
- at processing plant	VFB	single	25 g	6	0				
dairy products, not specified									
ready-to-eat									
made from pasteurised milk									
- at retail	VFB, HPI	single	25 g	28	0				
- at processing plant	VFB	single	25 g	24	0				
- at processing plant - domestic production - Monitoring - official sampling	VFB	single	25 g	50	0				
Infant formula									
dried									
- at processing plant	VFB	batch	25 g	2	0				
- at processing plant - domestic production - Monitoring - official sampling	VFB	batch	25 g	2	0				

(1) : Hard and semi-hard cheeses

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Stanleyville	S. Derby	S. London	S. Choleraesuis	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. group B	S. enterica subsp. enterica	S. Lexington
Meat from pig															
fresh															
- at processing plant	VFB	single	25 g	198	1						1				
- at retail	VFB, HPI	single	25 g	11	0										
- at cutting plant - domestic production - Monitoring - official sampling	VFB	single	25 g	322	1				1						
- at slaughterhouse - Surveillance - official controls - official sampling - suspect sampling (1)	VFB	single	25 g	2	0										
minced meat															
intended to be eaten cooked															
- at processing plant	VFB	single	10 g	17	1			1							
- at retail	VFB, HPI	single	10 g	18	0										
meat preparation															

intended to be eaten cooked															
- at processing plant	VFB	single	10 g	102	1						1				
- at retail	VFB, HPI	single	10 g	15	0										
meat products															
raw but intended to be eaten cooked															
- at retail	HPI	single	25 g	10	0										
- at processing plant	VFB	single	25 g	90	0										
- at retail	VFB	single	25 g	11	0										
carcass															
- at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling	VFB	animal	swab	636	0										
offal															
- at retail	VFB	single	25 g	2	0										
Meat from bovine animals															
fresh															
- at processing plant	VFB	single	25 g	100	1	1									
- at retail	VFB, HPI	single	25 g	6	0										
- at cutting plant - domestic production - Monitoring - official sampling	VFB	single	25 g	77	0										
- at slaughterhouse - Surveillance - official controls - official sampling - suspect sampling	VFB	single	25 g	91	0										
minced meat															
intended to be eaten cooked															
- at processing plant	VFB	single	10 g	13	1		1								

- at retail	VFB, HPI	single	10 g	5	0										
meat preparation															
intended to be eaten cooked															
- at processing plant	VFB	single	10 g	1	0										
meat products															
cooked, ready-to-eat															
- at retail	HPI	single	25 g	4	0										
- at processing plant	VFB	single	25 g	17	0										
- at retail	VFB	single	25 g	1	0										
carcass															
- at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling	VFB	animal	swab	334	6							2		3	1
Meat from sheep															
fresh															
- at slaughterhouse	VFB	single	25 g	23	0										
- at processing plant	VFB	single	25 g	13	0										
meat preparation															
intended to be eaten cooked															
- at processing plant	VFB	single	10 g	4	0										
- at retail	VFB	single	10 g	1	0										
meat products															
- at processing plant	VFB	single	10 g	1	0										
Meat from rabbit															
fresh															
- at slaughterhouse	VFB	single	25 g	1	0										
Meat from wild boar															
fresh															

- at slaughterhouse	VFB	single	25 g	2	0										
Meat from wild game - land mammals															
fresh															
- at slaughterhouse	VFB	single	25 g	6	0										
- at processing plant	VFB	single	25 g	12	0										
meat products															
- at processing plant	VFB	single	10 g	1	0										
Meat from farmed game- land mammals															
fresh															
- at processing plant	VFB	single	25 g	1	0										
meat preparation															
- at processing plant	VFB	single	10 g	1	0										
Meat, mixed meat															
minced meat															
intended to be eaten cooked															
- at processing plant	VFB	single	10 g	56	2	1				1					
- at retail	VFB, HPI	single	10 g	31	1								1		
meat preparation															
intended to be eaten cooked															
- at processing plant	VFB	single	10 g	29	0										
- at retail	VFB	single	10 g	3	0										
meat products															
- at processing plant	VFB	single	25 g	64	0										
- at retail	VFB	single	25 g	16	0										

(1) : Post mortem inspection

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Eggs								
table eggs								
- at packing centre	VFB	single	25 g	18	0			
- at retail	VFB, HPI	single	25 g	4	0			
- at packing centre - Monitoring - official sampling	VFB	single	25 g	68	0			
- at packing centre - Monitoring - official sampling (2)	VFB	single	25 g	6	0			
Egg products								
- at processing plant	VFB	single	25 g	4	0			
liquid								
- at processing plant - domestic production - Monitoring - official sampling	VFB	single	25 g	16	0			
- at processing plant - domestic production - Monitoring - official sampling	VFB	single	25 g	1	0			
Fishery products, unspecified								
non-ready-to-eat								
- at processing plant	VFB	single	25 g	32	0			
- at retail (3)	VFB	single	25 g	25	0			
ready-to-eat								
- at processing plant	VFB	single	25 g	7	0			
- at retail (4)	VFB, HPI	single	25 g	13	0			
Crustaceans								
- at retail	HPI	single	25 g	4	0			
shrimps								
- at processing plant	VFB	single	25 g	2	0			
Seeds, sprouted								
ready-to-eat (1)	VFB	single	25 g	2	0			

Juice								
- at processing plant	VFB	single	25 g	1	0			
Infant formula								
- at retail	HPI	single	25 g	10	0			
Foodstuffs intended for special nutritional uses								
- at processing plant	VFB	single	25 g	2	0			
Fish								
raw								
chilled								
- at processing plant	VFB	single	25 g	6	0			
marinated								
- at retail	HPI	single	25 g	4	0			
Nuts and nut products								
- at retail	VFB	single	25 g	3	0			
Vegetables								
non-precut								
- at processing plant	VFB	single	25 g	16	0			
- at retail	VFB	single	25 g	3	0			
pre-cut								
- at processing plant	VFB	single	25 g	5	0			
products								
- at processing plant	VFB	single	25 g	10	0			
- at retail	VFB	single	25 g	7	0			
- at retail	HPI	single	25 g	9	0			
Ready-to-eat salads								
- at processing plant	VFB	single	25 g	54	0			
- at retail	VFB, HPI	single	25 g	145	0			
Bakery products								
- at processing plant	VFB	single	25 g	33	0			
- at retail	VFB, HPI	single	25 g	21	0			
cakes								
- at retail	HPI	single	25 g	58	0			
Confectionery products and pastes								
- at processing plant	VFB	single	25 g	28	0			
- at retail	VFB, HPI	single	25 g	12	0			
Other processed food products and prepared dishes								
- at processing plant	VFB	single	25 g	35	0			
- at retail	VFB, HPI	single	25 g	57	0			
Water								
bottled water								
- at processing plant	VFB	single	25 g	2	0			
- at retail	HPI	single	25 g	30	0			

Other food								
- at processing plant	VFB	single	25 g	15	0			
- at retail	VFB	single	25 g	7	0			
Fruits								
- at processing plant	VFB	single	25 g	4	0			
Cereals and meals								
- at retail	HPI	single	25 g	9	0			
Chocolate								
- at retail	HPI	single	25 g	14	0			
Fats and oils (excluding butter)								
oils								
- at retail	HPI	single	25 g	1	0			
Sauce and dressings								
- at retail	HPI	single	25 g	2	0			

(1) : at retail
(2) : Quail egg
(3) : Including import control
(4) : Including import control

2.1.4. Salmonella in animals

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

Monitoring system

Sampling strategy

Laying hens flocks

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 authorized veterinarians of the Veterinary and Food Board. Samples are taken at the farm and at hatchery. Sampling is a part of a permanent monitoring scheme.

Frequency of the sampling

Laying hens: Day-old chicks

Other: every flock/ batch is sampled

Laying hens: Rearing period

Other: every 16 weeks at the hatchery, at the age of 4 weeks old and 2 weeks before moving to laying unit

Laying hens: Production period

At the age of 22-26 weeks

Laying hens: Before slaughter at farm

8 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

Day-old chicks that are weak or dead, internal linings of chick boxes and dust shall be sampled - 10 samples per flock/ lot.

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
50-59 35
60-89 40
90-199 50
200-499 55
250-349 200
350-449 220
450-799 250
800-999 260
1000 and more 300
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 has reached 50 %.

Laying hens: Production period

See "Laying hens: Rearing period".

Laying hens: Before slaughter at farm

See "Laying hens: Rearing period".

Case definition

Laying hens: Day-old chicks

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

Laying hens: Rearing period

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

Laying hens: Production period

A flock is considered to be positive if the presence of Salmonella spp. is detected at least in 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 6579:2003 Cor.1 2004

Laying hens: Rearing period

Bacteriological method: ISO 6579:2003 Cor.1 2004

Laying hens: Production period

Bacteriological method: ISO 6579:2003 Cor.1 2004

Laying hens: Before slaughter at farm

Bacteriological method: ISO 6579:2003 Cor.1 2004

Vaccination policy

Laying hens flocks

According to the Commission Regulation No 1177/ 2006 of 1 August 2006 implementing Regulation No 2160/ 2003 of the European Parliament and of the Council as regards requirements for the use of specific control methods in the framework of the national programmes for the control of salmonella in poultry.

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.

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 46 from 29.03.2007 "Prevention against Salmonellosis"; Commission Regulation No 1003/ 2005 of 30 June 2005 implementing Regulation No 2160/ 2003 as regards Community target for the reduction of the prevalence of certain salmonella serotypes in breeding flocks of Gallus gallus and amending Regulation No 2160/ 2003 and Commission Regulation No 1168/ 2006 of 31 July 2006 implementing Regulation (EC) No 2160/ 2003 as regards a Community target for the reduction of the prevalence of certain salmonella serotypes in laying hens of Gallus gallus and amending Regulation (EC) No 1003/ 2005.

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 to take them out, except for slaughter. All poultry flocks (young birds, breeding flock, productive flock), where Salmonella spp. has been diagnosed should be sent immediately for slaughter or destroyed in accordance with Regulation No 1774/ 2002. 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 bacteriologically 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.
Table eggs from flocks infected or suspected of being infected by salmonella are allowed to be used for preparation of pasteurized egg products or shall be destroyed. Hatching eggs should be destroyed.

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 the year 2007 61 flock of laying hens was analyzed. 1 flock was found to be positive for Salmonella enteritidis.

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

The overall prevalence of Salmonella in laying hens flocks was 1,6 % in 2007.

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 authorized veterinarians of the Veterinary and Food Board. Samples are taken at the farm and hatchery. 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

Other: every 16 weeks at hatchery, at the age 4 weeks old and 2 weeks before moving to laying unit

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

Other: 4 weeks after moving to laying unit and 2-3 weeks before slaughter

Broiler flocks: Day-old chicks

Every flock is sampled

Broiler flocks: Rearing period

Other: at the age 4 weeks old and 2 weeks before moving to the flock

Broiler flocks: Before slaughter at farm

2-3 weeks prior to slaughter

Type of specimen taken

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

Other: Dead chicks, faeces and dust

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

Other: Dead chicks, faeces and dust

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

Day-old dead chicks, internal linings of chick boxes (10 samples per flock/ lot).

Breeding flocks (separate elite, grand parent and parent flocks when necessary): 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
50-59 35
60-89 40
90-199 50
200-499 55
250-349 200
350-449 220
450-799 250
800-999 260
1000 and more 300.

Breeding flocks: Production 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
50-59 35
60-89 40
90-199 50
200-499 55
250-349 200
350-449 220
450-799 250
800-999 260
1000 and more 300.
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 meat breeds has reached 30 %.

Broiler flocks: Day-old chicks

Day-old dead chicks, internal linings of chick boxes (10 samples per flock/ lot).

Broiler flocks: Rearing period

Samples are taken from each flock in the number prescribed below:
number of birds in the flock / number of samples
50-59 35
60-89 40
90-199 50
200-499 55
250-349 200
350-449 220
450-799 250
800-999 260
1000 and more 300.

Broiler flocks: Before slaughter at farm

Samples are taken from each flock in the number prescribed below:
number of birds in the flock / number of samples
50-59 35
60-89 40
90-199 50
200-499 55
250-349 200
350-449 220
450-799 250
800-999 260
1000 and more 300.

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 6579:2003 Cor.1 2004

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

Bacteriological method: ISO 6579:2003 Cor.1 2004

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

Bacteriological method: ISO 6579:2003 Cor.1 2004

Broiler flocks: Day-old chicks

Bacteriological method: ISO 6579:2003 Cor.1 2004

Broiler flocks: Rearing period

Bacteriological method: ISO 6579:2003 Cor.1 2004

Broiler flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2003 Cor.1 2004

Vaccination policy

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

According to the Commission Regulation (EC) No 1177/ 2006 of 1 August 2006 implementing Regulation (EC) No 2160/ 2003 of the European Parliament and of the Council as regards requirements for the use of specific control methods in the framework of the national programmes for the control of salmonella in poultry.

Broiler flocks

According to the Commission Regulation (EC) No 1177/ 2006 of 1 August 2006 implementing Regulation (EC) No 2160/ 2003 of the European Parliament and of the Council as regards requirements for the use of specific control methods in the framework of the national programmes for the control of salmonella in poultry.

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.

Control program/ mechanisms

The control program/ strategies in place

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

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 46 from 29.03.2007 "Prevention against Salmonellosis" and Commission Regulation No 1003/ 2005 of 30 June 2005 implementing Regulation No 2160/ 2003 as regards Community target for the reduction of the prevalence of certain salmonella serotypes in breeding flocks of Gallus gallus and amending Regulation No 2160/ 2003.

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 46 from 29.03.2007 "Prevention against Salmonellosis".

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 bacteriologically for salmonella.
The dead and slaughtered birds shall be made harmless or utilized. Poultry buildings should be checked on the efficiency of deratization, 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

In the year 2007 3 breeding flocks and 62 broiler flocks were tested. 9,6 % of broiler flocks were positive for Salmonella enteritidis.

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

The occurence of salmonella in breeding flocks for meat production is
low.
The predominant Salmonella serovar in broiler flocks is Salmonella enteritidis.

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 fertilization 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.
Faeces samples should be taken by age groups or keeping groups from fattening pigs less than one year old. Faeces samples are taken from 5-10 animals should be united into one pooled sample at the laboratory.
When transferring pigs to artificial fertilization station or to the breeding herd kept for

the purposes of artificial fertilization, animals should be examined bacteriologically within 30 days before the transfer on the basis of individual faeces samples or at the fertilization station during the quarantine on the basis of individual faeces 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 faeces 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 faeces samples should be halved in the laboratory. At least 5 grams is 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 6579:2003 Cor.1 2004

Multiplying herds

Bacteriological method: ISO 6579:2003 Cor.1 2004

Fattening herds at farm

Bacteriological method: ISO 6579:2003 Cor.1 2004

Fattening herds at slaughterhouse (herd based approach)

Bacteriological method: ISO 6579:2003 Cor.1 2004

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.
To monitor salmonellosis among pigs, the herds as well as animals sent to artificial fertilization stations shall be examined. The herds shall be examined bacteriologically on the basis of faeces 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
The faeces samples taken from animals under examination shall be united into a pooled sample.
When transferring the pigs to artificial fertilization station or to the breeding herd kept for the purposes of artificial fertilization, they shall be examined bacteriologically within 30 days before the transfer on the basis of individual faeces samples or in the fertilization station during the quarantine on the basis of individual faeces samples.

Fattening 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.
Faeces samples shall be taken from fattening pigs less than one year old by age groups or keeping groups. Faeces samples are taken from 5-10 animals and are pooled at the laboratory, 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.

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 pooled sample taken from 5-10 animals should be examined, and from feeding stuffs. 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 faeces samples 2 times with a one month interval until receiving two consecutive negative results, or animals should be sent for slaughter.
Slaughter of clinically healthy, but salmonella positive pigs shall be performed at the end of the day or the other day in order to separate the positive and negative animals. The slaughter rooms should be cleaned and disinfected after slaughter of that animals.
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 authorized veterinarian so that the spread of salmonella should be prevented.
Deratization, disinfection and protection against wild birds should be organized.
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

In the year 2007 there were no positive samples tested in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases.
There were 27 positive lymh nodes (6,4 %) samples taken in the frames of the baseline survey

according to the Commission Decision of 29 September 2006 concerning a financial contribution from the Community towards baseline survey on the prevalence of Salmonella in slaughter pigs to be carried out in the Member States (2006/ 668/ EC). S.enteritidis was isolated from lymh nodes in 9 samples, S.typhimurium - in 7 samples, S.Lexington in 5 samples, S.enterica sbsp. enterica in 4 samples and S.Senftenberg in 2 samples taken in the frames of baseline survey in lsaughter pig in 2006-2007.
13 samples analyzed on the basis of clinical investigations were positive in 2007. Salmonella enteritidis was detected in 3 samples, S.typhimurium in 1 sample, S.Infantis in 3 samples, S.Inganda in 5 and S. group C in 1 sample.

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

No positive samples taken in the frames of of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases were detected.
Altogether 40 samples were positive for Salmonella in 2007. S.enteritidis was isolated in 12 samples, S.typhimurium - in 8 samples, S.Lexington in 5 samples, S.Inganda in 5, S.enterica sbsp. enterica in 4 samples, S.Infantis in 3 samples, S.Senftenberg in 2 samples, S. group C in 1 sample.
2006 Salmonela enteritidis was isolated in the Veterinary and Food Laboratory in 5 samples, Salmonella typhimurium in 2, Salmonella Agona - in 4, Salmonella Bareily in 1 and Salmonella Infantis in 1 sample.
In 2005 Salmonella Stanleyville was isolated in 3 and Salmonella Typhimurium in 8 samples taken from pigs.
In the 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 link found between human cases of salmonellosis and salmonellosis in pigs in the year 2007.

D. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

To monitor salmonellosis in cattle, the herds as well as animals sent to artificial fertilization 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 faeces 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 faeces samples should be taken by age groups or keeping groups. Faeces samples taken from 5-10 animals should be united into a pooled sample.
In transferring the cattle to artificial fertilization station or to the breeding herd kept for the

purposes of artificial fertilization, animals should be examined bacteriologically within 30 days before the transfer on the basis of individual faeces samples or in the fertilization station during the quarantine on the basis of individual faeces 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 faeces samples should be taken from the rectum of animals with the doubt of salmonellosis.
Faeces sample weighting at least 10 grams should be taken from the rectum of animals under examination 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 faeces samples should be halved at the laboratory. At least 5 grams is 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, besides faeces 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 faeces samples from all cattle over one year old. The samples may be accumulated by five into an additional package;
- individual faeces samples from the cattle less than one year old, that have clinical characteristics referring to salmonellosis;
- faeces samples from the cattle without clinical characteristics, breakdown by age groups or keeping groups, samples taken from 5-10 animals are pooled at the laboratory;
- 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 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 faeces samples 2 times with 1 month interval until receiving two consecutive negative results, or animals should be sent for slaughter.
Animals 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 authorized veterinarian so that the spread of salmonella should be prevented.
Deratization, disinfection and protection against wild birds should be organized.
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

1302 samples were tested in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases. 0,8 % of samples tested were positive for Salmonella.
Salmonella enteritidis was isolated in 2 samples, S.typhimurium in 3, S.Lexington in 3, S.Stanleyville in 1 and S.Dublin in 1 sample.
247 samples were analyzed on the basis of clinical investigations. 1,6 % of samples were found to be positive. S.typhimurium was detected in 3 samples and S.Dublin in 1 sample.

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

The existing control programmes and investigations document that S.Typhimurium is the prevalent serovar 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 during years.

Table Salmonella in breeding flocks of Gallus gallus

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	S. Hadar	S. Infantis	S. Virchow	Salmonella spp., unspecified
Gallus gallus (fowl)										
parent breeding flocks for meat production line										
during rearing period	VFB	flock	3	0						
during production period	VFB	flock	3	0						

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Gallinarum
Gallus gallus (fowl)								
laying hens	VFB	flock	61	1	1			
broilers	VFB	flock	62	6	6			
unspecified (1)	VFL	animal	19	5				5

(1) : Birds organs were analyzed, clinical investigations

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Quails	VFL	animal	22	0			
Swans	VFL	animal	1	1			1
Birds (1)	VFB	animal	1	0			

(1) : White-tailed eagle

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. enterica subsp. enterica	S. Lexington	S. Senftenberg	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. enterica subsp. arizonae	S. Stanleyville	S. Infantis	S. group C	S. Inganda	S. Dublin
Cattle (bovine animals)	VFB	animal	1302	10		3		2	3			1				1
unspecified																
- Clinical investigations	VFL	animal	247	4					3							1
Sheep (1)	VFL	animal	27	2							2					
Pigs (2)	VFL	animal	54	13				3	1				3	1	5	
fattening pigs																
- at slaughterhouse - animal sample - lymph nodes - Survey (3)	VFB	animal	423	27	4	5	2	9	7							
- at farm	VFB	animal	2255	0												

(1) : Clinical investigations
(2) : Clinical investigations
(3) : Baseline survey 01.10.2006-30.09.2007 on the prevalence of Salmonella in slaughter pigs (Commission Decision 2006/ 668/ EC)

2.1.5. 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 spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of marine animal origin								
fish meal	VFB	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 spp.	S. Lexington	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of cereal grain origin									
maize derived	VFB	batch	25 g	2	0				
Feed material of oil seed or fruit origin									
rape seed derived	VFB	batch	25 g	6	3	3			
palm kernel derived	VFB	batch	25 g	1	0				
soya (bean) derived	VFB	batch	25 g	5	0				
sunflower seed derived	VFB	batch	25 g	2	0				

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Inganda	S. Lexington	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified
Compound feedingstuffs for cattle										
final product	VFB	batch	25 g	7	1					1
Compound feedingstuffs for pigs										
final product	VFB	batch	25 g	7	1					1
Compound feedingstuffs for poultry (non specified)										
final product	VFB	batch	25 g	1	0					
Pet food	VFB	batch	25 g	6	0					
Compound feedingstuffs, not specified	VFB	batch	25 g	35	3	2	1			

2.1.6. Salmonella serovars and phagetype distribution

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

Table Salmonella serovars in animals

Serovars		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Sheep	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	10	4	27	13	18	5				2
Number of isolates serotyped	N=	10	4	27	13	18	5	0	0	0	2
Number of isolates per type											
S. Dublin		1	1								
S. Enteritidis		2		9	3	18					
S. Infantis					3						
S. Inganda					5						
S. Lexington		3		5							
S. Senftenberg				2							
S. Stanleyville		1									
S. Typhimurium		3	3	7	1						
S. enterica subsp. arizonae				4							2
S. group C					1						
S. Gallinarum							5				
S. enterica subsp. enterica											

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella serovars in food

Serovars		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	8		4		4				3	
Number of isolates serotyped	N=	6	0	4	0	4	0	0	0	3	0
Number of isolates per type											
S. Choleraesuis				1							
S. Derby		1									
S. Enteritidis						3				1	
S. Koenigstuhl						1					
S. Lexington		1									
S. London				1							
S. Stanleyville		1								1	
S. Typhimurium				2							
S. group B										1	
S. enterica subsp. enterica		3									

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella serovars in feed

Serovars		Compound feedingstuffs for pigs		Feed material of oil seed or fruit origin - rape seed derived	
Sources of isolates (*)		M	C	M	C
Number of isolates in the laboratory	N=	5		3	
Number of isolates serotyped	N=	3	0	3	0
Number of isolates per type					
S. Inganda		2		0	
S. Lexington		1		3	

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Enteritidis phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=			4					
Number of isolates phagetyped	N=	0	0	4	0	0	0	0	0
Number of isolates per type									
PT 1				2					
PT 4				2					

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Enteritidis phagetypes in food

Phagetype		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=										
Number of isolates phagetyped	N=	0	0	0	0	0	0	0	0	0	0

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=			1					
Number of isolates phagetyped	N=	0	0	1	0	0	0	0	0
Number of isolates per type									
DT 104				1					

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium phagetypes in food

Phagetype		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=										
Number of isolates phagetyped	N=	0	0	0	0	0	0	0	0	0	0

Footnote

(*) M : Monitoring, C : Clinical

2.1.7. Antimicrobial resistance in Salmonella isolates

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

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Frequency of the sampling

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 or case 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 ISO 20776-1:2006 (using MIC) and CLSI M31-A2 (using disc diffusion method in Mueller-Hinton agar plates).
Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, florfenicol (MIC), cefotaxim, sulfamethoxazol, trimethoprim, nalidixic acid, streptomycin, kanamycin (MIC), tetracyclin.

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 2007 12 Salmonella isolates from cattle were tested (2 S.enteritidis, 2 S.Typhimurium, 3 S.Lexington, 4 S.Dublin, 1 S.Stanleyville).
10 strains (83 %) were fully sensitive,
2 strains (16 %) were resistant to 1 antimicrobial,
Detailed information about the year 2007 can be found in the resistance tables.

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

The number of fully sensitive isolates increased in comparison with the previous years (2006 and 2005). The number of multiresistant isolates decreased.

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

In the year 2007 3,1 % of S.Enteritidis strains isolated from humans were resistant to sulfonamides (in 2006 - 7,7 %; in 2005 - 39 %), 6,2 % to tetracyclin, 4,1 % to ampicillin (in 2006 - 6,5 %; in 2005 - 13 %), 0,4 % to trimetoprim (in 2006 - 5 %; in 2005 - 9,9 %) and 5,4 % to nalidixic acid (in 2006 - 4,9 %; in 2005 - 35 %).
55 % of S.Typhimurium strains isolated from humans was resistant to ampicillin (in 2006 - 42 %; in 2005 - 53 %), 87,5 % to tetracycline (in 2006 - 33 %; in 2005 - 63 %), 87,5 % to streptomycin (in 2006 - 33 %; in 2005 - 40 %), 33 % to sulfonamide (in 2006 - 20 %; in 2005 - 28,6 %), 0 % to trimetoprim (in 2006 - 15 %; in 2005 - 25 %) and 25 % to chloramphenicol (in 2006 - 6,9 %; in 2005 - 18,8 %).

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 performed according to ISO 20776-1:2006 (using MIC) and CLSI M31-A2 (using disc diffusion method in Mueller-Hinton agar plates).
Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, florfenicol (MIC), cefotaxim, sulfamethoxazol, trimethoprim, nalidixic acid, streptomycin, kanamycin (MIC), tetracyclin.

Breakpoints used in testing

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

Results of the investigation

27 Salmonella strains originated from pigs were tested in VFL in 2007.
7 strains (28 %) were fully sensitive,
7 strains (28 %) were resistant to 1 antimicrobial,
4 strains (18 %) were resistant to 2 antimicrobials,
3 strains (11 %) were resistant to 3 antimicrobials,
1 strain (4 %) was resistant to 4 antimicrobials,
1 strain (4 %) was resistant to 5 antimicrobials.
11 % were resistant to ampicillin, 11 % to chloramphenicol, 15 % to ciprofloxacin, 15 % to nalidic acid, 19 % to sulfamethoxazol, 7 % to trimetoprim, 22 % to streptomycin, 15 % to tetracyclin.

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

The number of resistant isolates increased.

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 or batch 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 performed according to CLSI M31-A2 using disc diffusion method in Mueller-Hinton agar plates. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, cefotaxim, sulfamethoxazol, trimethoprim, nalidixic acid, streptomycin, tetracyclin.

Breakpoints used in testing

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

Results of the investigation

In 2007 6 S.Enteritidis isolates were tested.
2 strains were fully sensitive,
4 strains (66 %) were resistabnt to 6 antimicrobials.
Resistance was discovered to ampicillin (66 %), nalidixic acid (66 %), sulfamethoxazol (66 %), trimethoprim (66 %), tetracycline (66 %), streptomycin (66 %).
1 Salmonella gallinarum and 1 Salmonella pullorum were tested.
S.gallinarum and S.pullorum were resistant to 1 antimicrobial (nalidixic acid).

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

The prevalence of strains that are resistant to nalidixic acid is noted among isolates derived from poultry.

There is also an increase in cases of multiresistance detected among poultry.

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

In the year 2007 3,1 % of S.Enteritidis strains isolated from humans was resistant to sulfonamides (in 2006 - 7,7 %; in 2005 - 39 %), 6,2 % to tetracyclin, 4,1 % to ampicillin (in 2006 - 6,5 %; in 2005 - 13 %), 0,4 % to trimetoprim (in 2006 - 5 %; in 2005 - 9,9 %) and 5,4 % to nalidixic acid (in 2006 - 4,9 %; in 2005 - 35 %).

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/ sample 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 CLSI M31-A2 using disc diffusion method in Mueller-Hinton agar plates. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin,

chloramphenicol, cefotaxim, sulphamethoxazol, trimethoprim, nalidixic acid, streptomycin, tetracyclin.

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 were tested (S.Derby, S.Harrisonburg, S.Lexington, S.enterica sbsp.enterica, S.spp group E):
3 strains (60 %) were fully sensitive,
1 strain (20 %) was resistant to 2 antimicrobials,
1 starin (20 %) was resistant to 5 antimicroials.
Resistance was detected to ampicilin, chloramphenicol, sulfamethoxazol, streptomycin and tetracyclin.

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

The number of Salmonella isolates is very small, thus it is very hard to make any decision.

E. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

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 pig meat and products thereof

Methods of sampling (description of sampling techniques)

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

Procedures for the selection of isolates for antimicrobial testing

One isolate from each positive batch/ sample 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 pig 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 CLSI M31-A2 using disc diffusion method in Mueller-Hinton agar plates. Quality control according to the CLSI standards; Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, cefotaxim, trimethoprim, sulfamethoxazol, nalidixic acid, streptomycin, tetracyclin.

Breakpoints used in testing

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

Results of the investigation

3 strains isolated from pig meat were tested in VFL in 2007.
One isolate (S.Typhimurium) was resistant to 6 antimicrobials: ampicillin, chloramphenicol, nalidic acid, sulfamethoxazol, streptomycin, tetracyclin.
Salmonella London and Salmonella Cholerasius were fully sensitive.

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

S.Typhimurium isolated from humans was resistant to ampicillin, chloramphenicol, sulfonamide, tetracyclin, streptomycin and trimetoprim.

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 performed according to ISO 20776-1:2006.
Escherichia coli ATCC 25922 was used as Quality control strain.
Antimicrobials included in monitoring were ampicillin, gentamicin, ciprofloxacin, chloramphenicol, florfenicol, cefotaxim, sulphamethoxazol, trimethoprim, nalidixic acid, streptomycin, kanamycin, tetracyclin.

Breakpoints used in testing

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

Results of the investigation

In the year 2007 only 1 strain of Salmonella Enteritidis was tested. This strain was resistant to ciprofloxacin and fully sensitive to the other tested antimicrobials.

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

Previous year was noticed high resistance to nalidixic acid. 2007 isolated Salmonella was resistant to ciprofloxacin.
Due to small amount isolates (1) it is difficult to make any decision.

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

In the year 2007 3,1 % of S.Enteritidis strains isolated from humans was resistant to sulfonamides (in 2006 - 7,7 %; in 2005 - 39 %), 6,2 % to tetracyclin, 4,1 % to ampicillin (in 2006 - 6,5 %; in 2005 - 13 %), 0,4 % to trimetoprim (in 2006 - 5 %; in 2005 - 9,9 %) and 5,4 % to nalidixic acid (in 2006 - 4,9 %; in 2005 - 35 %).

Table Antimicrobial susceptibility testing in S. Choleraesuis

n = Number of resistant isolates	S. Choleraesuis	
	Meat from pig	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	1
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfamethoxazol	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

Table Antimicrobial susceptibility testing in S. Derby

n = Number of resistant isolates		
	S. Derby	
	Meat from bovine animals	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	0
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	1
Resistant to 2 antimicrobials	1	1
Sulfonamides		
Sulfamethoxazol	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	1

Table Antimicrobial susceptibility testing in S. Dublin

n = Number of resistant isolates		
	S. Dublin	
	Cattle (bovine animals)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		4
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	4	0
Streptomycin	4	0
Amphenicols		
Chloramphenicol	4	0
Cephalosporins		
Cefotaxim	4	0
Fluoroquinolones		
Ciprofloxacin	4	0
Fully sensitive	4	4
Penicillins		
Ampicillin	4	0
Quinolones		
Nalidixic acid	4	0
Sulfonamides		
Sulfonamide	4	0
Tetracyclines		
Tetracyclin	4	0
Trimethoprim	4	0

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

	S. Dublin
	Cattle (bovine animals)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	4

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																																
	Break point	**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**
Aminoglycosides																																	
Gentamicin	12	4	0																			1	1	1	1								
Streptomycin	11	4	0															2	2														
Amphenicols																																	
Chloramphenicol	12	4	0																							1		3					
Cephalosporins																																	
Cefotaxim	14	4	0																														4
Fluoroquinolones																																	
Ciprofloxacin	15	4	0																												1	1	2
Penicillins																																	
Ampicillin	13	4	0																							3		1					
Quinolones																																	
Nalidixic acid	13	4	0																					2	1	1							
Sulfonamides																																	
Sulfamethoxazol	10	4	0																						2	2							
Tetracyclines																																	
Tetracyclin	14	4	0																	1	3												
Trimethoprim	10	4	0																									2	1	1			

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

	S. Enteritidis
	Pigs
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	3

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																														
				<=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**
Aminoglycosides																																		
Gentamicin	12	3	0															1	1	1														
Streptomycin	11	3	0											1	1	1																		
Amphenicols																																		
Chloramphenicol	12	3	0																				1	2										
Cephalosporins																																		
Cefotaxim	14	3	0																								1	1	1					
Fluoroquinolones																																		
Ciprofloxacin	15	3	0																									1	1				1	
Penicillins																																		
Ampicillin	13	3	2	2																			1											
Quinolones																																		
Nalidixic acid	13	3	0																		1	2												
Sulfonamides																																		
Sulfamethoxazol	10	3	0																				1	1	1									
Tetracyclines																																		
Tetracyclin	14	3	0																1		1					1								
Trimethoprim	10	3	0																								1	1		1				

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

	S. Enteritidis
	Gallus gallus (fowl)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	6

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																																
	Break point	**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**
Aminoglycosides																																	
Gentamicin	12	6	0															1	2	3													
Streptomycin	11	6	4	4													1	1															
Amphenicols																																	
Chloramphenicol	12	6	0																				1		2	3							
Cephalosporins																																	
Cefotaxim	14	6	0																								1	1	1	2		1	
Fluoroquinolones																																	
Ciprofloxacin	15	6	0																					1	2	1					1	1	
Penicillins																																	
Ampicillin	13	6	4	4																			1		1								
Quinolones																																	
Nalidixic acid	13	6	4	4																		2											
Sulfonamides																																	
Sulfamethoxazol	10	6	4	4																1		1											
Tetracyclines																																	
Tetracyclin	14	6	4	4														2															
Trimethoprim	10	6	4	4																							1		1				

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

	S. Enteritidis
	Other poultry
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	2

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																														
				<=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**
Aminoglycosides																																		
Gentamicin	12	2	0																1	1														
Streptomycin	11	2	0												1		1																	
Amphenicols																																		
Chloramphenicol	12	2	0																					1	1									
Cephalosporins																																		
Cefotaxim	14	2	0																										2					
Fluoroquinolones																																		
Ciprofloxacin	15	2	0																					2										
Penicillins																																		
Ampicillin	13	2	0																				1	1										
Quinolones																																		
Nalidixic acid	13	2	2	2																														
Sulfonamides																																		
Sulfamethoxazol	10	2	0																		1			1										
Tetracyclines																																		
Tetracyclin	14	2	0																	2														
Trimethoprim	10	2	0																							1				1				

Table Antimicrobial susceptibility testing of S. Enteritidis in Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - quantitative data [Dilution method]

	S. Enteritidis
	Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	7

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Kanamycin	16	7	0							6	1												
Streptomycin	32	7	0								5	2											
Amphenicols																							
Chloramphenicol	16	7	0								5	2											
Florfenicol	16	7	0		6							1											
Cephalosporins																							
Cefotaxim	0.5	7	1		1	3	1	1		1													
Fluoroquinolones																							
Ciprofloxacin	0.06	7	4		3		4																
Penicillins																							
Ampicillin	4	7	0					2	2	3													
Quinolones																							
Nalidixic acid	16	7	4								3					4							
Sulfonamides																							
Sulfamethoxazol	256	7	2												2	3		1		1			
Tetracyclines																							
Tetracyclin	8	7	0						3	4													
Trimethoprim	2	7	1				1	5			1												

Table Antimicrobial susceptibility testing of S.Enteritidis in animals

n = Number of resistant isolates

S. Enteritidis

	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys		Gallus gallus (fowl) - laying hens		Gallus gallus (fowl) - broilers		Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - Survey		Poultry, unspecified	
Isolates out of a monitoring programme		no		no		no								no		no
Number of isolates available in the laboratory		2		3		6								7		2
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides																
Gentamicin	2	0	3	0	6	0							7	0	2	0
Kanamycin													7	0		
Streptomycin	2	0	3	0	6	4							7	0	2	0
Amphenicols																
Chloramphenicol	2	0	3	0	6	0							7	0	2	0
Florfenicol													7	0		
Cephalosporins																
Cefotaxim	2	0	3	0	6	0							7	1	2	0
Fluoroquinolones																
Ciprofloxacin	2	0	3	0	6	0							7	4	2	0
Fully sensitive	2	0	3	1	6	2							7	1	2	0
Penicillins																
Ampicillin	2	0	3	2	6	4							7	0	2	0
Quinolones																
Nalidixic acid	2	2	3	0	6	4							7	4	2	2
Resistant to 1 antimicrobial	2	2	3	2	6	2							7	1	2	2
Resistant to 2 antimicrobials													7	4		

Resistant to 3 antimicrobials													7	1		
Resistant to >4 antimicrobials					6	4										
Sulfonamides																
Sulfamethoxazol															2	0
Sulfonamide	2	0	3	0	6	4							7	2		
Tetracyclines																
Tetracyclin	2	0	3	0	6	4							7	0	2	0
Trimethoprim	2	0	3	0	6	4							7	1	2	0

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

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

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																														
				<=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**
Aminoglycosides																																		
Gentamicin	12	2	0																	1	1													
Streptomycin	11	2	0															2																
Amphenicols																																		
Chloramphenicol	12	2	0																						1	1								
Cephalosporins																																		
Cefotaxim	14	2	0																												2			
Fluoroquinolones																																		
Ciprofloxacin	15	2	0																									1		1				
Penicillins																																		
Ampicillin	13	2	0																					2										
Quinolones																																		
Nalidixic acid	13	2	2	2																														
Sulfonamides																																		
Sulfamethoxazol	10	2	0																		1	1												
Tetracyclines																																		
Tetracyclin	14	2	0															1		1														
Trimethoprim	10	2	0																									2						

Table Antimicrobial susceptibility testing in S. Enteritidis

n = Number of resistant isolates	S. Enteritidis	
	Meat from broilers (Gallus gallus)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Florfenicol	1	0
Fluoroquinolones		
Ciprofloxacin	1	1
Fully sensitive	1	0
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Resistant to 1 antimicrobial	1	1
Sulfonamides		
Sulfamethoxazol	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

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

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

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	2	1	0					1															
Kanamycin	16	1	0							1													
Streptomycin	32	1	0								1												
Amphenicols																							
Chloramphenicol	16	1	0									1											
Cephalosporins																							
Cefotaxim	0.5	1	0			1																	
Fluoroquinolones																							
Ciprofloxacin	0.06	1	1				1																
Penicillins																							
Ampicillin	4	1	0						1														
Quinolones																							
Nalidixic acid	16	1	1													1							
Sulfonamides																							
Sulfamethoxazol	256	1	0												1								
Tetracyclines																							
Tetracyclin	8	1	0							1													
Trimethoprim	2	1	0				1																

Table Antimicrobial susceptibility testing in S. Harrisonburg

n = Number of resistant isolates	S. Harrisonburg	
	Meat from bovine animals	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	1
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfamethoxazol	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

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

	S. Infantis
	Pigs
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	3

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																													
				<=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**
Aminoglycosides																																	
Gentamicin	12	3	0																	2		1											
Streptomycin	11	3	0								1		2																				
Amphenicols																																	
Chloramphenicol	12	3	0																											1	1	1	
Cephalosporins																																	
Cefotaxim	14	3	0																											3			
Fluoroquinolones																																	
Ciprofloxacin	15	3	0																											1	1	1	
Penicillins																																	
Ampicillin	13	3	0																				1	1		1							
Quinolones																																	
Nalidixic acid	13	3	0																		1					2							
Sulfonamides																																	
Sulfamethoxazol	10	3	0																								1	1		1			
Tetracyclines																																	
Tetracyclin	14	3	0																		1	2											
Trimethoprim	10	3	0																											1		2	

Table Antimicrobial susceptibility testing in S. Infantis

n = Number of resistant isolates	S. Infantis	
	Pigs	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		3
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	3	0
Streptomycin	3	0
Amphenicols		
Chloramphenicol	3	0
Cephalosporins		
Cefotaxim	3	0
Fluoroquinolones		
Ciprofloxacin	3	0
Fully sensitive	3	3
Penicillins		
Ampicillin	3	0
Quinolones		
Nalidixic acid	3	0
Sulfonamides		
Sulfonamide	3	0
Tetracyclines		
Tetracyclin	3	0
Trimethoprim	3	0

Table Antimicrobial susceptibility testing in S. Inganda

n = Number of resistant isolates	S. Inganda	
	Pigs	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	1
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfonamide	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

Table Antimicrobial susceptibility testing in S. Lexington

n = Number of resistant isolates				
	S. Lexington			
	Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - Survey		**Cattle (bovine animals)**	
Isolates out of a monitoring programme	no		no	
Number of isolates available in the laboratory	2		3	
Antimicrobials:	**N**	**n**	**N**	**n**
Aminoglycosides				
Gentamicin	2	0	3	0
Kanamycin	2	0		
Streptomycin	2	0	3	0
Amphenicols				
Chloramphenicol	2	0	3	0
Florfenicol	2	0		
Cephalosporins				
Cefotaxim	2	0	3	0
Fluoroquinolones				
Ciprofloxacin	2	0	3	0
Fully sensitive	2	2	3	3
Penicillins				
Ampicillin	2	0	3	0
Quinolones				
Nalidixic acid	2	0	3	0
Sulfonamides				
Sulfonamide	2	0	3	0
Tetracyclines				
Tetracyclin	2	0	3	0
Trimethoprim	2	0	3	0

Table Antimicrobial susceptibility testing of S. Lexington in Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - quantitative data [Dilution method]

	S. Lexington
	Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	2

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	2	2	0					1	1														
Kanamycin	16	2	0							1	1												
Streptomycin	32	2	0									2											
Amphenicols																							
Chloramphenicol	16	2	0									2											
Florfenicol	16	2	0								1	1											
Cephalosporins																							
Cefotaxim	0.5	2	0			2																	
Fluoroquinolones																							
Ciprofloxacin	0.06	2	0		2																		
Penicillins																							
Ampicillin	4	2	0						2														
Quinolones																							
Nalidixic acid	16	2	0								2												
Sulfonamides																							
Sulfamethoxazol	256	2	0													2							
Tetracyclines																							
Tetracyclin	8	2	0						1	1													
Trimethoprim	2	2	0				1	1															

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

	S. Lexington
	Cattle (bovine animals)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	3

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																																
	Break point	**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**
Aminoglycosides																																	
Gentamicin	12	3	0															2			1												
Streptomycin	11	3	0													1		2															
Amphenicols																																	
Chloramphenicol	12	3	0																			1	1	1									
Cephalosporins																																	
Cefotaxim	14	3	0																											2		1	
Fluoroquinolones																																	
Ciprofloxacin	15	3	0																							1							2
Penicillins																																	
Ampicillin	13	3	0																						2	1							
Quinolones																																	
Nalidixic acid	13	2	0																				2										
Sulfonamides																																	
Sulfamethoxazol	10	3	0																	1		2											
Tetracyclines																																	
Tetracyclin	14	3	0															2		1													
Trimethoprim	10	3	0																								2	1					

Table Antimicrobial susceptibility testing in S. Lexington

n = Number of resistant isolates	S. Lexington	
	Meat from bovine animals	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	1
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfamethoxazol	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

Table Antimicrobial susceptibility testing in S. London

n = Number of resistant isolates	S. London	
	Meat from pig	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	1
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfamethoxazol	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

Table Antimicrobial susceptibility testing in S. Senftenberg

n = Number of resistant isolates		
	S. Senftenberg	
	Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - Survey	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Kanamycin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Florfenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	0
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Resistant to 1 antimicrobial	1	1
Sulfonamides		
Sulfonamide	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	1

Table Antimicrobial susceptibility testing of S. Senftenberg in Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - quantitative data [Dilution method]

	S. Senftenberg
	Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	2	1	0						1														
Kanamycin	16	1	0							1													
Streptomycin	32	1	0										1										
Amphenicols																							
Chloramphenicol	16	1	0									1											
Florfenicol	16	1	0									1											
Cephalosporins																							
Cefotaxim	0.5	1	0			1																	
Fluoroquinolones																							
Ciprofloxacin	0.06	1	0		1																		
Penicillins																							
Ampicillin	4	1	0						1														
Quinolones																							
Nalidixic acid	16	1	0								1												
Sulfonamides																							
Sulfamethoxazol	256	1	0													1							
Tetracyclines																							
Tetracyclin	8	1	0						1														
Trimethoprim	2	1	1								1												

Table Antimicrobial susceptibility testing in S. Stanleyville

n = Number of resistant isolates	S. Stanleyville	
	Cattle (bovine animals)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	1
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfonamide	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

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

	S. Stanleyville
	Cattle (bovine animals)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																																
	Break point	**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**
Aminoglycosides																																	
Gentamicin	12	1	0															1															
Streptomycin	11	1	0												1																		
Amphenicols																																	
Chloramphenicol	12	1	0																		1												
Cephalosporins																																	
Cefotaxim	14	1	0																									1					
Fluoroquinolones																																	
Ciprofloxacin	15	1	0																											1			
Penicillins																																	
Ampicillin	13	1	0																			1											
Quinolones																																	
Nalidixic acid	13	1	0																				1										
Sulfonamides																																	
Sulfamethoxazol	10	1	0																	1													
Tetracyclines																																	
Tetracyclin	14	1	0																1														
Trimethoprim	10	1	0																							1							

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

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

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																			
				<=0.03	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	2	1	0						1														
Kanamycin	16	1	0							1													
Streptomycin	32	1	0									1											
Amphenicols																							
Chloramphenicol	16	1	0									1											
Florfenicol	16	1	0									1											
Cephalosporins																							
Cefotaxim	0.5	1	0			1																	
Fluoroquinolones																							
Ciprofloxacin	0.06	1	0		1																		
Penicillins																							
Ampicillin	4	1	0								1												
Quinolones																							
Nalidixic acid	16	1	0								1												
Sulfonamides																							
Sulfamethoxazol	256	1	0														1						
Tetracyclines																							
Tetracyclin	8	1	0							1													
Trimethoprim	2	1	0				1																

Table Antimicrobial susceptibility testing of S.Typhimurium in animals

n = Number of resistant isolates

S. Typhimurium

	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys		Gallus gallus (fowl) - laying hens		Gallus gallus (fowl) - broilers		Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - Survey	
Isolates out of a monitoring programme		no		no										no
Number of isolates available in the laboratory		2		1										4
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides														
Gentamicin	2	0	1	0									4	0
Kanamycin			1	0									4	0
Streptomycin	2	0	1	0									4	2
Amphenicols														
Chloramphenicol	2	0	1	0									4	1
Florfenicol	2	0	1	0									4	0
Cephalosporins														
Cefotaxim	2	0	1	0									4	0
Fluoroquinolones														
Ciprofloxacin	2	0	1	0									4	0
Fully sensitive	2	2	1	1									4	1
Penicillins														
Ampicillin	2	0	1	0									4	1
Quinolones														
Nalidixic acid	2	0	1	0									4	0
Resistant to 1 antimicrobial													4	1
Resistant to 3 antimicrobials													4	1
Resistant to >4 antimicrobials													4	1
Sulfonamides														
Sulfonamide	2	0	1	0									4	3
Tetracyclines														
Tetracyclin	2	0	1	0									4	2
Trimethoprim	2	0	1	0									4	0

Table Antimicrobial susceptibility testing of S. Typhimurium in Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - quantitative data [Dilution method]

	S. Typhimurium
	Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	4

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	2	4	0						3	1													
Kanamycin	16	4	0								4												
Streptomycin	32	4	2										2				2						
Amphenicols																							
Chloramphenicol	16	4	1									3				1							
Florfenicol	16	4	0								1	2	1										
Cephalosporins																							
Cefotaxim	0.5	4	0			4																	
Fluoroquinolones																							
Ciprofloxacin	0.06	4	0		4																		
Penicillins																							
Ampicillin	4	4	1						1	2				1									
Quinolones																							
Nalidixic acid	16	4	0								4												
Sulfonamides																							
Sulfamethoxazol	256	4	4																		4		
Tetracyclines																							
Tetracyclin	8	4	1							3					1								
Trimethoprim	2	4	0				3	1															

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

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

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	2	2	0						2														
Kanamycin	16	2	0								2												
Streptomycin	32	2	0										2										
Amphenicols																							
Chloramphenicol	16	2	0									2											
Florfenicol	16	2	0									2											
Cephalosporins																							
Cefotaxim	0.5	2	0			2																	
Fluoroquinolones																							
Ciprofloxacin	0.06	2	0		2																		
Penicillins																							
Ampicillin	4	2	0							2													
Quinolones																							
Nalidixic acid	16	2	0								2												
Sulfonamides																							
Sulfamethoxazol	256	2	0														2						
Tetracyclines																							
Tetracyclin	8	2	0							2													
Trimethoprim	2	2	0				2																

Table Antimicrobial susceptibility testing in S. Typhimurium

n = Number of resistant isolates	S. Typhimurium	
	Meat from pig	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	1
Amphenicols		
Chloramphenicol	1	1
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	0
Penicillins		
Ampicillin	1	1
Quinolones		
Nalidixic acid	1	1
Resistant to >4 antimicrobials	1	1
Sulfonamides		
Sulfamethoxazol	1	1
Tetracyclines		
Tetracyclin	1	1
Trimethoprim	1	0

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

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

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																																
	Break point	**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**
Aminoglycosides																																	
Gentamicin	12	1	0													1																	
Streptomycin	11	1	1		1																												
Amphenicols																																	
Chloramphenicol	12	1	1	1																													
Cephalosporins																																	
Cefotaxim	14	1	0																							1							
Fluoroquinolones																																	
Ciprofloxacin	15	1	0																								1						
Penicillins																																	
Ampicillin	13	1	1	1																													
Quinolones																																	
Nalidixic acid	13	1	1	1																													
Sulfonamides																																	
Sulfamethoxazol	10	1	1	1																													
Tetracyclines																																	
Tetracyclin	14	1	1					1																									
Trimethoprim	10	1	0																							1							

Table Antimicrobial susceptibility testing in S. enterica subsp. arizonae

n = Number of resistant isolates		
	S. enterica subsp. arizonae	
	Sheep	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		2
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	2	0
Streptomycin	2	0
Amphenicols		
Chloramphenicol	2	0
Cephalosporins		
Cefotaxim	2	0
Fluoroquinolones		
Ciprofloxacin	2	0
Fully sensitive	2	2
Penicillins		
Ampicillin	2	0
Quinolones		
Nalidixic acid	2	0
Sulfonamides		
Sulfonamide	2	0
Tetracyclines		
Tetracyclin	2	0
Trimethoprim	2	0

Table Antimicrobial susceptibility testing of S. enterica subsp. arizonae in Sheep - quantitative data [Diffusion method]

	S. enterica subsp. arizonae
	Sheep
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	2

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																																
	Break point	**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**
Aminoglycosides																																	
Gentamicin	12	2	0																1			1											
Streptomycin	11	2	0											1	1																		
Amphenicols																																	
Chloramphenicol	12	2	0																							1		1					
Cephalosporins																																	
Cefotaxim	14	2	0																											1			1
Fluoroquinolones																																	
Ciprofloxacin	15	2	0																													1	1
Penicillins																																	
Ampicillin	13	2	0																				1			1							
Quinolones																																	
Nalidixic acid	13	2	0																					1	1								
Sulfonamides																																	
Sulfamethoxazol	10	2	0																			1			1								
Tetracyclines																																	
Tetracyclin	14	2	0																			2											
Trimethoprim	10	1	0																											1			

Table Antimicrobial susceptibility testing in S. group C

n = Number of resistant isolates	S. group C	
	Pigs	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	1
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfonamide	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

Table Antimicrobial susceptibility testing in S. group E

n = Number of resistant isolates		
	S. group E	
	Meat from bovine animals	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	1
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	0
Sulfonamides		
Sulfamethoxazol	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

Table Antimicrobial susceptibility testing in S. Gallinarum

n = Number of resistant isolates		
	S. Gallinarum	
	Gallus gallus (fowl)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	0
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	1
Resistant to 1 antimicrobial	1	1
Sulfonamides		
Sulfonamide	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

Table Antimicrobial susceptibility testing in Other serotypes

n = Number of resistant isolates		
	Other serotypes	
	Gallus gallus (fowl)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Amphenicols		
Chloramphenicol	1	0
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	0
Penicillins		
Ampicillin	1	0
Quinolones		
Nalidixic acid	1	1
Resistant to 1 antimicrobial	1	1
Sulfonamides		
Sulfonamide	1	0
Tetracyclines		
Tetracyclin	1	0
Trimethoprim	1	0

Footnote

Salmonella Pullorum

Table Antimicrobial susceptibility testing of Other serotypes in Gallus gallus (fowl) - quantitative data [Diffusion method]

	Other serotypes
	Gallus gallus (fowl)
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	2

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																																
	Break point	**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**
Aminoglycosides																																	
Gentamicin	12	2	0																						1	1							
Streptomycin	11	2	0									1				1																	
Amphenicols																																	
Chloramphenicol	12	2	0																	1	1												
Cephalosporins																																	
Cefotaxim	14	2	0																											2			
Fluoroquinolones																																	
Ciprofloxacin	15	2	0																		1	1											
Penicillins																																	
Ampicillin	13	2	0																			2											
Quinolones																																	
Nalidixic acid	13	2	2	2																													
Sulfonamides																																	
Sulfamethoxazol	10	2	0																	2													
Tetracyclines																																	
Tetracyclin	14	2	0																	1	1												
Trimethoprim	10	2	0																							1	1						

Footnote

Salmonella Gallinarum and Salmonella Pullorum

Table Antimicrobial susceptibility testing of Other serotypes in Pigs - quantitative data [Diffusion method]

	Other serotypes
	Pigs
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	2

Antimicrobials:	Break point	N	n	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																														
				<=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
Aminoglycosides																																		
Gentamicin	12	2	0																	1	1													
Streptomycin	11	2	0										1	1																				
Amphenicols																																		
Chloramphenicol	12	2	0																					1		1								
Cephalosporins																																		
Cefotaxim	14	2	0																										1		1			
Fluoroquinolones																																		
Ciprofloxacin	15	2	0																											1	1			
Penicillins																																		
Ampicillin	13	2	0																			1	1											
Quinolones																																		
Nalidixic acid	13	2	0																			1	1											
Sulfonamides																																		
Sulfamethoxazol	10	2	0																									1		1				
Tetracyclines																																		
Tetracyclin	14	2	0																		2													
Trimethoprim	10	2	0																											1	1			

Footnote

Salmonella Inganda and Salmonella spp. group C

Table Antimicrobial susceptibility testing of Other serotypes in Meat from bovine animals - quantitative data [Diffusion method]

	Other serotypes
	Meat from bovine animals
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	5

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																																
	Break point	**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**
Aminoglycosides																																	
Gentamicin	12	5	0															2	2		1												
Streptomycin	11	5	1	1									1		2	1																	
Amphenicols																																	
Chloramphenicol	12	5	1			1															2	2											
Cephalosporins																																	
Cefotaxim	14	5	0																			1				1				2	1		
Fluoroquinolones																																	
Ciprofloxacin	15	5	0																								1			1	1		2
Penicillins																																	
Ampicillin	13	5	1	1																			2		2								
Quinolones																																	
Nalidixic acid	13	5	1	1									1									3											
Sulfonamides																																	
Sulfamethoxazol	10	5	1	1														1			1	1			1								
Tetracyclines																																	
Tetracyclin	14	5	1	1														1	2	1													
Trimethoprim	10	5	1	1																						1	1	1	1				

Footnote

Salmonella Lexington, Salmonella Harrisonburg, Salmonella Derby, Salmonella enterica subsp. enterica, Salmonella spp. E group

Table Antimicrobial susceptibility testing of Other serotypes in Meat from pig - quantitative data [Diffusion method]

	Other serotypes
	Meat from pig
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	2

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																																
	Break point	**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**
Aminoglycosides																																	
Gentamicin	12	2	0																1		1												
Streptomycin	11	2	0											1		1																	
Amphenicols																																	
Chloramphenicol	12	2	0																					1	1								
Cephalosporins																																	
Cefotaxim	14	2	0																													2	
Fluoroquinolones																																	
Ciprofloxacin	15	2	0																														2
Penicillins																																	
Ampicillin	13	2	0																				1	1									
Quinolones																																	
Nalidixic acid	13	2	0																		1	1											
Sulfonamides																																	
Sulfamethoxazol	10	2	0																							1		1					
Tetracyclines																																	
Tetracyclin	14	2	0																	2													
Trimethoprim	10	2	0																				1					1					

Footnote

Salmonella London and Salmonella Cholerasuis

Table Antimicrobial susceptibility testing in S. enterica subsp. enterica

n = Number of resistant isolates	S. enterica subsp. enterica	
	Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - Survey	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		4
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	4	0
Kanamycin	4	0
Streptomycin	4	4
Amphenicols		
Chloramphenicol	4	2
Florfenicol	4	0
Cephalosporins		
Cefotaxim	4	0
Fluoroquinolones		
Ciprofloxacin	4	0
Fully sensitive	4	0
Penicillins		
Ampicillin	4	1
Quinolones		
Nalidixic acid	4	0
Resistant to 1 antimicrobial	4	2
Resistant to 3 antimicrobials	4	1
Resistant to 4 antimicrobials	4	1
Sulfonamides		
Sulfonamide	4	0
Tetracyclines		
Tetracyclin	4	2
Trimethoprim	4	0

Table Antimicrobial susceptibility testing of S. enterica subsp. enterica in Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes - quantitative data [Dilution method]

	S. enterica subsp. enterica Pigs - fattening pigs - at slaughterhouse - animal sample - lymph nodes
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	4

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	2	4	0						4														
Kanamycin	16	4	0								3	1											
Streptomycin	32	4	4												3		1						
Amphenicols																							
Chloramphenicol	16	4	2								2					2							
Florfenicol	16	4	0								2		2										
Cephalosporins																							
Cefotaxim	0.5	4	0			4																	
Fluoroquinolones																							
Ciprofloxacin	0.06	4	0		4																		
Penicillins																							
Ampicillin	4	4	1						1	2				1									
Quinolones																							
Nalidixic acid	16	4	0								2	2											
Sulfonamides																							
Sulfamethoxazol	256	4	0												2	2							
Tetracyclines																							
Tetracyclin	8	4	2							2					2								
Trimethoprim	2	4	0				2	2															

Table Antimicrobial susceptibility testing in S. enterica subsp. enterica

n = Number of resistant isolates	S. enterica subsp. enterica	
	Meat from bovine animals	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	1
Amphenicols		
Chloramphenicol	1	1
Cephalosporins		
Cefotaxim	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	0
Penicillins		
Ampicillin	1	1
Quinolones		
Nalidixic acid	1	0
Resistant to >4 antimicrobials	1	1
Sulfonamides		
Sulfamethoxazol	1	1
Tetracyclines		
Tetracyclin	1	1
Trimethoprim	1	0

Table Breakpoints for antibiotic resistance testing in Animals

Test Method Used

Disc diffusion

Broth dilution

Standards used for testing

ISO_20776-1:2006

2007/ 407/ EC

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	CLSI, 2007/ 407/ EC			16	1	128	30	18		12
Florfenicol	CLSI, 2007/ 407/ EC			16	4	32	30	18		12
Tetracyclines										
Tetracyclin	CLSI, 2007/ 407/ EC			8	0.5	64	30	19		14
Fluoroquinolones										
Ciprofloxacin	CLSI, 2007/ 407/ EC			0.06	0.008	1	5	21		15
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI, 2007/ 407/ EC			16	1	128	30	19		13
Trimethoprim	CLSI, 2007/ 407/ EC			2	0.25	32	5	16		10
Sulfonamides										
Sulfonamide										
Sulfamethoxazol	CLSI, 2007/ 407/ EC			256	16	2048	300	16		10
Aminoglycosides										
Streptomycin	CLSI, 2007/ 407/ EC			32	2	256	10	15		11
Gentamicin	CLSI, 2007/ 407/ EC			2	0.5	64	10	15		12
Neomycin										
Kanamycin	CLSI, 2007/ 407/ EC			16	2	16	30	18		13
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim	CLSI, 2007/ 407/ EC			0.5	0.06	2	30	23		14
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI, 2007/ 407/ EC			4	0.25	32	10	17		13

Table Breakpoints for antibiotic resistance testing in Food

Test Method Used

Disc diffusion

Broth dilution

Standards used for testing

ISO_20776-1:2006

2007/ 407/ EC

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	CLSI, 2007/ 407/ EC			16	1	128	30	18		12
Florfenicol	CLSI, 2007/ 407/ EC			16	4	32	30	18		12
Tetracyclines										
Tetracyclin	CLSI, 2007/ 407/ EC			8	0.5	64	30	19		14
Fluoroquinolones										
Ciprofloxacin	CLSI, 2007/ 407/ EC			0.06	0.008	1	5	21		15
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI, 2007/ 407/ EC			16	1	128	30	19		13
Trimethoprim	CLSI, 2007/ 407/ EC			2	0.25	32	5	16		10
Sulfonamides										
Sulfonamide										
Sulfamethoxazol	CLSI, 2007/ 407/ EC			256	16	2048	300	16		10
Aminoglycosides										
Streptomycin	CLSI, 2007/ 407/ EC			32	2	256	10	15		11
Gentamicin	CLSI, 2007/ 407/ EC			2	0.5	64	10	15		12
Neomycin										
Kanamycin	CLSI, 2007/ 407/ EC			16	2	16	30	18		13
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim	CLSI, 2007/ 407/ EC			0.5	0.06	2	30	23		14
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI, 2007/ 407/ EC			4	0.25	32	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 the country.
The number of human cases in the year 2007 was 114. The Campylobacter jejuni is the pathogen most frequently discovered in humans and in poultry meat.
1 household outbreak caused by C.jejuni with unknown food implicated was reported in 2007 (in 2006 - 3 outbreaks).

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

46 broiler slaughter batches were analysed. Intact caecae at time of evisceration and neck skin samples were taken from broilers at slaughterhouse. Each sample consists of 10 sub-samples taken from 10 birds belonging to the same batch. Campylobacter jejuni was detected in neck skin sample.
There are no official monitoring programmes in regard to Campylobacter in feedingstuffs.
Food samples were taken in the frames of official food control.
99 food samples have been tested in 2007, 4 % of them were positive (in 2005 - 5,5 %; in 2006 - 2,4 %). All positive samples originate from poultry meat (broilers not of Estonian origin).
C.coli was detected in 3 samples and C.jejuni in 2 samples.
Only 1 Campylobacter strain, detected in broiler neck skin, was tested on antimicrobial resistance. The isolate was fully sensitive.
The number of Campylobacter isolated from poultry meat was very small during years. There were no isolates detected in broilers intact caeca during last years.

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 humans during years.

2.2.2. Campylobacteriosis in humans

2.2.3. Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

The neck skin samples were taken from the slaughter batches. Each sample consists from 10 sub-samples.

At retail

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

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling 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 retail

Other: fresh meat, meat preparation

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

Neck skin sample taken from the slaughter batch consists from 10 sub-samples, which are pooled at the laboratory.

At retail

The samples of 25 g each taken from broiler meat, handled hygienically, placed in refrigerated containers and sent immediately to the laboratory.

Definition of positive finding

At slaughterhouse and cutting plant

A sample where Thermofilic Campylobacter was detected.

At retail

A sample where Thermofilic Campylobacter was isolated.

Diagnostic/ analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 10272-1:2006

At retail

Bacteriological method: NMKL 119:1990

Control program/ mechanisms

The control program/ strategies in place

Sampling has been performed randomly at slaughterhouse (neck skin), at border control and retail level in the frames of the official food control 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 on enterprises which handle food of animal origin are required to register Campylobacter and 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.
Laboratories report quarterly the list of registered pathogens in food to the Veterinary and Food Board.

Results of the investigation

Altogether 5 (7,1 %) of 70 poultry meat samples tested in the year 2007 on presence of Campylobacter were positive (in 2005 - 7,5 %; in 2006 - 6,3 %).
C.jejuni was detected in 4 samples, C.coli - in 1 sample.

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

The occurrence of Campylobacter in fresh broiler meat is quite high. During last 3 years it seems to be stable:

2004 - 56 samples taken and 26,8 % of them were positive,
2005 - 278 samples and 7,5 % of them were positive,
2006 - 80 samples - 6,3 % were positive
2007 - 70 samples - 7,1 % were positive.
In 2007 the prevalent Campylobacter specie was C.jejuni, in 2006 - C.coli, in 2005 - C.jejuni.

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. In the year 2007 there was 1 Campyloabcter household outbreak, which was not linked to consumption of any kind of food.
Most of the 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. upsaliensis	C. jejuni	Thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus)										
fresh										
- at retail	HPI	single	25 g	14	1				1	
chilled										
- at retail	HPI	single	10 g	3	1				1	
meat preparation										
intended to be eaten cooked										
- at retail	HPI	single	25 g	5	1				1	
- at retail	HPI	single	10 g	2	1	1				
- at slaughterhouse - animal sample - neck skin - Monitoring - official sampling (1)	VFB	slaughter batch	1 g	46	1				1	

(1) : 1 sample was taken from each batch. Each sample consists of 10 sub-samples.

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										
fresh										
- at retail	HPI	single	25 g	4	0					
chilled										
- at retail	HPI	single	10 g	3	0					
minced meat										
intended to be eaten raw										
- at retail	HPI	single	25 g	1	0					
intended to be eaten cooked										
- at retail	HPI	single	10 g	3	0					
meat preparation										
- at retail	HPI	single	25 g	5	0					
intended to be eaten cooked										
- at retail	HPI	single	10 g	2	0					
meat products										
- at retail	HPI	single	25 g	1	0					
Meat from bovine animals										
fresh										
- at retail	HPI	single	25 g	12	0					
chilled										
- at retail	HPI	single	10 g	4	0					
minced meat										
intended to be eaten raw										
- at retail	HPI	single	25 g	2	0					
intended to be eaten cooked										
- at retail	HPI	single	10 g	1	0					

meat preparation										
- at retail	HPI	single	25 g	6	0					
intended to be eaten cooked										
- at retail	HPI	single	10 g	1	0					
meat products										
cooked, ready-to-eat										
- at retail	HPI	single	25 g	1	0					
Meat, mixed meat										
minced meat										
- at retail	HPI	single	25 g	14	0					
intended to be eaten cooked										
- at retail	HPI	single	10 g	2	0					
Fish										
cooked										
- at retail	HPI	single	25 g	2	0					
Ready-to-eat salads										
- at retail	HPI	single	25 g	8	0					
Other processed food products and prepared dishes										
- at retail	HPI	single	25 g	3	0					

2.2.4. Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

Monitoring was performed at slaughterhouse. The sampling is based on random selection of slaughter batches regarding sampling days and batches to be sampled. Sampling was performed all the year round. A 12-month period was divided into 12 periods of 1 month. In each month 1/ 12th of the total sample size was taken.
Samples were taken from 1 slaughterhouse.
The number of batches sampled were calculated according to the number of batches slaughtered at the slaughterhouse in 2006.
Sample taken is intact ceacae.
Ceacal samples are taken at time of evisceration. Each sample consists of 10 caecae taken from the birds belonging to the same slaughter batch.

Frequency of the sampling

At slaughter

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughter

Other: intact caecae

Methods of sampling (description of sampling techniques)

At slaughter

Samples taken are intact ceacae. Ceacal samples are taken at time of evisceration. Each sample consists of 10 caecae taken from the birds belonging to the same slaughter batch.
Caecal samples are transported as intact caecae to the laboratory as soon as possible. At the laboratory, the ceacal contents are aseptically removed and pooled to 1 composite sample.

Case definition

At slaughter

A slaughter batch is considered positive for Campylobacter spp. if the presence of the agent is confirmed in the pooled sample from this batch.

Diagnostic/ analytical methods used

At slaughter

Other: according to draft techn.specifications SANCO/ 3487/ 2005

Vaccination policy

No vaccination.

Measures in case of the positive findings or single cases

The supervision official should inform the veterinarian performing supervision of the broilers farm. The infection sources and their spreading ways should be investigated and eliminated.

Notification system in place

Detection of Campylobacter is not notifiable.

Results of the investigation

No positive samples were detected in 2007.

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

1 neck skin sample was positive for C.jejuni in 2007. No caeca samples were detected to be positive.
No positive results were received in 2006.
In 2005 only broilers neck skin samples were taken at slaughterhouse. Some positive results were discovered.

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

In 2007 there was 1 possible household outbreak registered. 2 persons, who traveled in Peru became ill. Campylobacter jejuni was detected.
Outbreak was not linked to the consumption of broiler meat.

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Gallus gallus (fowl)									
broilers									
- at slaughterhouse - animal sample - Monitoring - official sampling	VFB	slaughter batch	46	0					

(1) : Intact caeca samples were taken at time of evisceration. Each sample consists of 10 sub-samples (caeca samples taken from 10 birds).

2.2.5. Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Sampling strategy used in monitoring

Frequency of the sampling

Campylobacter isolates that originate from samples that routinely come to the Veterinary and Food Laboratory in the frames of official control or monitoring programmes performed by VFB officials.

Methods of sampling (description of sampling techniques)

Campylobacter isolates that are discovered in poultry of Estonian origin in all laboratories are included in monitoring. Isolates are stored and then sent to the VFL central laboratory, which performs antimicrobial resistance testing

Procedures for the selection of isolates for antimicrobial testing

Campylobacter isolates that are discovered in poultry of Estonian origin are included in monitoring. Selection of isolates depends on amount of isolates in laboratory. Usually 1 isolate per sample.

Methods used for collecting data

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

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 are incubated in a microaerophilic atmosphere +37 +/ - 1,0 for 40-48 h.
Control strain: Campylobacter jejuni ATCC 33560.
The antimicrobials included in monitoring are tetracycline, nalidixic acid, ciprofloxacin, streptomycin, gentamicin, erythromycin.

Breakpoints used in testing

Commission Decision of 19 July 2007 concerning a financial contribution from the Community towards a survey on the prevalence and antimicrobial resistance of Campylobacter spp. in broiler flocks and on the prevalence of Campylobacter spp. and Salmonella spp. in broiler carcasses to be carried out in the Member States (2007/ 516/ EC)

Control program/ mechanisms

The control program/ strategies in place

Only Campylobacter isolates derived from domesic poultry are included into monitoring.

Results of the investigation

No Campylobacter isolates were detected in 2007, thus no antimicrobial resistance testing were performed.

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

There were no Campylobacter found in poultry during last 3 years, so no antimicrobial resistance testing was not performed.

B. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from cattle

Sampling strategy used in monitoring

Frequency of the sampling

Campylobacter isolates that originate from samples that routinely come to the Veterinary and Food Laboratory in the frames of official control or monitoring programmes performed by VFB officials.

Methods of sampling (description of sampling techniques)

Campylobacter isolates that are discovered in foodstuffs of Estonian origin in all laboratories are included in monitoring. Isolates are stored and then sent to the VFL central laboratory, which performs antimicrobial resistance testing.

Procedures for the selection of isolates for antimicrobial testing

Campylobacter isolates that are discovered in foodstuffs of Estonian origin are included in monitoring. Selection of isolates depends on amount of isolates in laboratory. Usually 1 isolate per sample.

Methods used for collecting data

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

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Results of the investigation

No Campylobacter isolates were detected in foodstuffs derived from cattle in 2007.

C. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from pigs

Additional information

As no positive samples has been detected, no antimicrobial testing was performed.

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

Sampling strategy used in monitoring

Frequency of the sampling

Campylobacter isolates that originate from samples that routinely come to the Veterinary and Food Laboratory in the frames of official control or monitoring programmes performed by VFB officials.

Methods of sampling (description of sampling techniques)

Campylobacter isolates that are discovered in foodstuffs of Estonian origin in all laboratories are included in monitoring. Isolates are stored and then sent to the VFL central laboratory, which performs antimicrobial resistance testing.

Procedures for the selection of isolates for antimicrobial testing

Campylobacter isolates that are discovered in foodstuffs of Estonian origin are included in monitoring. Selection of isolates depends on amount of isolates in laboratory. Usually 1 isolate per sample.

Methods used for collecting data

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

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 are incubated in a microaerophilic atmosphere +37 +/ - 1,0 for 40-48 h.
Control strain: Campylobacter jejuni ATCC 33560.
The antimicrobials included in monitoring are tetracycline, nalidixic acid, ciprofloxacin, streptomycin, gentamicin, erythromycin.

Breakpoints used in testing

Commission Decision of 19 July 2007 concerning a financial contribution from the Community towards a survey on the prevalence and antimicrobial resistance of Campylobacter spp. in broiler flocks and on the prevalence of Campylobacter spp. and Salmonella spp. in broiler carcasses to be carried out in the Member States (2007/ 516/ EC)

Control program/ mechanisms

The control program/ strategies in place

Only Campylobacter isolates derived from foodstuffs of domestic origin are included into monitoring.

Results of the investigation

In 2007 only one strain isolated from broiler neck skin taken at slaughterhouse in the frames of Campylobacter monitoring was tested.
The strain was fully sensitive.

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

In the year 2007 was tested only one strain, isolated from neck skin of broiler. This strain was fully sensitive.
In 2006 there were no Campylobacter isolated from poultry of domestic origin. So no sensitivity testing was performed.
In the year 2005 7 Campylobacter jejuni strains and 2 C.coli strains were obtained for sensitivity testing.
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 C.coli isolate from broiler meat was fully sensitive.
Due to the small amount of Campylobacter isolates it is very difficult to make any decision.

Table Antimicrobial susceptibility testing in C. jejuni

n = Number of resistant isolates		
	C. jejuni	
	Meat from broilers (Gallus gallus)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		1
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	1	0
Streptomycin	1	0
Fluoroquinolones		
Ciprofloxacin	1	0
Fully sensitive	1	1
Macrolides		
Erythromycin	1	0
Quinolones		
Nalidixic acid	1	0
Tetracyclines		
Tetracyclin	1	0

Table Antimicrobial susceptibility testing of C. jejuni in Meat from broilers (Gallus gallus) - at slaughterhouse - animal sample - neck skin - quantitative data [Dilution method]

	C. jejuni
	Meat from broilers (Gallus gallus) - at slaughterhouse - animal sample - neck skin
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	1

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	1	1	0					1															
Streptomycin	2	1	0						1														
Fluoroquinolones																							
Ciprofloxacin	1	1	0			1																	
Macrolides																							
Erythromycin	4	1	0						1														
Quinolones																							
Nalidixic acid	16	1	0										1										
Tetracyclines																							
Tetracyclin	2	1	0					1															

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

Broth dilution

Standards used for testing

ISO_20776-1:2006

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin				2	0.12	16				
Fluoroquinolones										
Ciprofloxacin				1	0.06	8				
Quinolones										
Nalidixic acid				16	1	64				
Aminoglycosides										
Streptomycin (1)				2	0.5	64				
Gentamicin (2)				1	0.12	16				
Macrolides										
Erythromycin (3)				4	0.5	64				
Penicillins										
Ampicillin										

(1) : Cut-off for C.jejuni
(2) : Cut-off for C.jejuni
(3) : Cut-off for C.jejuni

Footnote

Standard for breakpoint:
Commission Decision of 19 July 2007 concerning a financial contribution from the Community towards a survey on the prevalence and antimicrobial resistance of Campylobacter spp. in broiler flocks and on the prevalence of Campylobacter spp. and Salmonella spp. in broiler carcasses to be carried out in the Member States (2007/ 516/ EC)

Table Breakpoints used for antimicrobial susceptibility testing in Food

Test Method Used

Broth dilution

Standards used for testing

ISO_20776-1:2006

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin				2	0.12	16				
Fluoroquinolones										
Ciprofloxacin				1	0.06	8				
Quinolones										
Nalidixic acid				16	1	64				
Aminoglycosides										
Streptomycin (1)				2	0.5	64				
Gentamicin (2)				1	0.12	16				
Macrolides										
Erythromycin (3)				4	0.5	64				
Penicillins										
Ampicillin										

(1) : Cut-off for C.jejuni
(2) : Cut-off for C.jejuni
(3) : Cut-off for C.jejuni

Footnote

Standard for breakpoint:
Commission Decision of 19 July 2007 concerning a financial contribution from the Community towards a survey on the prevalence and antimicrobial resistance of Campylobacter spp. in broiler flocks and on the prevalence of Campylobacter spp. and Salmonella spp. in broiler carcasses to be carried out in the Member States (2007/ 516/ EC)

Table Breakpoints used for antimicrobial susceptibility testing in Feedingstuff

Test Method Used

Standards used for testing

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

2.3. LISTERIOSIS

2.3.1. General evaluation of the national situation

A. Listeriosis general evaluation

History of the disease and/ or infection in the country

During years the number of laboratory confirmed cases of Listeriosis in Estonia has been very low.
There were 3 cases of human listeriosis recorded in the year 2007 (2 cases in 2004, 2 cases in 2005 and 1 in 2006).
No outbreaks involving Listeria spp. were reported.

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

Altogether there were 11 samples taken from cattle, 2 samples taken from pigs and 7 samples taken from sheep positive for Listeria spp.
Listeria monocytogenes was found in 11 samples taken from cattle (in 2006 - 7; in 2005 - 6), in 2 samples taken from pigs (in 2006 - 0) and in 4 samples taken from sheep (in 2006 - 5; in 2005 - 10) in the year 2007. 3 samples taken from sheep were positive for Listeria ivanovii.
In the year 2007 there were detected 26 (2,4 %) positive samples in ready-to-eat products (in 2006 - 25 positive samples; in 2005 - 30). Among ready-to-eat products taken at retail there was only 3 positive samples - fishery products (in 2006 - 1 ready-to-eat products taken at retail were Listeria positive; in 2005 - 15).
In 2007 3 samples of raw milk intended for direct human consumption taken at farm were positive.
Presence of Listeria was determined in 5 (4,6 %) of 109 ready-to-eat fishery products. In 2006 10 (7,4 %) of 135 ready-to-eat fishery products contained Listeria monocytogenes and in 2005 8 (13,3%) of 60 investigated ready-to-eat fishery products.

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 (1-2 per year). In all cases Listeria monocytogenes has been detected.
Foodborne transmission is believed to be more important than transmission from animals.

2.3.2. Listeriosis in humans

A. Listeriosis in humans

History of the disease and/ or infection in the country

2.3.3. Listeria in foodstuffs

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Milk, cows'										
raw										
intended for direct human consumption (1)	VFB	single	25 g	33	3	33	3	0	0	0
pasteurised milk										
- at processing plant	VFB	single	25 g	7	0	7	0	0	0	0
Cheeses made from cows' milk										
soft and semi-soft										
made from pasteurised milk										
- at processing plant	VFB	single	25 g	18	0	18	0	0	0	0
- at retail	VFB	single	25 g	1	0	1	0	0	0	0
hard										
made from pasteurised milk										
- at processing plant	VFB	single	25 g	23	1	23	1	0	0	0
- at retail	VFB	single	25 g	4	0	4	0	0	0	0
Dairy products (excluding cheeses)										
butter										
- at processing plant	VFB	single	25 g	12	0	12	0	0	0	0
cream										
- at processing plant	VFB	single	25 g	6	0	6	0	0	0	0
dairy desserts										
- at processing plant	VFB	single	25 g	6	0	6	0	0	0	0
milk powder and whey powder										
- at processing plant	VFB	single	25 g	6	0	6	0	0	0	0
ice-cream										
made from pasteurised milk										
- at processing plant	VFB	single	25 g	4	0	4	0	0	0	0

dairy products, not specified										
made from pasteurised milk										
- at processing plant	VFB	single	25 g	70	0	70	0	0	0	0
- at retail	VFB, HPI	single	25 g	32	0	9	0	23	0	0
Infant formula										
dried										
- at processing plant	VFB	single	25 g	4	0	4	0	0	0	0
- at retail	VFB	single	25 g	2	0	0	0	2	0	0

(1) : At farm

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Meat from broilers (Gallus gallus)										
fresh										
- at processing plant - Monitoring - official sampling	VFB	batch	25 g	34	19	34	19	0	0	0
meat products										
cooked, ready-to-eat										
- at processing plant	VFB	single	25 g	31	1	30	1	1	0	0
- at retail	VFB, HPI	single	25 g	29	0	1	0	28	0	0
meat preparation										
intended to be eaten cooked										
- at processing plant	VFB	single	25 g	2	1	2	1	0	0	0
- at retail	VFB	single	25 g	1	0	1	0	0	0	0
Meat from pig										
meat products										
cooked, ready-to-eat										
- at processing plant	VFB	single	25 g	92	8	83	8	9	0	0
- at retail	VFB, HPI	single	25 g	17	0	6	0	11	0	0
meat preparation										
intended to be eaten cooked										
- at processing plant	VFB	single	25 g	35	12	35	12	0	0	0
- at retail	VFB, HPI	single	25 g	5	1	1	0	4	1	0
offal										
- at retail	VFB	single	25 g	1	0	1	0	0	0	0
Meat from bovine animals										
fresh										
- at retail	VFB, HPI	single	25 g	4	1	3	0	1	1	0
meat products										
cooked, ready-to-eat										
- at processing plant	VFB	single	25 g	19	1	17	1	2	0	0

- at retail	VFB, HPI	single	25 g	4	0	1	0	3	0	0
Fish										
marinated										
- at retail	HPI	single	25 g	4	0	1	0	3	0	0
cooked										
- at retail	HPI	single	25 g	6	1	2	0	4	1	0
Infant formula										
- at retail	HPI	single	25 g	7	0	7	0	0	0	0
Meat, mixed meat										
meat products										
cooked, ready-to-eat										
- at processing plant	VFB	single	25 g	65	0	60	0	5	0	0
- at retail	VFB, HPI	single	25 g	16	2	1	0	15	2	0
meat preparation										
intended to be eaten cooked										
- at processing plant	VFB	single	25 g	8	4	8	4	0	0	0
- at retail	VFB	single	25 g	2	1	1	1	1	0	0
minced meat										
intended to be eaten cooked										
- at retail	VFB	single	25 g	1	0	1	0	0	0	0
Meat from turkey										
meat products										
cooked, ready-to-eat										
- at processing plant	VFB	single	25 g	3	0	3	0	0	0	0
- at retail	VFB	single	25 g	1	0	0	0	1	0	0
Meat from wild game - land mammals										
meat products										
cooked, ready-to-eat										
- at processing plant	VFB	single	25 g	1	0	1	0	0	0	0
Meat from sheep										
meat products										
cooked, ready-to-eat										
- at processing plant	VFB	single	25 g	1	0	1	0	0	0	0
Fruits and vegetables										
- at processing plant	VFB	single	25 g	37	0	28	0	9	0	0
- at retail	VFB	single	25 g	9	0	3	0	6	0	0
Ready-to-eat salads										
- at processing plant	VFB	single	25 g	65	5	46	4	19	0	1
- at retail	VFB, HPI	single	25 g	135	3	38	0	97	3	0
Other processed food products and prepared dishes										
- at processing plant	VFB	single	25 g	62	2	52	2	10	0	0
- at retail	VFB, HPI	single	25 g	43	0	10	0	33	0	0
Fishery products, unspecified										

non-ready-to-eat										
- at processing plant	VFB	single	25 g	15	2	12	2	3	0	0
- at retail	VFB	single	25 g	2	0	1	0	1	0	0
ready-to-eat										
- at processing plant	VFB	single	25 g	81	3	77	2	4	1	0
- at retail	VFB	single	25 g	16	4	11	3	5	1	0
Meat from poultry, unspecified										
meat products										
- at retail	HPI	single	25 g	2	0	1	0	1	0	0
Cereals and meals										
- at retail	HPI	single	25 g	9	0	0	0	9	0	0
Bakery products										
- at retail	HPI	single	25 g	20	0	0	0	20	0	0
cakes										
- at retail	HPI	single	25 g	59	0	0	0	59	0	0
Confectionery products and pastes										
- at retail	HPI	single	25 g	21	0	0	0	21	0	0
Vegetables										
- at retail	HPI	single	25 g	1	0	0	0	1	0	0
Fats and oils (excluding butter)										
oils										
- at retail	HPI	single	25 g	1	0	0	0	1	0	0

2.3.4. Listeria in animals

Table Listeria in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria spp.	L. monocytogenes	Listeria spp., unspecified	L. ivanovii
Cattle (bovine animals)	VFL	animal	93	11	11		
Sheep	VFL	animal	29	7	4		3
Goats	VFL	animal	2	0			
Pigs	VFL	animal	91	2	2		

Footnote

Type of specimen taken: brain, abortion material, internal organs.
Brain samples taken from cattle and sheep were investigated in case of BSE and rabies analyses negative results.

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, in 2006 6 and in 2007 3 human cases 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 was started. Dairy cows are analyzed at farm. Animals from farms with more than 100 dairy cows are tested. This monitoring is a part of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases.
The investigations show no presence of Verotoxigenic E.coli O157 on big farms with more than 100 animals.
No positive cases were discovered in 2007.
In 2006 VTEC O157 was detected in dairy cows on 1 small farm with 17 animals. The investigation of that animals was started due to the VTEC human case linked to the consumption of raw cows milk from that farm. Samples taken from 13 animals were found to be positive.
In 2006 57 food samples and in 2007 64 food samples were tested at retail. No positive results were detected.

Recent actions taken to control the zoonoses

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

2.4.2. E. Coli Infections in humans

2.4.3. Escherichia coli, pathogenic in foodstuffs

Table VT E. coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified	Verotoxigenic E. coli (VTEC) - VTEC O157
Meat from pig								
fresh								
- at retail (official sampling)	HPI	single	25 g	8	0			0
minced meat								
- at retail (official sampling)	HPI	single	25 g	3	0			0
meat preparation								
- at retail (official sampling)	HPI	single	25 g	5	0			0
Meat from bovine animals								
fresh								
- at retail (official sampling)	HPI	single	25 g	13	0			0
minced meat								
- at retail (official sampling)	HPI	single	25 g	3	0			0
Milk, cows'								
raw								
intended for direct human consumption	HPI	single	25 g	9	0			0
Dairy products (excluding cheeses)								
dairy products, not specified								
- at retail (official sampling)	HPI	single	25 g	8	0			0
Meat, mixed meat								

minced meat								
- at retail (official sampling)	HPI	single	25 g	13	0			0
Ready-to-eat salads								
- at retail (official sampling)	HPI	single	25 g	2	0			0

2.4.4. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

Faecal samples are taken from dairy cows representing farms with more than 100 animals. 4 samples should be taken at each farm, one sample per animal. 4 samples taken at farm are pooled in the laboratory.
Sampling is random and farms are located in different counties in 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.

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 divided in the laboratory into 2 parts: one part is pooled in the laboratory and sample weight analyzed is 20 g (5 g x 4 samples). In case of positive result, each sample from the other part should be tested individually.

Case definition

Animals at farm

Animal is considered to be positive, if VTEC O157 has been isolated from its faecal sample.
In case of VTEC O157 isolation in pooled feacal sample, each sample should be tested separately.

Diagnostic/ analytical methods used

Animals at farm

With following modifications: Bacteriological method EVS-EN ISO 16654

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

162 dairy cows from the different dairy 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 was started in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases and investigations followed in 2006 and 2007.
No positive samples have been detected in 2005 and 2007.
13 positive samples were detected in 2006.

Table VT E. coli in animals

	Source of information	Sampling unit	Sample weight	Units tested	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Cattle (bovine animals)								
dairy cows								
- at farm	VFB	animal	20 g	162	0			

Footnote

Milk production farms with more than 100 animals were tested. 4 faecal samples were 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.
Human 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 of the Ministry of Agriculture No 34 "List of Notifiable DiseaseS and Diseases subject to Registration" and the requirements for controlling tuberculosis of bovine animals are approved by the Regulation of the Minister of Agriculture No 61 (in force since 23.04.2004).
According to the above mentioned 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 2007. 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. Tuberculosis, Mycobacterial Diseases in humans

2.5.3. Mycobacterium in animals

A. Mycobacterium bovis in bovine animals

Status as officially free of bovine tuberculosis during the reporting year

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 were 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 Infectious 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

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

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 tuberculoses positive herds should be tuberculin tested according to the EC Regulation 1226/ 2002,
all in point 3 mentioned tuberculoses positive animals should be slaughtered,
bovine animals could be taken out from the herd only for slaughter,
disinfection 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 animals given unclear or positive results have undergone second intra dermal tuberculin test or comparison tuberculin test and in case of positive result have been slaughtered and organ samples collected for laboratory investigation.
There were no positive results in 2007.

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

Surveillance programme for bovine tuberculoses started in 1962. The last positive case had been reported in 1986. Consequently thereof we consider our bovine herds free from tuberculoses.
Since the year 2005 tuberculoses 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 spp.	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified	M. avium complex - M. avium subsp. avium
Pigs	VFB	animal	2119	0				
- in total	VFL	animal	2	0				
Gallus gallus (fowl)	VFB	animal	13	8			8	
Other poultry	VFL	animal	5	4				4

Table Bovine tuberculosis - data on herds - Community co-financed eradication programmes

Region	Total number of herds	Total number of herds under the programme	Number of herds checked	Number of positive herds	Number of new positive herds	Number of herds depopulated	% positive herds depopulated	Indicators		
								% herd coverage	% positive herds - period herd prevalence	% new positive herds - herd incidence
EESTI	7224	7224	7224	0	0	0	0	100	0	0
Total	7224	7224	7224	0	0	0	0	100	0	0
Total - 1										

Table Bovine tuberculosis - data on animals - Community co-financed eradication programmes

Region	Total number of animals	Number of animals to be tested under the programme	Number of animals tested	Number of animals tested individually	Number of positive animals	Slaughtering		Indicators	
						Number of animals with positive result slaughtered or culled	Total number of animals slaughtered	% coverage at animal level	% positive animals - animal prevalence
EESTI	242462	220867	213575	213575	0	0	0	96.698	0
Total	242462	220867	213575	213575	0	0	0	96.698	0
Total - 1									

Table Bovine tuberculosis - data on status of herds at the end of the period - Community co-financed eradication programmes

Region	Status of herds and animals under the programme													
	Total number of herds and animals under the programme		Unknown		Not free or not officially free				Free or officially free suspended		Free		Officially free	
					Last check positive		Last check negative							
	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals
EESTI	7224	220867	0	0	0	0	7224	213575	0	0	7224	242462	0	0
Total	7224	220867	0	0	0	0	7224	213575	0	0	7224	242462	0	0
Total - 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 registered in Estonia since 1957.

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 were fulfilled for the sufficient period of time set out in the Directive 64/ 432/ EEC.
Since 2005 the brucellosis surveillance programme in bovine animals are implemented according to the EC legislation.
No official surveillance programmes for Brucella detection in food exists in Estonia.
No human cases were recorded during many 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 has not been detected in production animals during years, the risk of humans obtaining brucellosis from Estonian animal products is negligible.

2.6.2. Brucellosis in humans

2.6.3. Brucella in foodstuffs

2.6.4. Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

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 the 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 cattle: 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 authorized veterinarians. Samples are taken at farm.
Sampling is a part of a permanent monitoring 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

Laboratory 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 brucellosis 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 - 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 in 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,
disinfection 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 2007.

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

Surveillance 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.
Since the year 2005 brucellosis surveillance programme has been implemented according to the EC legislation.
No human cases registered since 1957.

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 45 years there were no positive B.melitensis cases reported. Consequently thereof we consider our sheep herds free from brucellosis.

Monitoring system

Sampling strategy

Blood samples are taken from parent stock of breeding herds once a year and analyzed 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, organizers 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, immunization or treatment of suspected or diseased animals, or to prohibit such activities;
demand to perform changes in the organization 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 organization 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 license 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 2007.

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 goats

Monitoring system

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Individual blood sample for serology.

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 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 of 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.

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, organizers 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, immunization or treatment of suspected or diseased animals, or to prohibit such activities;
demand to perform changes in the organization 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 organization 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 license 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

In 2007 no positive results were received.

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 50 years.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella spp.	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Pigs	VFL	animal	1134	0				
Zoo animals, all	VFL	animal	108	0				
Dogs	VFL	animal	4	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	7224	242462	0	0	0	0	7224	149056	0	6244	104531	0	0	0	0	44525	0	0	0	0	0
Total	7224	242462	0	0	0	0	7224	149056	0	6244	104531	0	0	0	0	44525	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 herds	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbio logically	Number of animals positive microbio logically	Number of suspended herds
EESTI	2284	6445	0	0	0	0	48	1637	0	1637	0	0	0	0
Total	2284	6445	0	0	0	0	48	1637	0	1637	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 1999-2007. The peak was mentioned in 1999 (113 cases), then the number of cases varied during years:
2000 - 60 cases,
2001 - 51,
2002 - 20,
2003 - 31,
2004 - 15,
2005 - 31,
2006 - 42
2007 - 76.

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

There is no special programme for monitoring of Yersinia spp. in animals in Estonia. Isolation of Yersinia was related to the confirmation of the presence of cross-reacting antibody in case of positive brucellosis serological reaction.
In 2007 one sample taken from cattle was positive.
In 2007 47 food samples were taken, 47 % of samples tested were postive for Yersinia enterocolitica. No pathogenic species of Yersinia were found.
27 raw carrots (pelled and pre-cut) samples were taken at processing plants in the frames of survey on presence of Y.enterocolitica and Y.pseudotuberculosis. 74 % of tested samples were positive for non-pathogenic Yersinia enterocolitica.
In 2006 20 % of fresh meat samples taken at retail 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.In 2006 2 samples taken from sheep and in 2007 one sample taken from cattle were positive for Yersinia enterocolitica.

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

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

2.7.2. Yersiniosis in humans

2.7.3. Yersinia in foodstuffs

Table Yersinia in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Yersinia spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified
Meat from pig										
fresh										
- at retail	HPI	single	25 g	8	1					1
meat preparation										
- at retail	HPI	single	25 g	5	0					
Vegetables										
non-precut										
- at processing plant - domestic production	VFB	single	25 g	21	15	15		0	0	
pre-cut										
ready-to-eat										
- at processing plant - domestic production	VFB	single	25 g	6	5	5		0	0	
Ready-to-eat salads										
- at processing plant - domestic production	VFB	single	25 g	7	2	2		0	0	

2.7.4. Yersinia in animals

Table Yersinia in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. enterocolitica - O:9	Y. enterocolitica - O:3	Y. enterocolitica - unspecified
Cattle (bovine animals)	VFL	animal	4	1					1
Sheep	VFL	animal	3	0					

Footnote

There is no programme for monitoring of Yersinia spp. in animals. All investigations of Yersinia spp. from animals faeces were related to confirmation of the presence of cross-reacting antibody in cases, when Brucella serological reaction on 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 8 years there were no cases of trichinellosis found in farmed animals.
Among wild animals there are still some cases of trichinellosis diagnosed each year.
Human trichinellosis is relatevely rare disease in Estonia. The number of human cases per year is very small and in the years 2000-2007 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 animals is considered to be very low as Trichinella has not been detected in animals that are usually consumed 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.

Recent actions taken to control the zoonoses

Carcases of animals (swine, horse, wild game and etc.) are systematically sampled at slaughterhouses as a part of the post-mortem examination.

2.8.2. Trichinellosis in humans

2.8.3. 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 authorized or official veterinarians at post mortem inspection in accordance with the Commission Regulation 2075/ 2005 requirements.

Frequency of the sampling

General

Carcasses of domestic pigs are systematically sampled at slaughterhouses as a part of the post-mortem inspection.

Type of specimen taken

General

In the case of the whole carcasses, a specimen is to be taken from pillar of the diaphragm at the transition to the sinewy part.
In the absence of both diaphragm pillars, a specimen is to be taken from the rib part or breastbone part of the diaphragm or from the jaw muscle, tongue or abdominal muscles tongue muscle or the jaw muscle, abdominal muscle.
For cuts of meat and frozen samples, a sample of striated muscle is to be taken.

Methods of sampling (description of sampling techniques)

General

According to the requirements of the Commission Regulation 2075/ 2005.

Case definition

General

An animal where Trichinella spp. was detected.

Diagnostic/ analytical methods used

General

Detection methods described in Chapters I and III of the Annex I of Commission Regulation 2075/ 2005.

Control program/ mechanisms

The control program/ strategies in place

Each slaughtered pig has to be examined at slaughterhouses at post-mortem inspection.

Recent actions taken to control the zoonoses

Carcasses do not leave the premises before the result of the Trichinella examination is found to be negative.

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 in accordance with the requirements of the Regulation 1774/ 2002.

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 2007.

Fattening pigs not 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 the extensive surveillance programmes of pig production in place.

B. Trichinella in horses

Monitoring system

Sampling strategy

Carcases are sampled at the slaughterhouse. Sampling is performed by authorized or official veterinarians at post-mortem inspection.

Frequency of the sampling

All slaughtered animals intended for human consumption are sampled. Sampling is performed according to the requirements of the Regulation 2075/ 2005.

Type of specimen taken

Specimens are to be taken from the lingual or jaw muscle.
In case of their lacking, a specimen is to be taken from a pillar of the diaphragm at the transition to the sinewy part.

Methods of sampling (description of sampling techniques)

In accordance with the Regulation 2075/ 2005.

Case definition

An animal where Trichinella spp. was detected.

Diagnostic/ analytical methods used

In accordance with the Chapter I of the Annex I of Regulation 2075/ 2005

Results of the investigation including the origin of the positive animals

In 2007 no positive cases were reported.

Control program/ mechanisms

The control program/ strategies in place

Every carcase should be examined at post-mortem inspection.

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".

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

No Trichinella is found in horses during years. As there is no tradition in Estonia to consume horse

meat, the number of slaughtered horses is not very big (2-14 horses per year).

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. britovi	T. nativa	T. spiralis	Trichinella spp., unspecified
Pigs								
fattening pigs								
not raised under controlled housing conditions in integrated production system	VFB	animal	436255	0				
breeding animals								
not raised under controlled housing conditions in integrated production system								
sows and boars	VFB	animal	11700	0				
gilts	VFB	animal	3175	0				
piglets	VFB	animal	1040	0				
Solipeds, domestic								
horses	VFB	animal	12	0				
Wild boars								
wild	VFB, VFL	animal	2717	10	4			6
Bears	VFB, VFL	animal	46	8	2	1		5
Lynx								
wild (1)	VFL	animal	10	5	1	1		4

(1) : Two Trichinella subspecies were isolated from one sample: T.britovi and T.nativa.

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 2004-2006. In 2007 one case of liver ehhinococcosis was registered in cattle.
In 2005 2 cases of echinococcosis in wild reindeer 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 spp. is carried out by the meat inspectors according the the Regulation 854/ 2004. 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)

Human echinococcosis is a very rear disease in Estonia.

2.9.2. Echinococcosis in humans

2.9.3. Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals) (1)	VFB	animal	53903	1			1
Sheep	VFB	animal	6191	0			
Goats	VFB	animal	16	0			
Pigs	VFB	animal	452170	0			
Solipeds, domestic	VFB	animal	12	0			
Reindeers	VFB	animal	1942	0			

(1) : Positive case - Ehinococcus was found in liver.

Footnote

All animals were examined at post mortem inspection.

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 10 years the number of human cases of toxoplasmosis varies. The highest incidence rate is detected in 2004 when 16 cases were registered. Since that time there is a decrease tendency in number of human cases of toxoplasmosis: in 2005 there were 5 cases, in 2006 3 cases and in 2007 1 human case of toxoplasmosis registered.
No special programme is present on monitoring of 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.
In 2007 1 dog and 2 zoo animals tested were found to be positive.
There is no enough information about the most common sources of infection.

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

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

2.10.2. Toxoplasmosis in humans

2.10.3. Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii
Dogs	VFL	animal	2	1	1
Cats	VFL	animal	3	0	
Zoo animals, all	VFL	animal	5	2	2

2.11. RABIES

2.11.1. General evaluation of the national situation

A. Rabies general evaluation

History of the disease and/ or infection in the country

Rabies 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 raccoon dogs.
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
salivatic 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.
The number of infections of farm animals has significantly decreased in bovines: 2 cases of infection in 2007 (2004 - 15 cases, 2005 - 19 cases, 2006 - 4 cases).
In the dogs and cats category, the occurrence of rabies has a tendency to decrease: 20 cases in 2004 (6,3 % of all registered rabies cases in animals), 14 cases in 2005 (5,2 %), 9 cases in 2006 (7,9 %) and 0 cases in 2007. Rabies cases in dogs decreased significantly: 2004 - 7,6 %; 2005 - 7,4 %; 2006 - 4,3 % and 0 in 2007. This may be due to the improved awareness of pet owners, who vaccinate their cats alongside dogs.
Among wild animals in 2006, red foxes accounted for 33 % (2004 - 29,3 %; 2005 - 35,7 %), raccoon dogs for 52,6 % (2004 - 48 %; 2005 - 47,4 %) and other wild animals (badgers, martens, wild boars, deer, rabbits, beavers, squirrels, lynx, minks, weasel, rats, mice etc) for 2,6 % (2004 - 3,8 %; 2005 - 3 %) of all rabies cases in wild animals.
In 2007 there was 1 raccoon dog positive for rabies and 1 badger and no positive cases registered in foxes and other wild animals.
Although the last mortal case of rabies in humans was registered in Estonia 20 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 (4436). There is noted a decrease in number of attacks in the years 2004 (3763) and 2005 (3334) and a significant decrease in the years 2006 (2948) and 2007 (2588).

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

During the years 2001-2003 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 decrease in number of cases has been noted since the year 2004 - 314 cases, 266 in the year 2005, 114 cases in 2006.
In the year 2007 only 4 rabies cases were registered. 2 cases were registered among wild and 2 among farmed animals.
In the year 2004 255 rabies cases were diagnosed in wild animals and 59 in farm animals. In 2005 there were 230 rabies positive cases diagnosed in wild (mostly in foxes and raccoon-dogs) and 37 in farm animals. In 2006 there were registered 101 rabies cases in wildlife and 13 cases in farm animals.

Rabies is widely distributed in all counties in Estonia, even in the islands Hiiumaa and Saaremaa. Thus the oral vaccination program of wildlife has been performed in 2004 for the first time on the small island named Vormsi (about 100 square km). Vaccination was performed 2 times a year.
After that in Autumn 2005 the oral vaccination programme in the frames of Transition Facility program started. Bait drop area covered 25 540 km² of Northern part of Estonia.
Since the year 2006 the oral vaccination is performed on the whole territory of the country 2 times per year (in spring and autumn). Vaccine baits are distributed by aircraft. The vaccination will be followed until no cases of rabies are registered in the country.
The analyzes show that the 74 % of vaccine had been eaten by the animals in 2005, 85 % in 2006 and 82 % in 2007.
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. As a result of oral vaccination the number of animal attacks is decreasing.

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 still a lot of human cases of injury from infected animals every year, but due to the oral vaccination the number of attacks from animals is decreasing.
No transmission 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 oral vaccination program of wildlife in the frames of Transition Facility program started in Autumn 2005 (10.10.2005- 3.11.2005), when the Northern part of the country was covered.
Since the year 2006 the oral vaccination of wildlife is performed on the whole territory of the country twice per year (in spring and autumn).
The investigations show a significant decrease in number of positive cases among animals and in number of attacks of humans by animals.
The vaccination will be carried out untill no positive cases are present in Estonia.

Additional information

The investigations show a significant decrease in number of positive rabies cases among animals and in number of attacks of humans by animals due to the oral vaccination of wild animals.
The oral vaccination of wildlife (started in 2005) shows a significant decrease in number of positive cases registered in animals:
2003 - 814,
2004 - 314,
2005 - 266,
2006 - 114,
2007 - 4 cases.

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 authorized 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

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

Diagnostic/ analytical methods used

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

Vaccination policy

Vaccination of cats and dogs:
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 3 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, authorized veterinarians or licensed 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 authorized 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 endangered 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 authorized 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.

Recent actions taken to control the zoonoses

Rabies in Estonia originates from wildlife and its main reservoir are red foxes and raccoon dogs. The oral vaccination programme of wildlife started in autumn 2005 in the frames of Transition Facility Programme when bait drop area covered only the Northern part of Estonia. Since the year 2006 the whole country is covered by vaccination and the baits are distributed twice a year (in spring and autumn). Vaccination of wild animals will be performed until no cases of rabies are registered in Estonia.
The investigations of wild animals show that 85 % and 82 % of vaccine had been eaten by animals in the years 2006 and 2007 accordingly. The number of positive cases significantly decreased from 266 cases registered in 2005 to 114 cases in 2006 and 4 cases registered in 2007.

Suggestions to the Community for the actions to be taken

Rabies in Estonia originates from wildlife and its main reservoir are red foxes and raccoon dogs. The oral vaccination programme of wildlife started in autumn 2005 in the frames of

Transition Facility Programme when bait drop area covered only the Northern part of Estonia. Since the year 2006 the whole country is covered by vaccination and the baits are distributed twice a year (in spring and autumn). Vaccination of wild animals will be performed until no cases of rabies are registered in Estonia.
The investigations of wild animals show that 85 % and 82 % of vaccine had been eaten by animals in the years 2006 and 2007 accordingly. The number of positive cases significantly decreased from 266 cases registered in 2005 to 114 cases in 2006 and 4 cases registered in 2007.

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 authorized 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 authorized 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 analysis has been taken the carcass of the animal has to be burnt.
If rabies is diagnosed in one animal of the herd the authorized 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 authorized veterinarian.
If the infection source is not known, the authorized 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 authorized 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 behavior should be slaughtered pursuant to the orders of the veterinary supervisory official or the authorized 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 2007 37 dog brain tissue have been tested for rabies. None of them was 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 raccoon dogs are its main reservoir. Thus the oral vaccination of wild animals started in the year 2005 and will be performed each year (in spring and autumn) until no cases of rabies are registered in Estonia.
The vaccination of dogs and cats is obligatory and free of charge in Estonia.

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 2007 was registered in Harjumaa (especially Tallinn city), Tartumaa and Ida-Virumaa counties. The same situation was in the year 2006
1924 (in 2006 - 2200 and in 2005 - 2407 bites) dog bites have been registered in the year 2007.
The animal attacks on humans were caused in majority by dogs (74,3 %), followed by cats (22,6 %), foxes (0,5 %) and rats (0,5 %), raccoon dogs (0,2 %).

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	Unspecified Lyssavirus	European Bat Lyssavirus - unspecified	Classical rabies virus (genotype 1)
Cattle (bovine animals)	VFB	animal	30	2	2		
Sheep	VFB	animal	10	0			
Goats	VFB	animal	3	0			
Solipeds, domestic	VFB	animal	1	0			
Dogs	VFB	animal	37	0			
Cats	VFB	animal	103	0			
Foxes							
wild	VFB	animal	83	0			
Raccoon dogs							
wild	VFB	animal	75	1	1		
Badgers							
wild	VFB	animal	3	1	1		
Marten							
wild	VFB	animal	7	0			
Wild boars							
wild	VFB	animal	1	0			
Deer							
wild							
roe deer	VFB	animal	11	0			
Lynx							
wild	VFB	animal	2	0			
Minks							
wild	VFB	animal	1	0			
Polecats							
wild	VFB	animal	1	0			
Otter	VFB	animal	1	0			
Mice							
wild	VFB	animal	1	0			
Rats							
wild	VFB	animal	3	0			

2.12. Q-FEVER

2.12.1. General evaluation of the national situation

2.12.2. Coxiella (Q-fever) in animals

2.13. CYSTICERCOSIS, TAENIOSIS

2.13.1. General evaluation of the national situation

2.13.2. Cysticerci in animals

A. Cysticerci spp., unspecified in animal

Monitoring system

Sampling strategy

All slaughtered animals are examined visually at post-mortem inspection.

Frequency of the sampling

All slaughtered animals intended for human consumption are examined routinely at slaughterhouses.

Type of specimen taken

Other: liver, carcass

Methods of sampling (description of sampling techniques)

Macroscopic examination of carcasses is routinely done at post-mortem inspection at the slaughterhouse.

Case definition

A sample (liver) or carcass, where Cysticercus was detected.

Diagnostic/ analytical methods used

Visual examination, microscopy

Measures in case of the positive findings or single cases

In case of detecting of Cysticerci the animal carcass or organs are declared as unfit for human consumption.

Notification system in place

Cysticerci detection in food and in animals 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 on 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 zoonotic agents in food and animals.

Results of the investigation

Cysticerci were found in 1 pig liver, which was laboratory confirmed. Cysticerci hepatis was detected.

Table Cysticerci in animal

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Cysticerci	Cysticerci spp., unspecified
Pigs (1)	VFB	animal		452170	1	1
Cattle (bovine animals)	VFB	animal		53903	0	
Wild boars						
wild	VFB	animal		1821	0	

(1) : Cysticercus tenuicollis was detected in cattle liver

Footnote

All animals were examined at post mortem inspection

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ENTEROCOCCUS, NON-PATHOGENIC

3.1.1. General evaluation of the national situation

3.1.2. Antimicrobial resistance in Enterococcus, non-pathogenic isolates

A. Antimicrobial resistance of Enterococcus spp., unspecified in animal

Sampling strategy used in monitoring

Frequency of the sampling

The Enterococcus isolates are collected from the 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.

Methods of sampling (description of sampling techniques)

There is no monitoring programme on ingvestigation of E.coli in animals. animals in the frames of the official control. Analyzes 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. Analyzes are performed by the Veterinary and Food Laboratory.
There is no special programme for sampling of faeces for this project. The Enterococcus isolates are collected from the 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.

Methods used for collecting data

There is no special programme for sampling of faeces for this project. The Enterococcus isolates are collected from the 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.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, erythromycin, virginiamycin, gentamicin, streptomycin, kanamycin, tetracyclin, chloramphenicol, vancomycin, narasin, bacitracin, linezolid according to the Report from the Task Force on Zoonoses Data Collection including guidance for harmonized monitoring and reporting of antimicrobial resistance in commensal Escherichia coli and Enterococcus spp. from food animals. The EFSA Journal (2008) 141: 1-44.

Breakpoints used in testing

According to the Report from the Task Force on Zoonoses Data Collection including guidance for harmonized monitoring and reporting of antimicrobial resistance in commensal Escherichia coli and Enterococcus spp. from food animals. The EFSA Journal (2008) 141: 1-44.

Results of the investigation

There were analyzed 4 E.faecalis derived from pigs samples, 4 E.faecalis derived from cattle samples,

1 E.faecium derived from cattle sample and 2 E.faecium derived from pigs samples in 2007.
4 isolates (36 %) from 11 isolates tested were fully sensitive.
1 isolate (9 %) was resistant to 1 antimicrobial,
4 isolates (36 %) were resistant to 2 antimicrobials,
1 isolate (9 %) - to 4 and 1 (9 %) to more than to 4 antimicrobials.
Isolates were resistant to virginiamycin (1), chloramphenicol (1), bacitracin (1), erythromycin (2), kanamycin (2), vancomycin (3), tetracyclin (4), streptomycin (4).

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

	E. faecium
	Cattle (bovine animals)
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	1

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	32	1	0										1										
Kanamycin	1024	1	0														1						
Streptomycin	128	1	0												1								
Amphenicols																							
Chloramphenicol	32	1	0									1											
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	32	1	1												1								
Vancomycin	4	1	0						1														
Ionophores																							
Narasin	2	1	0						1														
Macrolides																							
Erythromycin	4	1	1										1										
Oxazolidines																							
Linezolid	4	1	0								1												
Penicillins																							
Ampicillin	4	1	0							1													
Streptogramins																							
Virginiamycin	4	1	0								1												
Tetracyclines																							
Tetracyclin	2	1	0						1														

Table Antimicrobial susceptibility testing of E. faecium in Pigs - quantitative data [Dilution method]

	E. faecium
	Pigs
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	2

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																			
				<=0.03	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	32	2	0									2											
Kanamycin	1024	2	1													1					1		
Streptomycin	128	2	1												1				1				
Amphenicols																							
Chloramphenicol	32	2	1									1			1								
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	32	2	0									1	1										
Vancomycin	4	2	0						1	1													
Ionophores																							
Narasin	2	2	0				1		1														
Macrolides																							
Erythromycin	4	2	1								1				1								
Oxazolidines																							
Linezolid	4	2	0							2													
Penicillins																							
Ampicillin	4	2	0						2														
Streptogramins																							
Virginiamycin	4	2	1						1					1									
Tetracyclines																							

Table Antimicrobial susceptibility testing in E. faecium

n = Number of resistant isolates	E. faecium			
	Cattle (bovine animals)		**Pigs**	
Isolates out of a monitoring programme	yes		yes	
Number of isolates available in the laboratory	1		2	
Antimicrobials:	**N**	**n**	**N**	**n**
Aminoglycosides				
Gentamicin	1	0	2	0
Kanamycin	1	0	2	1
Streptomycin	1	0	2	1
Amphenicols				
Chloramphenicol	1	0	2	1
Fully sensitive	1	0	2	1
Glycopeptides (Cyclic peptides, Polypeptides)				
Bacitracin	1	1	2	0
Vancomycin	1	0	2	0
Ionophores				
Narasin	1	0	2	0
Macrolides				
Erythromycin	1	1	2	1
Oxazolidines				
Linezolid	1	0	2	0
Penicillins				
Ampicillin	1	0	2	0
Resistant to 1 antimicrobial	1	0	2	0
Resistant to 2 antimicrobials	1	1	2	0
Resistant to 4 antimicrobials	1	0	2	0
Resistant to >4 antimicrobials	1	0	2	1
Streptogramins				
Virginiamycin	1	0	2	1
Tetracyclines				
Tetracyclin	1	0	2	1

Table Antimicrobial susceptibility testing of E. faecalis in Pigs - quantitative data [Dilution method]

	E. faecalis
	Pigs
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	4

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	32	4	0							1		2	1										
Kanamycin	1024	4	1											1	2						1		
Streptomycin	518	4	1											1	1	1			1				
Amphenicols																							
Chloramphenicol	32	4	0								1	2	1										
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	32	4	0										2	2									
Vancomycin	4	4	2							2		2											
Ionophores																							
Narasin	2	4	0				2	1	1														
Macrolides																							
Erythromycin	4	4	1					2		1					1								
Oxazolidines																							
Linezolid	4	4	0					1	1	1	1												
Penicillins																							
Ampicillin	4	4	0						4														
Streptogramins																							
Virginiamycin	32	4	0									3	1										
Tetracyclines																							

Table Antimicrobial susceptibility testing in E. faecalis

n = Number of resistant isolates	E. faecalis			
	Cattle (bovine animals)		**Pigs**	
Isolates out of a monitoring programme	yes		yes	
Number of isolates available in the laboratory	4		4	
Antimicrobials:	**N**	**n**	**N**	**n**
Aminoglycosides				
Gentamicin	4	0	4	0
Kanamycin	4	0	4	1
Streptomycin	4	2	4	1
Amphenicols				
Chloramphenicol	4	0	4	0
Fully sensitive	4	1	4	2
Glycopeptides (Cyclic peptides, Polypeptides)				
Bacitracin	4	0	4	0
Vancomycin	4	1	4	2
Ionophores				
Narasin	4	0	4	0
Macrolides				
Erythromycin	4	0	4	1
Oxazolidines				
Linezolid	4	0	4	0
Penicillins				
Ampicillin	4	0	4	0
Resistant to 1 antimicrobial	4	0	4	1
Resistant to 2 antimicrobials	4	3	4	0
Resistant to 4 antimicrobials	4	0	4	1
Resistant to >4 antimicrobials	4	0	4	0
Streptogramins				
Virginiamycin	4	0	4	0
Tetracyclines				
Tetracyclin	4	3	4	0

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

	E. faecalis
	Cattle (bovine animals)
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	4

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	32	4	0								2	1	1										
Kanamycin	1024	4	0												2	1	1						
Streptomycin	518	4	2												1	1			2				
Amphenicols																							
Chloramphenicol	32	4	0								2	2											
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	32	4	0								1	1	1	1									
Vancomycin	4	4	1							2	1	1											
Ionophores																							
Narasin	2	4	0			1	1	2															
Macrolides																							
Erythromycin	4	4	0					1	2		1												
Oxazolidines																							
Linezolid	4	4	0					1	1	1	1												
Penicillins																							
Ampicillin	4	4	0				1		3														
Streptogramins																							
Virginiamycin	32	4	0							2	1	1											
Tetracyclines																							

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

Test Method Used

Broth dilution

Standards used for testing

ISO_20776-1:2006

Enterococcus, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol				32	0.5	64				
Tetracyclines										
Tetracyclin				2	0.5	64				
Aminoglycosides										
Streptomycin (1)				518	8	1024				
Gentamicin				32	2	256				
Kanamycin				1024	16	2048				
Macrolides										
Erythromycin				4	0.5	64				
Glycopeptides (Cyclic peptides, Polypeptides)										
Bacitracin				32	1	128				
Vancomycin				4	1	128				
Oxazolidines										
Linezolid				4	0.5	16				
Penicillins										
Ampicillin				4	0.25	32				
Streptogramins										
Virginiamycin (2)				32	0.5	64				
Ionophores										
Narasin				2	0.12	16				

(1) : Breakpoint concentration - Resistant:
E.faecalis - 518
E.faecium - 128
(2) : Breakpoint concentration - Resistant:
E.faecalis - 32
E.faecium - 4

Footnote

Standard for breakpoint used:
Report from the Task Force on Zoonoses Data Collection including guidance for harmonized monitoring and reporting of antimicrobial resistance in commensal Escherichia coli and Enterococcus spp. from food animals. The EFSA Journal (2008) 141: 1-44

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

Test Method Used

Standards used for testing

Enterococcus, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin										
Amphenicols										
Chloramphenicol										
Aminoglycosides										
Streptomycin										
Gentamicin										
Kanamycin										
Macrolides										
Erythromycin										
Glycopeptides (Cyclic peptides, Polypeptides)										
Bacitracin										
Vancomycin										
Oxazolidines										
Linezolid										
Penicillins										
Ampicillin										
Streptogramins										
Virginiamycin										
Quinupristin/ Dalfopristin										
Ionophores										
Narasin										

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

Test Method Used

Standards used for testing

Enterococcus, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin										
Amphenicols										
Chloramphenicol										
Aminoglycosides										
Streptomycin										
Gentamicin										
Kanamycin										
Macrolides										
Erythromycin										
Glycopeptides (Cyclic peptides, Polypeptides)										
Bacitracin										
Vancomycin										
Oxazolidines										
Linezolid										
Penicillins										
Ampicillin										
Streptogramins										
Virginiamycin										
Quinupristin/ Dalfopristin										
Ionophores										
Narasin										

3.2. ESCHERICHIA COLI, NON-PATHOGENIC

3.2.1. General evaluation of the national situation

A. Escherichia coli general evaluation

History of the disease and/ or infection in the country

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 in the frames of the official control. Analyzes 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.

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. Analyzes are performed by the Veterinary and Food Laboratory.
There is no special programme for sampling of faeces for this project. The E.coli isolates are collected from the 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 2007 44 E.coli isolates derived from pigs and cattle were analyzed. The number of multiresistant isolates and the number of antimicrobials to which resistance was found increased significally in comparison with the previous year. Resistance to ciprofloxacin is of great concern: 73 % of E.coli isolates were resistant.
In the year 2007 antimicrobial resistance of E.coli had been investigated in 19 isolates discovered in samples taken from pigs:
1 isolate (5,3 %) was fully sensitive (in 2005 - 55 %; in 2006 - 27 %),
7 isolates (37 %) were resistant to 1 antimicrobial (in 2005 - 23 %; in 2006 - 36 %),
3 (16 %) were resistant to 2 antimicrobials (in 2005 - 13 %; in 2006 - 36 %),
4 isolates (21 %) were resistant to 3 antimicrobials (no in 2005 and 2006),
2 isolates (11 %) were resistant to 4 antimicrobials (no in 2005 and 2006),
2 isolates (11 %) were resistant to more than to 4 antimicrobials (no in 2005 and 2006).
Resistance to ciprofloxacin is of great concern: 74 % of E.coli isolates derived from pigs samples were resistant. Isolates were resistant to gentamicin (1), kanamycin (1), chloramphenicol (1), ampicillin (3), trimethoprim (4), sulfamethoxazol (6), streptomycin (7), tetracyclin (7), ciprofloxacin (14).
In 2006 isolates were resistant to streptomycin (5), kanamycin (3), gentamicin (2) and ampicillin (1).
25 isolates discovered in samples taken from cattle:
4 isolates (16 %) were fully sensitive (in 2005 - 78 %; in 2006 - 43 %),
14 isolates (56 %) were resistant to 1 antimicrobial (in 2005 - 8 %; in 2006 - 47 %),
1 isolate (4 %) was resistant to 2 antimicrobials (no in 2005 and 2006),
1 isolate (4 %) was resistant to 3 antimicrobials (no in 2005 and 2006),
5 (20 %) were resistant to more than to 4 antimicrobials (no in 2005 and 2006).

In 2007 isolates were resistant to cefotaxim (1), ceftoifur (1), gentamicin (3), chloramphenicol (3), kanamycin (5), ampicillin (5), trimethoprim (5), sulfamethoxazol (5), tetracyclin (5), streptomycin (7), ciprofloxacin (18). High prevalence of resistance to ciprofloxacin (72 %) was discovered.
In 2006 isolates were resistant to tetracycline (2), sulphametoxazol (2), streptomycin (3), ampicillin (1), ceftiofur (2) and chloramphenicol (1).

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

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					
Number of isolates available in the laboratory	25		19					
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides								
Gentamicin	25	3	19	1				
Kanamycin	25	5	19	1				
Streptomycin	25	7	19	7				
Amphenicols								
Chloramphenicol	25	3	19	1				
Florfenicol	25	0	19	0				
Cephalosporins								
Cefotaxim	25	1	19	0				
Ceftiofur	25	1	19	0				
Fluoroquinolones								
Ciprofloxacin	25	18	19	14				
Fully sensitive	25	4	19	1				
Penicillins								
Ampicillin	25	5	19	3				
Quinolones								
Nalidixic acid	25	0	19	0				
Resistant to 1 antimicrobial	25	14	19	7				
Resistant to 2 antimicrobials	25	1	19	3				
Resistant to 3 antimicrobials	25	1	19	4				
Resistant to 4 antimicrobials	25	0	19	2				
Resistant to >4 antimicrobials	25	5	19	2				
Sulfonamides								
Sulfamethoxazol	25	5	19	6				
Tetracyclines								
Tetracyclin	25	5	19	7				
Trimethoprim	25	5	19	4				

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

	E. coli
	Cattle (bovine animals)
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	25

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	2	25	3					1	19	2			1		2								
Kanamycin	16	25	5								17	3		5									
Streptomycin	16	25	7								1	17				1	6						
Amphenicols																							
Chloramphenicol	16	25	3								6	16				3							
Florfenicol	16	25	0								5	17	3										
Cephalosporins																							
Cefotaxim	0.25	25	1		14	10				1													
Ceftiofur	1	25	1				4	17	3		1												
Fluoroquinolones																							
Ciprofloxacin	0.03	25	18	7	18																		
Penicillins																							
Ampicillin	8	25	5						1	14	5			5									
Quinolones																							
Nalidixic acid	16	25	0							11	14												
Sulfonamides																							
Sulfamethoxazol	256	25	5											20							5		
Tetracyclines																							
Tetracyclin	8	25	5						9	10	1			1	4								
Trimethoprim	2	25	5				7	11	1	1				5									

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

	E. coli
	Pigs
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	19

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																			
				<=0.03	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	2	19	1					1	14	3	1												
Kanamycin	16	19	1								16	2		1									
Streptomycin	16	19	7									9	3	1	2	1	3						
Amphenicols																							
Chloramphenicol	16	19	1								6	12			1								
Florfenicol	16	19	0								3	15	1										
Cephalosporins																							
Cefotaxim	0.25	19	0		13	6																	
Ceftiofur	1	19	0				7	12															
Fluoroquinolones																							
Ciprofloxacin	0.03	19	14	5	14																		
Penicillins																							
Ampicillin	8	19	3						2	10	4			3									
Quinolones																							
Nalidixic acid	16	19	0						1	6	12												
Sulfonamides																							
Sulfamethoxazol	256	19	6											13							6		
Tetracyclines																							
Tetracyclin	8	19	7						7	5				3	4								
Trimethoprim	2	19	4				12	3						4									

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

Broth dilution

Standards used for testing

ISO_20776-1:2006

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol				16	1	128				
Florfenicol				16	4	32				
Tetracyclines										
Tetracyclin				8	0.5	64				
Fluoroquinolones										
Ciprofloxacin				0.03	0.008	1				
Enrofloxacin										
Quinolones										
Nalidixic acid				16	1	128				
Trimethoprim				2	0.25	32				
Sulfonamides										
Sulfonamide										
Sulfamethoxazol				256	16	2048				
Aminoglycosides										
Streptomycin				16	2	256				
Gentamicin				2	0.5	64				
Neomycin										
Kanamycin				16	2	16				
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim				0.25	0.06	2				
Ceftiofur				1	0.12	16				
3rd generation cephalosporins										
Penicillins										
Ampicillin				8	0.25	32				

Footnote

Standard for breakpoint used:
Report from the Task Force on Zoonoses Data Collection including guidance for harmonized monitoring and reporting of antimicrobial resistance in commensal Escherichia coli and Enterococcus spp. from food animals. The EFSA Journal (2008) 141: 1-44

Table Breakpoints used for antimicrobial susceptibility testing in Food

Test Method Used

Standards used for testing

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

Table Breakpoints used for antimicrobial susceptibility testing in Feedingstuff

Test Method Used

Standards used for testing

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

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1. HISTAMINE

4.1.1. General evaluation of the national situation

A. Histamine General evaluation

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

The situation is quite favorable, but the number of samples taken is not sufficient for making any conclusion.
No positive samples were detected in 2007. The same situation was in 2006.

4.1.2. Histamine in foodstuffs

A. Histamine in foodstuffs

Monitoring system

Sampling strategy

Samples are taken in the frames of official control at retail and in the frames of import control. Sampling was performed by the officials of the Veterinary and Food Board.

Frequency of the sampling

Sampling distributed evenly throughout the year.

Type of specimen taken

Other: fishery products

Methods of sampling (description of sampling techniques)

Sampling is performed randomly, sample weight analysed is 5 g.

Definition of positive finding

According to the Regulation 2073/ 2005.

Diagnostic/ analytical methods used

HPLC

Measures in case of the positive findings or single cases

The batch should be removed from the market.

Results of the investigation

In 2007 no unsatisfactory samples were detected.

Table Histamine in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units in non- conformity	<= 100 mg/ kg	>100 - <= 200 mg/ kg	>200 - <= 400 mg/ kg	> 400 mg/ kg
Fish									
Fishery products which have undergone enzyme maturation treatment in brine (1)	VFB	batch	5 g	3	0				

(1) : Import control

4.2. ENTEROBACTER SAKAZAKII

4.2.1. General evaluation of the national situation

A. Enterobacter sakazakii general evaluation

History of the disease and/ or infection in the country

The situation seems to be stable.
There are no human cases registered during years.

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

It is very early to make any conclusion, as the number of samples analyzed is very small. In 2007 3 batches and in 2006 2 batches were analyzed.
No positive samples were detected in the year 2007.
In 2006 one batch was found to be positive for E.sakazakii.

4.2.2. Enterobacter sakazakii in foodstuffs

A. Enterobacter sakazakii in foodstuffs

Monitoring system

Sampling strategy

Samples are taken randomly at processing plant.

Frequency of the sampling

Sampling distributed evenly throughout the year.

Type of specimen taken

Other: dried infant formulae

Methods of sampling (description of sampling techniques)

According to the Regulation 2073/ 2005 30 sub-samples are taken from the batch and analyzed separately. Sample weight analyzed is 10 g.

Definition of positive finding

The sample is considered to be positive, if in any of 30 subsamples Enterobacter sakazakii is isolated.

Diagnostic/ analytical methods used

Bacteriological method: ISO 22964.

Preventive measures in place

When possible, the batch is supposed for recycling.
The batch should be removed from the market.

Results of the investigation

3 batches were analyzed in the year 2007. None of them was positive for Enterobacter sakazakii.

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

The situation seems to be stable.

Table Enterobacter sakazakii in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Enterobacter sakazakii	E. sakazakii
Foodstuffs intended for special nutritional uses						
- at processing plant - domestic production (1)	VFB	batch	10 g	3	0	

(1) : Dried infant and folow-up formulae, each sample consists of 30 sub-samples

4.3. STAPHYLOCOCCAL ENTEROTOXINS

4.3.1. General evaluation of the national situation

A. Staphylococcal enterotoxins general evaluation

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

There were no samples detected with the values of coagulase-positive staphylococci >100000 cfu/ g in the year 2007. Thus staphylococcal enterotoxins were not analyzed in the year 2007.
The same situation was in 2006.

4.3.2. Staphylococcal enterotoxins in foodstuffs

A. Staphylococcal enterotoxins in foodstuffs

Monitoring system

Sampling strategy

Analyzes of cheeses, milk powder and whey powder are performed, as
referred to in the coagulase-positive staphylococci
criteria in Chapter 2.2 of the Annex I of the Commission Regulation (EC) No 1441/ 2007 amending Regulation (EC) No 2073/ 2005 on microbiological criteria for foodstuffs.
If values of coagulase-positive staphylococci > 10(5) cfu/ g are detected, the batch has to be tested for staphylococcal enterotoxins.

Methods of sampling (description of sampling techniques)

If values of coagulase-positive staphylococci > 10(5) cfu/ g are detected, the batch has to be tested for staphylococcal enterotoxins.

Results of the investigation

No values of coagulase-positive staphylococci > 10(5) cfu/ g were detected in foodstuffs in the year 2007.

5. FOODBORNE OUTBREAKS

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

A. Foodborne outbreaks

System in place for identification, epidemological investigations and reporting of foodborne outbreaks

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 needed and a system for dealing with 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 the 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
2006 27 173
2007 28 92
In 2000-2003 only general outbreaks were reported (with 10 or more cases), since 2004 general outbreaks and family clusters with 2 or more cases are reported.

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.

Descriptions of single outbreaks of special interest

Both verified outbreaks (Salmonella enteritidis) were linked to the same source of infection: raw eggs from one farm.

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

Foodborne Outbreaks: summarized data

	Total number of outbreaks	Number of possible outbreaks	Number of verified outbreaks
Bacillus	0	0	0
Campylobacter	1	1	0
Clostridium	0	0	0
Escherichia coli, pathogenic	0	0	0
Foodborne viruses	0	0	0
Listeria	0	0	0
Other agents	0	0	0
Parasites	0	0	0
Salmonella	25	23	2
Staphylococcus	0	0	0
Unknown	0	0	0
Yersinia	2	2	0

Verified Foodborne Outbreaks: detailed data

S. Enteritidis

	Value
Code	2
Subagent Choice	
Outbreak type	General
Human cases	8
Hospitalized	1
Deaths	0
Foodstuff implicated	Bakery products
More Foodstuff	Cake with cream prepared from raw egg
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	

S. Enteritidis

	Value
Code	1
Subagent Choice	
Outbreak type	General
Human cases	10
Hospitalized	3
Deaths	1
Foodstuff implicated	Bakery products
More Foodstuff	Cake with cream prepared from raw egg
Type of evidence	Laboratory detection in implicated food, Analytical epidemiological evidence, Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	