

ESTONIA

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

TRENDS AND SOURCES OF ZOONOSSES AND ZOOTIC AGENTS IN HUMANS, FOODSTUFFS, ANIMALS AND FEEDSTUFFS

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

IN 2013

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: Estonia

Reporting Year: 2013

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 veterinary, food safety, market regulation, animal welfare and farm animal breeding are followed. The broader objective of VFB is to ensure the consumers the production of safe, healthy and quality raw materials for food, to prevent and eradicate infectious animal diseases, to protect people from diseases common to both people and animals and diseases that are spread by animals. 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, feed 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.

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Laboratory name	Description	Contribution
Estonian Agricultural Registers and Information Board (ARIB)	<p>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.</p>	Susceptible animal population data.
Health Board	<p>The Health Board is a government agency within the Ministry of Social Affairs, which began to operate as of 1 January 2010. It incorporates the functions of the Health Care Board, the Health Protection Inspectorate, and the Chemicals Notification Centre. The area of its activity includes the organisation of supervision of drinking and bathing water; registration of communicable and parasitic diseases, investigation of the circumstances of infection transmission and working out measures for prevention and control of communicable diseases; supervision of the organisation of immunization of population and monitoring of immunization coverage. Additional fields of activity are health care, chemical safety and medical devices.</p>	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*. 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 2013 .

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.

* 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, 2013.

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

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		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
		Data	Year*	Data	Year*	Data	Year*	Data	Year*
Cattle (bovine animals)	meat production animals	1876		7151		40181		2153	
	dairy cows and heifers	2989		22917		143566		3401	
	calves (under 1 year)	2897		4127		71290		3378	
	- Unknown	4180		39754		261106		4697	
Deer	wild			1067					
	wild - roe deer			453					
Ducks	- Unknown	126						128	
Gallus gallus (fowl)	laying hens	73		33968				82	
	broilers			10740840					
	- Unknown	2355						2385	
Geese	- Unknown	135						136	
Goats	animals under 1 year	159		94		632		174	
	animals over 1 year	568		564		3332		600	

Table Susceptible animal populations

Animal species	Category of animals	Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
		Data	Year*	Data	Year*	Data	Year*	Data	Year*
Goats	- Unknown	582		658		3964		615	
Pigs	fattening pigs	194				161289		194	
	- Unknown	243		443085		354017		243	
	mixed herds - unspecified	104				33858		104	
Reindeers	farmed	1						1	
Sheep	animals under 1 year (lambs)	1026		6462		16708		1109	
	animals over 1 year	1881		10895		60790		1999	
	- Unknown	1921		17357		77498		2040	
Solipeds, domestic	horses	897		21		11095		931	
Turkeys	- Unknown	45						46	
Wild boars	farmed	10						10	
	wild			3697					
Bears	wild			28					
Beavers	wild			527					

Table Susceptible animal populations

		Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
Animal species	Category of animals	Data	Year*	Data	Year*	Data	Year*	Data	Year*
Moose	wild			2988					
Ostriches	farmed			18					
Quails	meat production flocks			109551					

2. INFORMATION ON SPECIFIC ZONNOSES 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 Board.

Data show that the number of cases of human salmonellosis is decreasing during years and in 2013 it was not the most frequently reported disease in Estonia as it was before. Salmonellosis is still an important zoonotic disease in Estonia. The majority of cases have acquired the infection 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 animals, food and feed has been carried out in Estonia for many years. In addition to the surveillance systems, monitoring programmes are conducted and they provide additional epidemiological information.

The State Programme on Monitoring and Surveillance of Animal Infectious Diseases is in place. The data received in the frames of this programme shows that *Salmonella* is mostly found in pigs.

No turkey, geese and duck flocks are present in Estonia.

Salmonella was found in 12,5% of samples of feed materials and feedingstuffs in 2013 (in 2012 - 4,8%; 2011 - 5%; 2010 - 5,1%; 2009 - 3,9%; 2008 - 5,2%; 2007 - 10,7%). The majority of positive samples were of non EU origin.

The Estonian *Salmonella* Monitoring Programme for Food of Animal Origin was started from 2002 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.

Data received from the monitoring programme and official control shows that the majority of positive samples were pig meat and products thereof.

There were no positive samples of milk and milk products or any other food category.

Antimicrobial resistance:

Salmonella isolates derived from foodstuffs and animals tested for antimicrobial resistance are collected in the frames of monitoring or surveillance programmes. In 2013 21 *Salmonella* isolates derived from food and 73 isolates derived from animals were tested in the frames of the Antimicrobial Resistance Monitoring of Zoonotic Agents. Investigations were performed by the Veterinary and Food Laboratory.

45,2% (in 2012 - 59,4%, 2011 - 78,6%) of tested *Salmonella* isolates derived from animals were fully sensitive. 27,5% of the resistant isolates were resistant to 3 and more antimicrobials.

57,1% (in 2012 - 68,8%, 2011 - 71,4%) of tested *Salmonella* isolates derived from food were fully sensitive. 77,8% of the resistant isolates were resistant to 3 and more antimicrobials.

The number of human salmonellosis cases decreased 1,5 times in comparison with the year 2012. The predominant causative agents of salmonellosis in humans was *S. Enteritidis*. *S. Typhimurium* and *S. Agona* are on the second position.

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

Salmonella infection in humans is mostly food borne. 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 already consumed before the examination starts.

Transmission from an infected person to person is possible.

Salmonella Enteritidis is the predominant agent discovered in humans during years. Salmonella Typhimurium and in 2013 Salmonella Agona are on the second position among the other serotypes isolated from humans.

Salmonella Enteritidis is a most frequently detected serovar in poultry and poultry meat during years.

Recent actions taken to control the zoonoses

Surveillance of salmonella in feed, animals and food has been carried out in Estonia for many years. In addition to the surveillance systems, monitoring programmes are conducted and they provide additional epidemiological information.

Salmonella monitoring in animals is carried out according to the State Programme on Monitoring and Surveillance of Animal Infectious Diseases. Salmonella monitoring in food of animal origin is performed according to the Salmonella Monitoring Programme in Food of Animal Origin since the year 2002.

2.1.2 Salmonella in foodstuffs

A. 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 performed in cases of suspicion.

Samples are taken also at border inspection posts in the frames of border veterinary checks and at retail. The samples are taken randomly, but in case of noncompliance, more stringent checks of consignments of the same origin are carried out.

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 annual plan 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

carcass, fresh meat, scrap cuttings

At meat processing plant

meat preparations, minced meat, meat products

At retail

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 carcasses at slaughterhouse and meat or scrap cuttings from cutting plants. At slaughterhouses a neck

skin sample is taken from 3 broiler carcasses belonging to the same batch. Samples are taken immediately after veterinary inspection at the final stage of slaughter line before chilling of carcasses.

The whole carcass is taken and put in sterile sampling 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. In the laboratory the skin sample is taken.

The sampling at cutting plant is performed randomly and carried out each month.

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; minced meat, meat preparations and meat preparations made from minced meat are sampled),

meat products establishments - meat products are sampled regularly.

At retail

According to the Commission Regulation 2073/2005. Number of subsamples taken is 5.

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

ISO 6579:2003

At meat processing plant

ISO 6579:2003

At retail

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 39 "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 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 Board about isolation of zoonotic agents.

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

Results of the investigation

87 samples of broiler meat and broiler meat products were taken in 2013. 3,4% of analysed samples were found to be positive for Salmonella spp. (in 2012 - 0,9%; 2011 - 0%; 2010 - 1,1%; 2009 - 0; 2008 - 0,85%, 2007 - 1,3%; 2005 - 11,2%; 2006 - 5,4%). All samples that were positive for Salmonella were taken at retail.

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

Data received from Salmonella Monitoring Programme for Food of Animal Origin 2002-2013 and analyzes of samples taken in the frames of official control showed that during years Salmonella has been detected mostly in fresh broiler meat samples. But the situation changed and in the years 2007-2013 the number of broiler meat samples positive for Salmonella was close to zero.

Salmonella Enteritidis was the prevalent serovar in broiler meat during years.

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

In the year 2013 no broiler meat or broiler meat products were supposed to be the source of infection in foodborne outbreaks.

The relevance of the source of infection in humans to broiler meat and products thereof in most outbreaks is determined on the basis of epidemiological investigation, but not bacteriologically.

Salmonella Enteritidis is the predominant serovar detected in humans during many years.

B. 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.

In addition, at the slaughterhouses all carcasses with infection suspicions and pigs slaughtered under special conditions should be sampled.

Sampling in the frames of official food surveillance is performed randomly. Targeted sampling is performed 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 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

carcass swabs, fresh meat

At meat processing plant

fresh meat, minced meat, meat preparations, meat products

At retail

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 were stored at 0+4C and sent to the laboratory as soon as possible.

Sampling in the frames of official control is performed randomly. Targeted sampling is performed in case of suspicion, consumer complains etc.

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; minced meat, meat preparations and meat preparations made of minced meat are sampled (each sample consists of 5 subsamples, which are examined individually).

meat products establishments - meat products are sampled regularly.

At retail

Sample analyzed - 10 or 25 g according to the Commission Regulation 2073/2005. Number of subsamples taken are 5.

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

ISO 6579:2003

At meat processing plant

ISO 6579:2003

At retail

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 39 "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 Board about isolation of zoonotic agents.

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

Results of the investigation

1,5% of the 206 samples of pig meat and pig meat products investigated in the frames of surveillance were positive for Salmonella in 2013 (2012 - 2,5%; 2011 - 2,3%; 2010 - 1,1%; 2009 - 1,15%; 2008- 0,3%; 2007 - 0,27%; 2006 - 0,27%; 2005 - 0,5%).

According to the Salmonella Monitoring Programme for Food of Animal Origin data pig meat is considered to be the most Salmonella contaminated foodstuff in Estonia. In 2013 4,2% of carcass samples (in 2012 - 2,7%; 2011 - 2%; 2010 - 3,6%) and no fresh meat samples (in 2012 - 0%; 2011 - 0,4% 2010 - 0,8%) were found to be positive for Salmonella spp. S.Derby was the predominant isolate found.

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

During last years pig meat is found to be more contaminated with Salmonella and is on the first place among other foodstuffs.

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

In the year 2013 there was 1 food borne outbreak that was associated with consumption of pig meat or products thereof.

The predominant Salmonella serotype in humans was S.Enteritidis and S.Typhimurium was on the second position, as in the previous years. S.Agona was for the first time at the same position as S.Typhimurium.

C. Salmonella spp. in bovine meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

Fresh bovine meat is sampled by the officials of the Veterinary and Food Board according to the Salmonella Monitoring Programme for Food of Animal Origin (SMPF) and in the frames of official food surveillance sampling plan.

SMPF comprises analyzes of randomly sampled swabs from bovine carcasses at slaughterhouse and meat or scrap cuttings from cutting plants. In addition at the slaughterhouses, all carcasses with infection suspicions and cattle slaughtered under special conditions should be sampled.

Sampling in the frames of official control is performed randomly. Targeted sampling is performed in case 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 annual plan 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

carcase swab, fresh meat

At meat processing plant

fresh meat, meat preparations, minced meat, meat products

At retail

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.

At cutting plants - samples should be taken during meat cutting from production line or any other appropriate site of the cutting plant.

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.

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; minced meat, meat preparations and meat preparations made from minced meat are sampled (sample consists of 5 subsamples, which are examined individually),

at meat products establishments - meat products are sampled regularly.

At retail

Sample analyzed - 10 or 25 g. Number of subsamples is 5.

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

ISO 6579:2003

At meat processing plant

ISO 6579:2003

At retail

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.

There is the Regulation of Minister of Agriculture No 39 "Prevention against salmonellosis", which defines

what should be done in case of Salmonella finding at any stage.

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 "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 Board about isolation of zoonotic agents.

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

Results of the investigation

In 2013 Salmonella was detected in 0,6% of analyzed bovine meat (carcass swabs and meat) samples taken in the frames of Salmonella Monitoring Programme. There were no positive samples taken in the frames of official control.

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

In the years 2010-2009 no positive samples were detected. In 2012 - 0,25% and in 2011 - 0,9% of all analyzed bovine meat samples were positive.

In the previous years the proportion of samples found to be positive for Salmonella has been the following: 0,6% of the samples analyzed in 2008 were found to be positive, 1,2% in 2007; 0,38% in 2006 and 0,2% in 2005 of the bovine meat was contaminated with Salmonella (mostly fresh and minced meat).

The Salmonella Monitoring Programme for Food of Animal Origin 2002-2013 data document that Salmonella has not been isolated from the samples of fresh bovine meat taken at cutting plants.

Salmonella was detected in 0,4% of the swab samples taken from carcasses at slaughter in 2002; in 0,6% of the samples in 2003; in 0,3% of the swab samples in 2006; in 1,8% of the samples analyzed in 2007; in 0,6% of the samples in 2008 and in 0,9% of the samples analysed in 2013. In 2009-2012 no positive bovine meat samples were found in the frames of monitoring programme.

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

No one case of human infection was epidemiologically linked to the consumption of bovine meat or products thereof.

D. 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 performed in cases of suspicion, consumer complains and etc.

At retail

Random sampling is performed as a part of official food control. Targeted sampling is performed 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

fresh meat, meat preparation, meat products

At retail

fresh meat, meat preparation, meat products

Methods of sampling (description of sampling techniques)

At meat processing plant

According to the Commission Regulation 2073/2005. Number of subsamples taken is 5.

At retail

According to the Commission Regulation 2073/2005. Number of subsamples taken is 5.

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

ISO 6579:2003

At retail

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 Board about isolation of zoonotic agents.

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

Results of the investigation

7 samples were taken in 2013. S.Newport and S.Sauntpaul were found in 1 sample.

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

The consumption of turkey meat is very small in Estonia. There is no turkey flocks in Estonia, so the meat or meat products analysed are not of Estonian origin.

It is very difficult to make any evaluation, as the amount of the samples analyzed is very small.

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

Turkey meat and products thereof were not confirmed or suspected as a source of infection in humans.

E. Salmonella spp. in eggs and egg products

Monitoring system

Sampling strategy

Eggs are sampled in case of suspicion or complain and egg products at production plants are sampled by the Veterinary and Food Board officials 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 annual plan as a part of official food control.

Sampling in the frames of official food control is performed randomly. Targeted sampling is performed in cases of suspicion, consumer complains etc.

Frequency of the sampling

Eggs at retail

Sampling is performed randomly.

Egg products (at production plant and at retail)

Sampling distributed evenly throughout the year

Type of specimen taken

Eggs at retail

Mixture of yolk and white

Egg products (at production plant and at retail)

dried/liquid egg products and ready-to-eat products

Methods of sampling (description of sampling techniques)

Eggs at egg packing centres (foodstuff based approach)

Eggs are sampled randomly. Sample taken - 5 eggs, sample analyzed - 25 g mixture of yolk and white.

Eggs at retail

Sample analyzed - 25 g mixture of egg yolk and white.

Raw material for egg products (at production plant)

Sampling is random.

Egg products (at production plant and at retail)

Egg products are sampled randomly.

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 retail

ISO 6579:2003

Raw material for egg products (at production plant)

ISO 6579:2003

Egg products (at production plant and at retail)

ISO 6579:2003

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 Board about isolation of zoonotic agents.

Local Veterinary centres notify the local offices of the Health Board about isolation of *Salmonella* in food.

Results of the investigation

In 2013 all samples analyzed were free from *Salmonella*.

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

The Estonian *Salmonella* Monitoring Programme for Food of Animal Origin 2002-2008 indicated that eggs taken at packaging centres are not contaminated with *Salmonella*. 2,3% of 308 egg product samples tested in the frames of the monitoring programme during this period were positive for *Salmonella*. At the same time since the year 2004 there were no positive egg products samples found in the frames of the monitoring programme. As a result of this eggs and egg products were excluded from the monitoring programme since the year 2008.

In 2013-2010 no samples taken in the frames of official control were positive for *Salmonella*. In 2009 one sample was found to be positive, the serovar detected was *S. enteritidis*.

Each year few foodborne outbreaks of human salmonellosis are registered where eggs and egg products were suspected to be the source of infection.

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

In 2013 1 outbreak of human salmonellosis was registered, where eggs or egg products were suspected to be the source of infection.

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Meat from broilers (Gallus gallus) - fresh - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat		Single	25 Gram	20	1		
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	9	0		
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	15	2	1	
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	14	0		
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample		Single	25 Gram	1	0		
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	2	0		
Meat from turkey - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0		
Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Monitoring	VFB	Objective sampling	Official sampling	food sample > neck skin	Domestic	Batch	25 Gram	14	0		
Meat from broilers (Gallus gallus) - fresh - Cutting plant - Monitoring	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Batch	25 Gram	11	0		
Meat from broilers (Gallus gallus) - fresh - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample > meat		Single	25 Gram	1	0		

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Meat from other poultry species - carcase - Slaughterhouse - Monitoring (Quail)	VFB	Objective sampling	Official sampling	food sample > neck skin	Domestic	Batch	25 Gram	2	0		
Meat from turkey - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	10 Gram	3	0		
Meat from turkey - meat preparation - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	2	0		
Meat from turkey - minced meat - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	1	1		
	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Infantis	S. Newport	S. Saintpaul						
Meat from broilers (Gallus gallus) - fresh - Retail - Surveillance			1								
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Processing plant - Surveillance											
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Retail - Surveillance			1								
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Processing plant - Surveillance											

Table Salmonella in poultry meat and products thereof

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Infantis	S. Newport	S. Saintpaul
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Retail - Surveillance					
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - Retail - Surveillance					
Meat from turkey - meat products - cooked, ready-to-eat - Processing plant - Surveillance					
Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Monitoring					
Meat from broilers (Gallus gallus) - fresh - Cutting plant - Monitoring					
Meat from broilers (Gallus gallus) - fresh - Retail - Surveillance					
Meat from other poultry species - carcase - Slaughterhouse - Monitoring (Quail)					
Meat from turkey - meat preparation - intended to be eaten cooked - Processing plant - Surveillance					
Meat from turkey - meat preparation - intended to be eaten cooked - Retail - Surveillance					
Meat from turkey - minced meat - intended to be eaten cooked - Retail - Surveillance				1	1

Table Salmonella in milk and dairy products

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Cheeses made from cows' milk - hard - made from pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	4	0		
Cheeses made from cows' milk - hard - made from raw or low heat-treated milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0		
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	6	0		
Dairy products (excluding cheeses) - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	16	0		
Dairy products (excluding cheeses) - cheese analogue - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	3	0		
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0		
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	6	0		
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	2	0		
Milk, cows' - pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	2	0		
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey (Milk filter was analysed)	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Batch	25 Millilitre	14	0		

Table Salmonella in milk and dairy products

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Milk, cows' - raw milk - intended for direct human consumption - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Single	25 Millilitre	1	0		
Milk, goats' - raw milk - intended for direct human consumption - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	4	0		
	S. 1,4,[5],12:i:-	Salmonella spp., unspecified									
Cheeses made from cows' milk - hard - made from pasteurised milk - Processing plant - Surveillance											
Cheeses made from cows' milk - hard - made from raw or low heat-treated milk - Processing plant - Surveillance											
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - Processing plant - Surveillance											
Dairy products (excluding cheeses) - Processing plant - Surveillance											
Dairy products (excluding cheeses) - cheese analogue - Processing plant - Surveillance											
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance											

Table Salmonella in milk and dairy products

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance		
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Retail - Surveillance		
Milk, cows' - pasteurised milk - Processing plant - Surveillance		
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey (Milk filter was analysed)		
Milk, cows' - raw milk - intended for direct human consumption - Retail - Surveillance		
Milk, goats' - raw milk - intended for direct human consumption - Retail - Surveillance		

Table Salmonella in other food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Eggs - table eggs - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample		Single	25 Gram	3	0		
Crustaceans - unspecified - cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	3	0		
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0		
Crustaceans - unspecified - Border inspection activities - Surveillance	VFB	Objective sampling	Official sampling	food sample	Imported from outside EU	Batch	25 Gram	2	0		
Egg products - ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	3	0		
Eggs - Packing centre - Surveillance (Quail egg)	VFB	Suspect sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0		
Eggs - table eggs - Processing plant - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0		
Fishery products, unspecified - non-ready-to-eat - chilled - Border inspection activities - Surveillance	VFB	Objective sampling	Official sampling	food sample	Imported from outside EU	Batch	25 Gram	2	0		
Fishery products, unspecified - non-ready-to-eat - frozen - Border inspection activities - Surveillance	VFB	Objective sampling	Official sampling	food sample	Imported from outside EU	Batch	25 Gram	2	0		
Fishery products, unspecified - ready-to-eat - Border inspection activities - Surveillance	VFB	Objective sampling	Official sampling	food sample	Imported from outside EU	Batch	25 Gram	7	0		
Fishery products, unspecified - ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	3	0		
Fruits and vegetables - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	14	0		

Table Salmonella in other food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Fruits and vegetables - products - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	2	0		
Infant formula - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0		
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	6	0		
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample > meat		Single	25 Gram	2	0		
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	1	0		
Ready-to-eat salads - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	7	0		
Ready-to-eat salads - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	4	0		
Vegetables - pre-cut - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	6	0		
	S. 1,4,[5],12:i:-	Salmonella spp., unspecified									
Eggs - table eggs - Retail - Surveillance											
Crustaceans - unspecified - cooked - Processing plant - Surveillance											

Table Salmonella in other food

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance		
Crustaceans - unspecified - Border inspection activities - Surveillance		
Egg products - ready-to-eat - Processing plant - Surveillance		
Eggs - Packing centre - Surveillance (Quail egg)		
Eggs - table eggs - Processing plant - Surveillance		
Fishery products, unspecified - non-ready-to-eat - chilled - Border inspection activities - Surveillance		
Fishery products, unspecified - non-ready-to-eat - frozen - Border inspection activities - Surveillance		
Fishery products, unspecified - ready-to-eat - Border inspection activities - Surveillance		
Fishery products, unspecified - ready-to-eat - Processing plant - Surveillance		
Fruits and vegetables - Processing plant - Surveillance		
Fruits and vegetables - products - Processing plant - Surveillance		
Infant formula - Processing plant - Surveillance		

Table Salmonella in other food

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Processing plant - Surveillance		
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Retail - Surveillance		
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Retail - Surveillance		
Ready-to-eat salads - Processing plant - Surveillance		
Ready-to-eat salads - Retail - Surveillance		
Vegetables - pre-cut - Retail - Surveillance		

Table Salmonella in red meat and products thereof

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Meat from pig - carcase - Slaughterhouse - Surveillance	VFB	Suspect sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	1	0		
Meat from pig - fresh - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	20	0		
Meat from pig - fresh - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample > meat		Single	25 Gram	2	0		
Meat from pig - minced meat - intended to be eaten cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	10 Gram	7	0		
Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	10 Gram	26	2		
Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	10 Gram	54	1		
Meat from pig - meat preparation - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	10 Gram	26	0		
Meat from pig - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	67	0		
Meat from pig - meat products - cooked, ready-to-eat - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	1	0		
Meat from bovine animals - carcase - Slaughterhouse - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	2	0		
Meat from bovine animals - fresh - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	5	0		
Meat from bovine animals - minced meat - intended to be eaten cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	10 Gram	9	0		

Table Salmonella in red meat and products thereof

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Meat from bovine animals - minced meat - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	10 Gram	8	0		
Meat from bovine animals - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	10 Gram	3	0		
Meat from bovine animals - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	11	0		
Meat from bovine animals - carcass - Slaughterhouse - Monitoring	VFB	Objective sampling	Official sampling	food sample > carcass swabs	Domestic	Single	1400 Square centimetre	213	2		1
Meat from bovine animals - fresh - Border inspection activities - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat	Imported from outside EU	Batch	25 Gram	1	0		
Meat from bovine animals - fresh - Cutting plant - Monitoring	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	96	0		
Meat from bovine animals - offal - Slaughterhouse - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	1	0		
Meat from pig - carcass - Slaughterhouse - Monitoring	VFB	Objective sampling	Official sampling	food sample > carcass swabs	Domestic	Single	1400 Square centimetre	385	16		1
Meat from pig - fresh - Cutting plant - Monitoring	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	281	0		
Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Domestic	Single	10 Gram	2	0		
Meat from rabbit - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0		
Meat from wild boar - carcass - Slaughterhouse - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	1	0		

Table Salmonella in red meat and products thereof

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Meat from wild game - land mammals - carcase - Slaughterhouse - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	1	0		
Meat from wild game - land mammals - fresh - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	12	0		
Meat from wild game - land mammals - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	10 Gram	1	0		
Meat from wild game - land mammals - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	5	0		
Meat, mixed meat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 Gram	15	1		
Meat, mixed meat - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	10 Gram	20	0		
Meat, mixed meat - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	30	0		
Meat, mixed meat - meat products - cooked, ready-to-eat - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	3	0		
Meat, mixed meat - minced meat - intended to be eaten cooked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	10 Gram	18	0		
Meat, mixed meat - minced meat - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	10 Gram	7	0		

Table Salmonella in red meat and products thereof

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Derby	S. Infantis	S. Mbandaka	S. Typhimurium, monophasic	S. Worthington	S. enterica subsp. enterica
Meat from pig - carcass - Slaughterhouse - Surveillance								
Meat from pig - fresh - Processing plant - Surveillance								
Meat from pig - fresh - Retail - Surveillance								
Meat from pig - minced meat - intended to be eaten cooked - Processing plant - Surveillance								
Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance			1		1			
Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Surveillance			1					
Meat from pig - meat preparation - intended to be eaten cooked - Retail - Surveillance								
Meat from pig - meat products - cooked, ready-to-eat - Processing plant - Surveillance								
Meat from pig - meat products - cooked, ready-to-eat - Retail - Surveillance								
Meat from bovine animals - carcass - Slaughterhouse - Surveillance								
Meat from bovine animals - fresh - Processing plant - Surveillance								
Meat from bovine animals - minced meat - intended to be eaten cooked - Processing plant - Surveillance								

Table Salmonella in red meat and products thereof

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Derby	S. Infantis	S. Mbandaka	S. Typhimurium, monophasic	S. Worthington	S. enterica subsp. enterica
Meat from bovine animals - minced meat - intended to be eaten cooked - Retail - Surveillance								
Meat from bovine animals - meat preparation - intended to be eaten cooked - Processing plant - Surveillance								
Meat from bovine animals - meat products - cooked, ready-to-eat - Processing plant - Surveillance								
Meat from bovine animals - carcase - Slaughterhouse - Monitoring			1					
Meat from bovine animals - fresh - Border inspection activities - Surveillance								
Meat from bovine animals - fresh - Cutting plant - Monitoring								
Meat from bovine animals - offal - Slaughterhouse - Surveillance								
Meat from pig - carcase - Slaughterhouse - Monitoring			7	2	1	2	1	2
Meat from pig - fresh - Cutting plant - Monitoring								
Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Surveillance								
Meat from rabbit - meat products - cooked, ready-to-eat - Processing plant - Surveillance								
Meat from wild boar - carcase - Slaughterhouse - Surveillance								

Table Salmonella in red meat and products thereof

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Derby	S. Infantis	S. Mbandaka	S. Typhimurium, monophasic	S. Worthington	S. enterica subsp. enterica
Meat from wild game - land mammals - carcase - Slaughterhouse - Surveillance								
Meat from wild game - land mammals - fresh - Processing plant - Surveillance								
Meat from wild game - land mammals - meat preparation - intended to be eaten cooked - Processing plant - Surveillance								
Meat from wild game - land mammals - meat products - cooked, ready-to-eat - Processing plant - Surveillance								
Meat, mixed meat - Processing plant - Surveillance			1					
Meat, mixed meat - meat preparation - intended to be eaten cooked - Processing plant - Surveillance								
Meat, mixed meat - meat products - cooked, ready-to-eat - Processing plant - Surveillance								
Meat, mixed meat - meat products - cooked, ready-to-eat - Retail - Surveillance								
Meat, mixed meat - minced meat - intended to be eaten cooked - Processing plant - Surveillance								
Meat, mixed meat - minced meat - intended to be eaten cooked - Retail - Surveillance								

2.1.3 Salmonella in animals

A. Salmonella spp. in Gallus Gallus - breeding flocks

Monitoring system

Sampling strategy

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

In accordance with the Infectious Animal Disease Control Act, the annual volume of salmonella in breeding poultry testing is laid down by the State Program on Monitoring and Surveillance of Animal Infectious Diseases approved annually by the Director General of the Veterinary and Food Board. Instructions for salmonella monitoring in breeding poultry are laid down in the Ministry of Agriculture Regulation No 39 "Prevention against salmonellosis", which also provides guidelines for the prevention and control of salmonella in breeding poultry and for the handling of products originating from suspected or infected birds.

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

Birds of 4 weeks of age and 2 weeks prior movement (slaughter).

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

Within 4 weeks after moving to the breeding phase or unit and during 2-3 weeks before the end of the production cycle (before slaughter). Samples in the frame of self-control are taken in every two weeks.

Type of specimen taken

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

Dust, litter and dead/weak chicks.

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

Faeces

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

Faeces and sock/boot swabs.

Methods of sampling (description of sampling techniques)

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

Day-old chicks that are weak or dead, litter and dust are sampled as 10 samples per flock/lot.

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

For the purposes of detecting Salmonella, the number of copro samples depends on the size of bird flock.

Number of birds in the flock / number of samples

250–349 / 200

350–449 / 220

450–799 / 250

800–999 / 260

1000 and more/ 300

Copro samples and sock/boot swabs (5 pairs) are taken. The number of copro samples depends on the

size of the flock.

Breeding flocks: Production period

Copro samples and sock/boot swabs are taken. The number of copro samples depends on the size of the flock (the same scheme as in rearing period).

Case definition

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

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

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

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

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

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

Diagnostic/analytical methods used

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

Vaccination policy

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

Vaccination against *Salmonella* in Estonia could only be performed based on the approval of Veterinary and Food Board.

Other preventive measures than vaccination in place

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

Feed samples:

- 1) On the enterprises handling feedstuffs the final products are studied bacteriologically under the framework of monitoring and self-inspection.
- 2) From imported feedstuffs official samples shall be taken in the course of random inspection during their storing.

Good farming practices and strict biosecurity measures are applied at the holdings.

Control program/mechanisms

The control program/strategies in place

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

Sampling is performed in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases, which is approved annually by the General Director of the Veterinary and Food Board and is established according to the Regulation of the Minister of Agriculture No 39 "Prevention against Salmonellosis". Commission Regulation (EU) No 200/2010 of 10 March 2010 implementing Regulation (EC) No 2160/2003 of the European Parliament and of the Council as regards a Union target for the reduction of the prevalence of *Salmonella* serotypes in adult breeding flocks of *Gallus gallus* is also followed.

Recent actions taken to control the zoonoses

Sampling is performed in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases, which is approved annually by the General Director of the Veterinary and Food Board and is established according to the Regulation of the Minister of Agriculture No 39 "Prevention against Salmonellosis" and also Commission Regulation No 200/2010.

Measures in case of the positive findings or single cases

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

According to the regulation No 39, if *Salmonella* presence is suspected in breeding flocks of *Gallus gallus*, the official veterinarian is obligated to take action to confirm the diagnosis and prevent the spread of the disease.

Measures in case of positive results:

- 1) movement restrictions (humans, birds, vehicles)
- 2) epidemiological investigation
- 3) disinfection (containers, vehicles, equipment in the holding, rooms etc)
- 4) manure must be removed as soon as possible, after that the holding is cleaned, washed and disinfected and samples are taken to estimate the quality of cleaning and disinfection. Disposal of manure on the premises of the holding is prohibited
- 5) the flock must be slaughtered, carcasses processed in accordance with Regulation (EC) No 1069/2009
- 6) hatching eggs must be destroyed in accordance with Regulation (EC) No 1069/2009

Notification system in place

Infection with *Salmonella* spp. 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

All tests were negative in 2013.

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

In 2010-2013 no *Salmonella* positive breeding flocks were detected in Estonia.

B. Salmonella spp. in Gallus Gallus - broiler flocks

Monitoring system

Sampling strategy

Broiler flocks

In accordance with the Infectious Animal Disease Control Act, the annual volume of broiler flocks testing for presence of Salmonella is laid down by the State Program on Monitoring and Surveillance of Animal Infectious Diseases approved annually by the Director General of the Veterinary and Food Board. Instructions for salmonella monitoring in broiler flocks are laid down in the Ministry of Agriculture Regulation No 39 "Prevention against salmonellosis", which also provides guidelines for the prevention and control of salmonella in broilers and for the handling of products originating from suspected or infected birds.

Frequency of the sampling

Broiler flocks: Before slaughter at farm

2-3 weeks prior to slaughter

Type of specimen taken

Broiler flocks: Before slaughter at farm

Faeces, socks/boot swabs.

Methods of sampling (description of sampling techniques)

Broiler flocks: Day-old chicks

Samples from meconium.

Broiler flocks: Before slaughter at farm

The sampling frame covers all flocks of broilers covered by the scope of Regulation (EC) No 2160/2003 and Regulation 200/2012. 2 pairs of boot swabs are taken 2-3 weeks before slaughter.

Flocks of broilers are also sampled on the initiative of the food business operator takes place in accordance with Article 5(3) of Regulation (EC) No 2160/2003 within three weeks before the birds are moved to the slaughterhouse.

A sampling carried out by the competent authority may replace the sampling on the initiative of the food business operator.

Case definition

Broiler flocks: Day-old chicks

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

Broiler flocks: Before slaughter at farm

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

Diagnostic/analytical methods used

Broiler flocks: Day-old chicks

Bacteriological method: ISO 6579:2002.

Broiler flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

Broiler flocks

Vaccination against Salmonella in Estonia could only be performed basing on the Veterinary and Food Board approval.

Other preventive measures than vaccination in place

Broiler flocks

Surveillance of salmonella in feed, animals and food is carried out for many years in Estonia. In addition to surveillance systems, monitoring programme is conducted, which provide an additional epidemiological information:

Feed samples:

- 1) On the enterprises handling feedstuffs the final products shall be studied bacteriologically under the framework of monitoring and self-inspection.
- 2) From imported feedstuffs official samples shall be taken in the course of random inspection in their storing.

Good farming practices and strict biosecurity measures are applied at the holdings.

Control program/mechanisms

The control program/strategies in place

Broiler 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 General Director of the Veterinary and Food Board and is established according to the Regulation of the Minister of Agriculture No 39 "Prevention against Salmonellosis"; Commission Regulation No 200/2012.

Recent actions taken to control the zoonoses

Sampling is performed in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases, which is approved annually by the General Director of the Veterinary and Food Board and is established according to the Regulation of the Minister of Agriculture No 39 "Prevention against Salmonellosis" and also Commission Regulation No 200/2012.

Measures in case of the positive findings or single cases

Broiler flocks: Day-old chicks

According to the regulation No 39, the measures in case of positive result are:

- 1) epidemiological investigation
- 2) unhatched eggs are destroyed
- 3) rooms and equipment are cleaned and disinfected, samples for the estimation of disinfection effectiveness are taken, samples have to be negative, if not then cleaning and disinfection is carried out until all samples are negative
- 4) empty period for 2 weeks
- 5) 3 days before the end of empty period aerosol disinfection should be carried out.

Broiler flocks: Before slaughter at farm

According to the regulation No 39, if Salmonella presence is suspected in broiler flocks of Gallus gallus, the official veterinarian is obligated to take action to confirm the diagnosis and prevent the spread of the disease.

Measures in case of positive results:

- 1) movement restrictions (humans, birds, vehicles)
- 2) epidemiological investigation
- 3) disinfection (containers, vehicles, equipment in the holding, rooms etc)
- 4) manure must be removed as soon as possible, after that the holding is cleaned, washed and disinfected and samples are taken to estimate the quality of cleaning and disinfection. Disposal of manure on the premises of the holding is prohibited

5) the flock must be slaughtered, carcasses processed in accordance with Regulation (EC) No 1069/2009

Notification system in place

Infection with *Salmonella* spp. 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 2013 all tests were negative.

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

The overall prevalence of *Salmonella* in broiler flocks was 0% in 2013.

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 one of the main source of human infection.

C. Salmonella spp. in Gallus Gallus - flocks of laying hens

Monitoring system

Sampling strategy

Laying hens flocks

In accordance with the Infectious Animal Disease Control Act, the annual volume of Salmonella tests in laying hens of Gallus gallus is laid down by the State Program on Monitoring and Surveillance of Animal infectious Diseases adopted by the General Director of the Veterinary and Food Board. Instructions for salmonella monitoring in laying hens of Gallus gallus are laid down in the Ministry of Agriculture Regulation No 39 "Prevention against salmonellosis", which also provides guidelines for the prevention and control of salmonella in laying hens of Gallus gallus and for the handling of products originating from suspected or infected birds. Samples are taken from the flocks with more than 50 laying hens.

Frequency of the sampling

Laying hens: Day-old chicks

Every flock is sampled

Laying hens: Rearing period

Birds of 4 weeks of age and 2 weeks prior movement.

Laying hens: Production period

Birds of 22-26 weeks of age and within 8 weeks prior slaughter. Samples taken in the frame of self-control are taken on every 15th week of production starting from the beginning of the production period.

Laying hens: Before slaughter at farm

8 weeks prior to slaughter

Type of specimen taken

Laying hens: Day-old chicks

Dust, litter and dead/weak chicks.

Laying hens: Rearing period

Faeces; boot swabs/dust samples (free-range chickens).

Laying hens: Production period

Faeces, boot swabs/dust samples (free-range chickens).

Laying hens: Before slaughter at farm

Faeces, boot swabs/dust samples (free-range chickens).

Methods of sampling (description of sampling techniques)

Laying hens: Day-old chicks

Day-old chicks that are weak or dead, litter and dust is sampled - 10 samples per flock/lot.

Laying hens: Rearing period

2x150 g of copro samples are taken. If hens are raised as free-range - 2 pairs of boot swabs are taken.

Laying hens: Production period

In flocks kept in cages, 2 × 150 grams of naturally pooled faeces are taken from all belts or scrapers in the house after running the manure removal system; however, in the case of step cage houses without scrapers or belts 2 × 150 grams of mixed fresh faeces is collected from 60 different places beneath the

cages in the dropping pits. In barn or free-range houses, two pairs of boot swabs or socks are taken.

Laying hens: Before slaughter at farm

In cage flocks, 2 × 150 grams of naturally pooled faeces are taken from all belts or scrapers in the house after running the manure removal system; however, in the case of step cage houses without scrapers or belts 2 × 150 grams of mixed fresh faeces is collected from 60 different places beneath the cages in the dropping pits. In barn or free-range houses, two pairs of boot swabs or socks are taken.

Case definition

Laying hens: Day-old chicks

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

Laying hens: Rearing period

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

Laying hens: Production period

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

Laying hens: Before slaughter at farm

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

Diagnostic/analytical methods used

Laying hens: Day-old chicks

Bacteriological method: ISO 6579:2002

Laying hens: Rearing period

Bacteriological method: ISO 6579:2002

Laying hens: Production period

Bacteriological method: ISO 6579:2002

Laying hens: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

Laying hens flocks

Vaccination against salmonella in Estonia could only be performed basing on the Veterinary and Food Board approval.

Other preventive measures than vaccination in place

Laying hens flocks

Surveillance of salmonella in feed, animals and food is carried out for many years in Estonia. In addition to surveillance systems, monitoring programme is conducted, which provide an additional epidemiological information:

Feed samples:

- 1) On the enterprises handling feedstuffs the final products shall be studied bacteriologically under the framework of monitoring and self-inspection.
- 2) From imported feedstuffs official samples shall be taken in the course of random inspection in their storing.

Good farming practices and strict biosecurity measures are applied at the holdings.

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 General Director of the Veterinary and Food Board and is established according to the Regulation of the Minister of Agriculture No 39 "Prevention against Salmonellosis" and Commission Regulation No 517/2011.

Measures in case of the positive findings or single cases

Laying hens flocks

According to the Regulation No 39, if salmonella presence is suspected in laying hens of *Gallus gallus* the official veterinarian is obliged to take action to confirm the diagnosis and prevent the spread of the disease. The official veterinarian should find out the infection sources and their spreading ways, remove or block them.

Measures in case of positive results:

- 1) movement restrictions (humans, birds, vehicles)
- 2) epidemiological investigation
- 3) disinfection (containers, vehicles, equipment in the holding, rooms etc)
- 4) manure must be removed as soon as possible, after that the holding is cleaned, washed and disinfected and samples are taken to estimate the quality of cleaning and disinfection. Disposal of manure on the premises of the holding is prohibited
- 5) the flock must be slaughtered, carcasses processed in accordance with Regulation (EC) No 1069/2009
- 6) eggs must be destroyed in accordance with Regulation (EC) No 1069/2009 or in the case they come from the flock which is positive for *Salmonella*.

Notification system in place

Salmonellosis is notifiable according to the Minister of Agriculture Regulation No 34 "List of Notifiable Diseases and Diseases subject to Registration".

Results of the investigation

In the year 2013 9% of the herds were positive to *Salmonella*

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

In 2012 all samples were negative, in 2013 9% of the flocks were positive.

D. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

To monitor salmonellosis in cattle, herds as well as animals sent to artificial fertilization stations should be examined. In the frames of official control cattle herds should be examined in the quantities provided by the monitoring plan of the Veterinary and Food Board.

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 with animals 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 20 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 herd where *Salmonella* spp. is confirmed in NRL at least in one of the sample.

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 in Estonia could only be performed basing on the Veterinary and Food Board approval.

Other preventive measures than vaccination in place

Surveillance of *Salmonella* in feed, animals and food is carried out for many years in Estonia. In addition to surveillance systems, monitoring programme is conducted, which provide an additional epidemiological information:

Feed samples:

- 1) on the enterprises handling feedstuffs the final products shall be studied bacteriologically under the framework of monitoring and self-inspection;
- 2) from imported feedstuffs official samples shall be taken in the course of random inspection in their storing.

Good farming practices and strict biosecurity measures are applied at the holdings.

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 animal keeper 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.
Animal keeper 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. 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 2013 4% of analyzed samples taken in the frames of the official control were positive. The predominant strain was S.Typhimurium.

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

The prevalence was a bit higher than in 2012: in 2012 3,7 % of herds tested in the frames of the official control were positive and the predominant strain was S.Typhimurium.

E. Salmonella spp. in pigs

Monitoring system

Sampling strategy

Multiplying herds

Samples are taken from the herds, whose production is sold to the market. In the frames of the official control herds should be examined in the quantities provided by the monitoring plan of the Veterinary and Food Board.

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.

Fattening herds

Samples are taken from the herds, whose production is sold to the market. In the frames of the official control herds should be examined in the quantities provided by the monitoring plan of the Veterinary and Food Board.

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.

In the frames of the Salmonella Monitoring Programme for Food of Animal Origin lymph nodes samples are taken at slaughterhouse.

Type of specimen taken

Breeding herds

Faeces

Multiplying herds

Faeces

Fattening herds at farm

Faeces

Fattening herds at slaughterhouse (herd based approach)

Lymph nodes, surface of carcasses.

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 25 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.

Fattening herds at farm

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 25 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.

Fattening herds at slaughterhouse (herd based approach)

Lymph nodes samples are taken from pigs at slaughterhouse. The aggregate of ileocaecal lymph nodes or at least 5 individual ileocaecal lymph nodes are taken, at least 25 g of lymph nodes without fat or connective tissues.

Case definition

Breeding herds

Herd is considered to be positive if the presence of *Salmonella* spp. is confirmed in NRL at least in one of the samples.

Multiplying herds

Herd is considered to be positive if the presence of *Salmonella* spp. is confirmed in NRL at least in one of the samples.

Fattening herds at farm

Herd is considered to be positive if the presence of *Salmonella* spp. is confirmed in NRL at least in one of the samples.

Fattening herds at slaughterhouse (herd based approach)

Herd is considered to be positive if the presence of *Salmonella* spp. is confirmed in NRL at least in one of the samples.

Diagnostic/analytical methods used

Breeding herds

ISO 6579:2003

Multiplying herds

ISO 6579:2003

Fattening herds at farm

ISO 6579:2003

Fattening herds at slaughterhouse (herd based approach)

ISO 6579:2003

Vaccination policy

Breeding herds

Vaccination against salmonella in Estonia could only be performed basing on the Veterinary and Food Board approval.

Multiplying herds

Vaccination against salmonella in Estonia could only be performed basing on the Veterinary and Food Board approval.

Fattening herds

Vaccination against salmonella in Estonia could only be performed basing on the Veterinary and Food Board approval.

Other preventive measures than vaccination in place

Breeding herds

Surveillance of Salmonella in feed, animals and food is carried out for many years in Estonia. In addition to surveillance systems, monitoring programme is conducted, which provide an additional epidemiological information:

Feed samples:

- 1) On the enterprises handling feedstuffs the final products shall be studied bacteriologically under the framework of monitoring and self-inspection.
- 2) From imported feedstuffs official samples shall be taken in the course of random inspection in their storing.

Good farming practices and strict biosecurity measures are applied at the holdings.

Multiplying herds

Surveillance of Salmonella in feed, animals and food is carried out for many years in Estonia. In addition to surveillance systems, monitoring programme is conducted, which provide an additional epidemiological information:

Feed samples:

- 1) On the enterprises handling feedstuffs the final products shall be studied bacteriologically under the framework of monitoring and self-inspection.
- 2) From imported feedstuffs official samples shall be taken in the course of random inspection in their storing.

Good farming practices and strict biosecurity measures are applied at the holdings.

Fattening herds

Surveillance of Salmonella in feed, animals and food is carried out for many years in Estonia. In addition to surveillance systems, monitoring programme is conducted, which provide an additional epidemiological information:

Feed samples:

- 1) on the enterprises handling feedstuffs the final products shall be studied bacteriologically under the framework of monitoring and self-inspection;
- 2) from imported feedstuffs official samples shall be taken in the course of random inspection in their storing.

Good farming practices and strict biosecurity measures are applied at the holdings.

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, herds as well as animals sent to artificial fertilization stations shall be examined. 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.

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.

Since the year 2008 lymph nodes are taken from pigs at slaughterhouse in the frames of the Salmonella Monitoring Programme for Food of Animal Origin.

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 owner 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 is 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 slaughtering the positive animals.

Pigs should be kept inside the 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 clothing and when leaving the livestock premises their footwear should be cleaned thoroughly and disinfected.

The owner 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 *Salmonella* spp. 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 2013 32,6 % of the analyzed herds sampled in the frames of the State Programme on Monitoring and Surveillance of Animal Infectious Diseases were positive. The prevalent serovar was *S. Derby*.

6,12% of pigs lymph nodes tested in the frames of the *Salmonella* Monitoring Programme for Food of Animal Origin were positive for *Salmonella* in 2013.

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

In 2013 the number of positive lymph nodes decreased in comparison with the previous year. The prevalence of positive lymph nodes is high during years (nearly 6-10% of the tested samples) with exception in the year 2011, when the prevalence was 3,5%.

The number of positive faeces samples has been increasing during the previous years. When in 2012 the dominant serovars were *S. Agona* and *S. Worthington*, then in 2013 the dominant serovar was *S. Derby*.

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 2013.

Table Salmonella in breeding flocks of Gallus gallus

	No of flocks under control programme	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Target Verification	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis
Gallus gallus (fowl) - breeding flocks for egg production line - hatching eggs - Hatchery - Control and eradication programmes	10	VFB	Suspect sampling	Official sampling	animal sample > eggs		yes	herd/flock	1	1	
Gallus gallus (fowl) - breeding flocks, unspecified - adult - Farm - Control and eradication programmes	10	VFB	Census	Official and industry sampling	environmental sample > boot swabs		yes	herd/flock	10	0	
		S. Hadar	S. Infantis	S. Typhimurium	S. Virchow	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Gallinarum			
Gallus gallus (fowl) - breeding flocks for egg production line - hatching eggs - Hatchery - Control and eradication programmes								1			
Gallus gallus (fowl) - breeding flocks, unspecified - adult - Farm - Control and eradication programmes											

Table Salmonella in other birds

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	S. 1,4,[5],12:i:-
Quails - laying hens - Farm - Clinical investigations	VFB	Census	Official sampling	animal sample > organ/tissue		Animal	2	0			
Quails - laying hens - Farm - Surveillance	VFB	Census	Official sampling	environmental sample > boot swabs		herd/flock	3	1		1	
Quails - laying hens - Farm - Surveillance	VFB	Census	Official sampling	animal sample > faeces		herd/flock	3	1			
Quails - laying hens - Farm - Surveillance	VFB	Census	Official sampling	environmental sample > dust		herd/flock	2	1			

	Salmonella spp., unspecified	S. Infantis
Quails - laying hens - Farm - Clinical investigations		
Quails - laying hens - Farm - Surveillance		1
Quails - laying hens - Farm - Surveillance		1
Quails - laying hens - Farm - Surveillance		1

Table Salmonella in other animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	S. 1,4,[5],12:i:-
Pigs - fattening pigs - Slaughterhouse - Monitoring	VFB	Objective sampling	Official sampling	animal sample > lymph nodes	Domestic	Animal	147	9	1		
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	67	1			
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > foetus/stillbirth		Animal	14	0			
Cattle (bovine animals) - unspecified - Farm - Surveillance	VFB	Census	Official sampling	animal sample > faeces		herd/flock	124	5		3	
Goats - animals over 1 year - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > foetus/stillbirth		Animal	3	0			
Goats - animals over 1 year - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	1	0			
Pigs - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	41	1			
Pigs - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > foetus/stillbirth		Animal	1	0			
Pigs - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > faeces		Animal	544	103			40
Pigs - unspecified - Farm - Surveillance ¹⁾	VFB	Census	Official sampling	animal sample > faeces		herd/flock	49	16			1

Table Salmonella in other animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	S. 1,4,[5],12:i:-
Rabbits - pet animals - Unknown - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	1	0			
Sheep - animals over 1 year - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	16	0			
Sheep - animals over 1 year - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > foetus/stillbirth		Animal	3	0			
Sheep - animals over 1 year - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > faeces		Animal	84	0			
Sheep - animals over 1 year - Farm - Surveillance ²⁾	VFB	Census	Official sampling	animal sample > faeces		herd/flock	100	13		2	
Sheep - animals over 1 year - Zoo - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > faeces		Animal	2	0			
Wild boars - wild - Natural habitat - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	2	1			
	Salmonella spp., unspecified	S. Agona	S. Choleraesuis var. Kunzendorf	S. Derby	S. Dublin	S. Infantis	S. Mbandaka	S. Typhimurium, monophasic	S. Worthington	S. enterica subsp. arizonae	S. enterica subsp. diarizonae
Pigs - fattening pigs - Slaughterhouse - Monitoring		2	1	3		1		1			
Cattle (bovine animals) - unspecified - Farm - Clinical investigations				1							

Table Salmonella in other animals

	Salmonella spp., unspecified	S. Agona	S. Choleraesuis var. Kunzendorf	S. Derby	S. Dublin	S. Infantis	S. Mbandaka	S. Typhimurium, monophasic	S. Worthington	S. enterica subsp. arizonae	S. enterica subsp. diarizonae
Cattle (bovine animals) - unspecified - Farm - Clinical investigations											
Cattle (bovine animals) - unspecified - Farm - Surveillance					1						
Goats - animals over 1 year - Farm - Clinical investigations											
Goats - animals over 1 year - Farm - Clinical investigations											
Pigs - unspecified - Farm - Clinical investigations			1								
Pigs - unspecified - Farm - Clinical investigations											
Pigs - unspecified - Farm - Clinical investigations			48	14							
Pigs - unspecified - Farm - Surveillance ¹⁾		3	3	10			1		2		
Rabbits - pet animals - Unknown - Clinical investigations											
Sheep - animals over 1 year - Farm - Clinical investigations											
Sheep - animals over 1 year - Farm - Clinical investigations											
Sheep - animals over 1 year - Farm - Clinical investigations											
Sheep - animals over 1 year - Farm - Surveillance ²⁾										3	10
Sheep - animals over 1 year - Zoo - Clinical investigations											

Table Salmonella in other animals

	Salmonella spp., unspecified	S. Agona	S. Choleraesuis var. Kunzendorf	S. Derby	S. Dublin	S. Infantis	S. Mbandaka	S. Typhimurium, monophasic	S. Worthington	S. enterica subsp. arizonae	S. enterica subsp. diarizonae
Wild boars - wild - Natural habitat - Clinical investigations			1								

	S. enterica subsp. enterica
Pigs - fattening pigs - Slaughterhouse - Monitoring	
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	
Cattle (bovine animals) - unspecified - Farm - Surveillance	1
Goats - animals over 1 year - Farm - Clinical investigations	
Goats - animals over 1 year - Farm - Clinical investigations	
Pigs - unspecified - Farm - Clinical investigations	
Pigs - unspecified - Farm - Clinical investigations	
Pigs - unspecified - Farm - Clinical investigations	1
Pigs - unspecified - Farm - Surveillance ¹⁾	1

Table Salmonella in other animals

	S. enterica subsp. enterica
Rabbits - pet animals - Unknown - Clinical investigations	
Sheep - animals over 1 year - Farm - Clinical investigations	
Sheep - animals over 1 year - Farm - Clinical investigations	
Sheep - animals over 1 year - Farm - Clinical investigations	
Sheep - animals over 1 year - Farm - Surveillance ²⁾	
Sheep - animals over 1 year - Zoo - Clinical investigations	
Wild boars - wild - Natural habitat - Clinical investigations	

Comments:

¹⁾ Several herds were positive to more than 1 serotype

²⁾ One herd was positive to 3 serotypes

Table Salmonella in other poultry

	No of flocks under control programme	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Target Verification	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	33	VFB	Census	Official sampling	environmental sample > dust		no	herd/flock	8	1	
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes	571	VFB	Census	Official and industry sampling	environmental sample > boot swabs		yes	herd/flock	571	0	
Ducks - pet animals - Farm - Surveillance		VFB	Census	Official sampling	environmental sample > boot swabs			herd/flock	1	0	
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	33	VFB	Census	Official and industry sampling	animal sample > faeces		no	herd/flock	33	1	
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	33	VFB	Census	Official sampling	animal sample > faeces		no	herd/flock	33	1	
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	33	VFB	Census	Official sampling	environmental sample > boot swabs		no	herd/flock	8	1	
Gallus gallus (fowl) - laying hens - day-old chicks - Farm - Clinical investigations		VFB	Suspect sampling	Official sampling	animal sample > organ/tissue			herd/flock	1	1	

	S. Typhimurium	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. enterica subsp. enterica
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	1			
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes				

Table Salmonella in other poultry

	S. Typhimurium	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. enterica subsp. enterica
Ducks - pet animals - Farm - Surveillance				
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	1			
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes				1
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	1			
Gallus gallus (fowl) - laying hens - day-old chicks - Farm - Clinical investigations	1			

2.1.4 Salmonella in feedingstuffs

Table Salmonella in compound feedingstuffs

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Compound feedingstuffs for cattle - final product - Feed mill - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		
Compound feedingstuffs for pigs - process control - Feed mill - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	2	0		
Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		
Compound feedingstuffs for poultry - laying hens - final product - Feed mill - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	3	0		
Compound feedingstuffs for cattle - final product - Farm - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	51	1		
Compound feedingstuffs for cattle - final product - Farm - Surveillance	VFB	Selective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		
Compound feedingstuffs for pigs - final product - Farm - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Intra EU trade	Batch	25 Gram	1	1		
Compound feedingstuffs for pigs - final product - Farm - Surveillance	VFB	Selective sampling	Official sampling	feed sample	Intra EU trade	Batch	25 Gram	2	0		
Compound feedingstuffs for pigs - final product - Farm - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	20	0		
Compound feedingstuffs for pigs - final product - Retail - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		

Table Salmonella in compound feedingstuffs

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Compound feedingstuffs for poultry (non specified) - final product - Farm - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		
Compound feedingstuffs for poultry - broilers - final product - Farm - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		
	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Anatum	S. Derby							
Compound feedingstuffs for cattle - final product - Feed mill - Surveillance											
Compound feedingstuffs for pigs - process control - Feed mill - Surveillance											
Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Surveillance											
Compound feedingstuffs for poultry - laying hens - final product - Feed mill - Surveillance											
Compound feedingstuffs for cattle - final product - Farm - Surveillance			1								
Compound feedingstuffs for cattle - final product - Farm - Surveillance											
Compound feedingstuffs for pigs - final product - Farm - Surveillance				1							
Compound feedingstuffs for pigs - final product - Farm - Surveillance											

Table Salmonella in compound feedingstuffs

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Anatum	S. Derby
Compound feedingstuffs for pigs - final product - Farm - Surveillance				
Compound feedingstuffs for pigs - final product - Retail - Surveillance				
Compound feedingstuffs for poultry (non specified) - final product - Farm - Surveillance				
Compound feedingstuffs for poultry - broilers - final product - Farm - Surveillance				

Table Salmonella in feed material of animal origin

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Feed material of marine animal origin - fish meal - Wholesale - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		
	S. 1,4,[5],12:i:-	Salmonella spp., unspecified									
Feed material of marine animal origin - fish meal - Wholesale - Surveillance											

Table Salmonella in other feed matter

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		
Feed material of cereal grain origin - barley derived - Farm - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	2	0		
Feed material of cereal grain origin - other cereal grain derived - Farm - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	7	0		
Feed material of oil seed or fruit origin - rape seed derived - Farm - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	8	2		
Feed material of oil seed or fruit origin - rape seed derived - Farm - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Imported from outside EU	Batch	25 Gram	3	1		
Feed material of oil seed or fruit origin - rape seed derived - Retail - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Imported from outside EU	Batch	25 Gram	1	0		
Feed material of oil seed or fruit origin - rape seed derived - Unknown - Surveillance	VFB	Selective sampling	Official sampling	feed sample	Imported from outside EU	Batch	25 Gram	26	12		
Feed material of oil seed or fruit origin - rape seed derived - Wholesale - Surveillance	VFB	Selective sampling	Official sampling	feed sample	Imported from outside EU	Batch	25 Gram	4	0		
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Intra EU trade	Batch	25 Gram	1	0		
Feed material of oil seed or fruit origin - sunflower seed derived - Unknown - Surveillance	VFB	Selective sampling	Official sampling	feed sample	Imported from outside EU	Batch	25 Gram	2	0		
Other feed material - yeast - Feed mill - Surveillance	VFB	Objective sampling	Official sampling	feed sample	Domestic	Batch	25 Gram	1	0		

Table Salmonella in other feed matter

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium
Pet food - final product - Unknown - Surveillance	VFB	Selective sampling	Official sampling	feed sample	Intra EU trade	Batch	25 Gram	1	0		
	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Anatum	S. Lexington							
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - Surveillance											
Feed material of cereal grain origin - barley derived - Farm - Surveillance											
Feed material of cereal grain origin - other cereal grain derived - Farm - Surveillance											
Feed material of oil seed or fruit origin - rape seed derived - Farm - Surveillance			2								
Feed material of oil seed or fruit origin - rape seed derived - Farm - Surveillance			1								
Feed material of oil seed or fruit origin - rape seed derived - Retail - Surveillance											
Feed material of oil seed or fruit origin - rape seed derived - Unknown - Surveillance			1	11							
Feed material of oil seed or fruit origin - rape seed derived - Wholesale - Surveillance				1							

Table Salmonella in other feed matter

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Anatum	S. Lexington
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance				
Feed material of oil seed or fruit origin - sunflower seed derived - Unknown - Surveillance				
Other feed material - yeast - Feed mill - Surveillance				
Pet food - final product - Unknown - Surveillance				

2.1.5 Antimicrobial resistance in Salmonella isolates

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.

Methods used for collecting data

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

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

Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, florfenicol, cefotaxime, sulfonamide, trimethoprim, nalidixic acid, streptomycin, kanamycin, tetracycline, colistine and ceftazidime.

Cut-off values used in testing

Details of cut-off values are described in the table Cut-off values for antimicrobial susceptibility testing of Salmonella in Animals

Results of the investigation

In 2013 9 Salmonella strains were tested. 55,6% of the tested isolates derived from cattle were fully sensitive (in 2012 - 70%, 2011 - 85,7%).

There were no isolates resistant to 3 and more antimicrobials (in 2012 - 15).

44,4% of the isolates were resistant only to 1 antimicrobial streptomycin (in 2012 - 25%, 2011 - 9,5%).

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

The number of fully sensitive isolates decreased.

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.

Methods used for collecting data

All isolates and data concerning isolates are collected in the Central 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

Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, florfenicol, cefotaxime, sulfonamide, trimethoprim, nalidixic acid, streptomycin, kanamycin, tetracycline, colistine and ceftazidime.

Cut-off values used in testing

Details of Cut-off values are described in the table Cut-off values for antibiotic resistance testing of *Salmonella*.

Results of the investigation

38 *Salmonella* strains originated from pigs were tested in 2013.

39,5% of tested strains (in 2012 - 53,8%, 2011 - 64,3%, 2010 - 78,9%) were fully sensitive, 47,8% of the strains were resistant to 3 and more antimicrobials (in 2012 - 42,3%, 2011 - 28,6%).

69,6% of resistant isolates were resistant to streptomycin, 52,2% to sulfometoxazole, 47,8% to tetracycline, 43,5% to ampicillin etc.

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

The number of multiresistant isolates increased in comparison with the year 2012. Resistance of isolates to ampicillin, sulfometoxazole, tetracycline and streptomycin is persisting during years.

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

In the year 2013 *Salmonella* spp. strains isolated from humans were mostly resistant to sulfometoxazole - 32,5%, ampicillin - 31,1%, streptomycin - 30%.

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Frequency of the sampling

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

Type of specimen taken

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

Methods of sampling (description of sampling techniques)

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

Procedures for the selection of isolates for antimicrobial testing

One isolate from each flock or batch.

Methods used for collecting data

All isolates and data concerning isolates are collected in the Central 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

Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, florfenicol, cefotaxime, sulfonamide, trimethoprim, nalidixic acid, streptomycin, kanamycin, tetracycline, colistine and ceftazidime.

Cut-off values used in testing

Details of Cut-off values are described in the table Cut-off values for antibiotic resistance testing of *Salmonella*.

Results of the investigation

In 2013 10 *Salmonella* isolates derived from poultry were tested. 70% of tested isolates were fully sensitive to all antimicrobials. Resistance was found to streptomycin and colistin.

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

In the year 2013 *Salmonella* spp. strains isolated from humans were mostly resistant to nalidixic acid - 20,8%, ampicillin - 16,1%, tetracycline - 11,9%, streptomycin - 11%, sulfonamide - 10,3%.

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.

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

Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, florfenicol, cefotaxime, sulfonamide, trimethoprim, nalidixic acid, streptomycin, kanamycin, tetracycline, colistine and ceftazidime.

Cut-off values used in testing

Details of cut-off values are described in the table Cut-off values for antibiotic resistance testing of Salmonella

Results of the investigation

In 2013 2 Salmonella strains were tested. One strain was fully sensitive and one was resistant to streptomycin.

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

The number of isolates tested is very small, as there is no positive samples for Salmonella or number of positive samples is very small. Usually all isolates are fully sensitive.

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

Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, florfenicol, cefotaxime, sulfonamide, trimethoprim, nalidixic acid, streptomycin, kanamycin, tetracycline, colistine and ceftazidime.

Cut-off values used in testing

Details of cut-off values are described in the table Cut-off values for antibiotic resistance testing of Salmonella

Results of the investigation

19 Salmonella strains originating from foodstuffs derived from pigs were tested in 2013. 52,6% (in 2012 - 86,4%; 2011 - 72,7%; 2010 - 86,4%) of all tested strains were fully sensitive, 77,8% of resistant strains were resistant to 3 and more antimicrobials. 36,8% of the tested isolates were resistant to sulfomethoxazole and to tetracycline, 31,6% - to ampicillin and streptomycin, 26,3% to trimetoprim.

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

The number of multiresistant Salmonella isolates increased in comparison with the previous years. In 2012 13,6% of the tested isolates were resistant to sulfomethoxazole and to streptomycin, 9% - to tetracycline, 4,5% - to ampicillin and chloramphenicol.

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 or sample.

Methods used for collecting data

All isolates and data concerning isolates are collected in the Central 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

Antimicrobials included in monitoring are ampicillin, gentamicin, ciprofloxacin, chloramphenicol, florfenicol, cefotaxime, sulfonamide, trimethoprim, nalidixic acid, streptomycin, kanamycin, tetracycline, colistine and ceftazidime.

Cut-off values used in testing

Details of cut-off values are described in the table Cut-off values for antibiotic resistance testing of Salmonella.

Results of the investigation

No Salmonella isolates derived from poultry meat were tested for antimicrobial susceptibility in 2013, as there were no Salmonella positive samples found.

Table Antimicrobial susceptibility testing of S. Mbandaka in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Mbandaka	Meat from pig - carcase - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096	
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0														1											
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0						1																			
Penicillins - Ampicillin	8	1	1																		1							
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	1																		1							
Trimethoprim	2	1	1															1										
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of *S. Mbandaka* in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

S. Mbandaka Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from pig - carcase - Slaughterhouse - Monitoring	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. enterica subsp. enterica	Meat from pig - carcase - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	2																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	2	0											1	1													
Aminoglycosides - Kanamycin	16	2	0														2											
Aminoglycosides - Streptomycin	16	2	1															1				1						
Amphenicols - Chloramphenicol	16	2	0														2											
Amphenicols - Florfenicol	16	2	0													2												
Cephalosporins - Cefotaxime	0.5	2	0								2																	
Fluoroquinolones - Ciprofloxacin	0.064	2	0							2																		
Penicillins - Ampicillin	8	2	0											1	1													
Quinolones - Nalidixic acid	16	2	0												1	1												
Tetracyclines - Tetracycline	8	2	1											1							1							
Trimethoprim	2	2	1										1					1										
Cephalosporins - Ceftazidime	2	2	0										1	1														
Polymyxins - Colistin	2	2	0										1		1													
Sulfonamides - Sulfamethoxazole	256	2	1															1						1				

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

S. enterica subsp. enterica Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from pig - carcase - Slaughterhouse - Monitoring	
	2	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Derby* in Meat from bovine animals and pig - fresh - Processing plant - Domestic - Surveillance - Objective sampling - Official sampling - food sample - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Meat from bovine animals and pig - fresh - Processing plant - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096	
Aminoglycosides - Gentamicin		2	1	0												1												
Aminoglycosides - Kanamycin		16	1	0														1										
Aminoglycosides - Streptomycin		16	1	0															1									
Amphenicols - Chloramphenicol		16	1	0														1										
Amphenicols - Florfenicol		16	1	0														1										
Cephalosporins - Cefotaxime		0.5	1	0										1														
Fluoroquinolones - Ciprofloxacin		0.064	1	0						1																		
Penicillins - Ampicillin		8	1	0											1													
Quinolones - Nalidixic acid		16	1	0													1											
Tetracyclines - Tetracycline		8	1	0												1												
Trimethoprim		2	1	0										1														
Cephalosporins - Ceftazidime		2	1	0											1													
Polymyxins - Colistin	2	1	0											1														
Sulfonamides - Sulfamethoxazole	256	1	0																		1							

Table Antimicrobial susceptibility testing of *S. Derby* in Meat from bovine animals and pig - fresh - Processing plant - Domestic - Surveillance - Objective sampling - Official sampling - food sample - quantitative data [Dilution method]

S. Derby Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from bovine animals and pig - fresh - Processing plant - Surveillance	
	1	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Worthington* in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Worthington	Meat from pig - carcase - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096	
Aminoglycosides - Gentamicin		2	1	0												1												
Aminoglycosides - Kanamycin		16	1	0														1										
Aminoglycosides - Streptomycin		16	1	1																		1						
Amphenicols - Chloramphenicol		16	1	0													1											
Amphenicols - Florfenicol		16	1	0													1											
Cephalosporins - Cefotaxime		0.5	1	0								1																
Fluoroquinolones - Ciprofloxacin		0.064	1	0							1																	
Penicillins - Ampicillin		8	1	1																		1						
Quinolones - Nalidixic acid		16	1	0												1												
Tetracyclines - Tetracycline		8	1	1																		1						
Trimethoprim		2	1	1															1									
Cephalosporins - Ceftazidime		2	1	0											1													
Polymyxins - Colistin		2	1	0										1														
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of S. Worthington in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

S. Worthington	Meat from pig - carcase - Slaughterhouse - Monitoring	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Meat from pig - carcase - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0														1											
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0									1																
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0												1													
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0											1														
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

S. Typhimurium	Meat from pig - carcase - Slaughterhouse - Monitoring	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium*, monophasic in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium, monophasic	Meat from pig - carcase - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	2	0												2													
Aminoglycosides - Kanamycin	16	2	0														2											
Aminoglycosides - Streptomycin	16	2	2																		2							
Amphenicols - Chloramphenicol	16	2	0													2												
Amphenicols - Florfenicol	16	2	0													2												
Cephalosporins - Cefotaxime	0.5	2	0							1	1																	
Fluoroquinolones - Ciprofloxacin	0.064	2	0							2																		
Penicillins - Ampicillin	8	2	2																		2							
Quinolones - Nalidixic acid	16	2	0													2												
Tetracyclines - Tetracycline	8	2	2																		2							
Trimethoprim	2	2	0								2																	
Cephalosporins - Ceftazidime	2	2	0										2															
Polymyxins - Colistin	2	2	0										2															
Sulfonamides - Sulfamethoxazole	256	2	2																					2				

Table Antimicrobial susceptibility testing of *S. Typhimurium*, monophasic in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

S. Typhimurium, monophasic Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from pig - carcase - Slaughterhouse - Monitoring	
	2	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Mbandaka in Meat from pig - minced meat - intended to be eaten cooked - Retail - Domestic - Surveillance - Objective sampling - Official sampling - food sample - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Mbandaka	Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0														1											
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	1																		1							
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	1																		1							
Trimethoprim	2	1	1															1										
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of S. Mbandaka in Meat from pig - minced meat - intended to be eaten cooked - Retail - Domestic - Surveillance - Objective sampling - Official sampling - food sample - quantitative data [Dilution method]

S. Mbandaka Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance	
	1	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Derby in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Meat from pig - carcase - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	7	0											1	6													
Aminoglycosides - Kanamycin	16	7	0														7											
Aminoglycosides - Streptomycin	16	7	0															7										
Amphenicols - Chloramphenicol	16	7	0													3	4											
Amphenicols - Florfenicol	16	7	0													5	2											
Cephalosporins - Cefotaxime	0.5	7	0								7																	
Fluoroquinolones - Ciprofloxacin	0.064	7	0						2	5																		
Penicillins - Ampicillin	8	7	0											7														
Quinolones - Nalidixic acid	16	7	0												1	6												
Tetracyclines - Tetracycline	8	7	0											4	3													
Trimethoprim	2	7	0									3	3	1														
Cephalosporins - Ceftazidime	2	7	0										5	2														
Polymyxins - Colistin	2	7	1										1	1	4	1												
Sulfonamides - Sulfamethoxazole	256	7	0																1	6								

Table Antimicrobial susceptibility testing of *S. Derby* in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

S. Derby Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from pig - carcase - Slaughterhouse - Monitoring	
	7	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Derby* in Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Domestic - Surveillance - Objective sampling - Official sampling - food sample - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096	
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																1									
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0														1											
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0												1													
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0												1													
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

Table Antimicrobial susceptibility testing of *S. Derby* in Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Domestic - Surveillance - Objective sampling - Official sampling - food sample - quantitative data [Dilution method]

S. Derby Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	
	1	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Derby* in Meat from bovine animals - carcass - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcass swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Meat from bovine animals - carcase - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096	
Aminoglycosides - Gentamicin		2	1	0												1												
Aminoglycosides - Kanamycin		16	1	0														1										
Aminoglycosides - Streptomycin		16	1	0															1									
Amphenicols - Chloramphenicol		16	1	0													1											
Amphenicols - Florfenicol		16	1	0														1										
Cephalosporins - Cefotaxime		0.5	1	0								1																
Fluoroquinolones - Ciprofloxacin		0.064	1	0						1																		
Penicillins - Ampicillin		8	1	0											1													
Quinolones - Nalidixic acid		16	1	0													1											
Tetracyclines - Tetracycline		8	1	0												1												
Trimethoprim		2	1	0									1															
Cephalosporins - Ceftazidime		2	1	0										1														
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

Table Antimicrobial susceptibility testing of S. Derby in Meat from bovine animals - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

S. Derby Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory Antimicrobials:	Meat from bovine animals - carcase - Slaughterhouse - Monitoring	
	1	
	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Infantis* in Meat from pig - carcass - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcass swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Meat from pig - carcase - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	2																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	2	0												2													
Aminoglycosides - Kanamycin	16	2	0														2											
Aminoglycosides - Streptomycin	16	2	1															1				1						
Amphenicols - Chloramphenicol	16	2	0													1	1											
Amphenicols - Florfenicol	16	2	0													2												
Cephalosporins - Cefotaxime	0.5	2	0								2																	
Fluoroquinolones - Ciprofloxacin	0.064	2	0							2																		
Penicillins - Ampicillin	8	2	1											1							1							
Quinolones - Nalidixic acid	16	2	0												1	1												
Tetracyclines - Tetracycline	8	2	1											1						1								
Trimethoprim	2	2	1									1						1										
Cephalosporins - Ceftazidime	2	2	0											2														
Polymyxins - Colistin	2	2	0											2														
Sulfonamides - Sulfamethoxazole	256	2	1															1							1			

Table Antimicrobial susceptibility testing of *S. Infantis* in Meat from pig - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

S. Infantis Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from pig - carcase - Slaughterhouse - Monitoring	
	2	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Meat from bovine animals - carcass - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcass swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Meat from bovine animals - carcase - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																		1							
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0														1											
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0						1																			
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from bovine animals - carcase - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - food sample - carcase swabs - quantitative data [Dilution method]

S. Typhimurium Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory Antimicrobials:	Meat from bovine animals - carcase - Slaughterhouse - Monitoring	
	1	
	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Mbandaka in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Mbandaka	Pigs - unspecified - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	1																		1							
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	1															1										
Trimethoprim	2	1	1															1										
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of *S. Mbandaka* in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Mbandaka Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - unspecified - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *arizonae* in Sheep - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. enterica subsp. arizonae	Sheep - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	3	0												3													
Aminoglycosides - Kanamycin	16	3	0														3											
Aminoglycosides - Streptomycin	16	3	1															2	1									
Amphenicols - Chloramphenicol	16	3	0												1	1	1											
Amphenicols - Florfenicol	16	3	0													3												
Cephalosporins - Cefotaxime	0.5	3	0							1	1	1																
Fluoroquinolones - Ciprofloxacin	0.064	3	0						3																			
Penicillins - Ampicillin	8	3	0											3														
Quinolones - Nalidixic acid	16	3	0													3												
Tetracyclines - Tetracycline	8	3	0											1	2													
Trimethoprim	2	3	0										3															
Cephalosporins - Ceftazidime	2	3	0										2	1														
Polymyxins - Colistin	2	3	0										2	1														
Sulfonamides - Sulfamethoxazole	256	3	0															2	1									

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *arizonae* in Sheep - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. enterica subsp. arizonae Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Sheep - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Agona* in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Pigs - fattening pigs - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096	
Aminoglycosides - Gentamicin	2	2	0												2													
Aminoglycosides - Kanamycin	16	2	0														2											
Aminoglycosides - Streptomycin	16	2	0														1	1										
Amphenicols - Chloramphenicol	16	2	0													2												
Amphenicols - Florfenicol	16	2	0													1	1											
Cephalosporins - Cefotaxime	0.5	2	0								2																	
Fluoroquinolones - Ciprofloxacin	0.064	2	0						1	1																		
Penicillins - Ampicillin	8	2	2																		2							
Quinolones - Nalidixic acid	16	2	0													2												
Tetracyclines - Tetracycline	8	2	2																		2							
Trimethoprim	2	2	2															2										
Cephalosporins - Ceftazidime	2	2	0											2														
Polymyxins - Colistin	2	2	0												2													
Sulfonamides - Sulfamethoxazole	256	2	2																					2				

Table Antimicrobial susceptibility testing of *S. Agona* in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

S. Agona Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - fattening pigs - Slaughterhouse - Monitoring	
	2	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Agona* in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Pigs - unspecified - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	4	0												4													
Aminoglycosides - Kanamycin	16	4	0														4											
Aminoglycosides - Streptomycin	16	4	2														1	1				2						
Amphenicols - Chloramphenicol	16	4	0													1	3											
Amphenicols - Florfenicol	16	4	0													1	3											
Cephalosporins - Cefotaxime	0.5	4	0								4																	
Fluoroquinolones - Ciprofloxacin	0.064	4	0						2	2																		
Penicillins - Ampicillin	8	4	3											1				1			2							
Quinolones - Nalidixic acid	16	4	0													4												
Tetracyclines - Tetracycline	8	4	2												2						2							
Trimethoprim	2	4	2										2					2										
Cephalosporins - Ceftazidime	2	4	0										2	2														
Polymyxins - Colistin	2	4	0										2		2													
Sulfonamides - Sulfamethoxazole	256	4	2															2						2				

Table Antimicrobial susceptibility testing of *S. Agona* in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Agona Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - unspecified - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in Cattle (bovine animals) - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. enterica subsp. enterica	Cattle (bovine animals) - unspecified - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0							1																		
Fluoroquinolones - Ciprofloxacin	0.064	1	0						1																			
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0												1													
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0									1																
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in Cattle (bovine animals) - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. enterica subsp. enterica Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Cattle (bovine animals) - unspecified - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in Pigs - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - organ/tissue - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. enterica subsp. enterica	Pigs - unspecified - Farm - Clinical investigations																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0							1																		
Fluoroquinolones - Ciprofloxacin	0.064	1	0						1																			
Penicillins - Ampicillin	8	1	1																		1							
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	1															1										
Trimethoprim	2	1	1															1										
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in Pigs - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - organ/tissue - quantitative data [Dilution method]

S. enterica subsp. enterica Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - unspecified - Farm - Clinical investigations	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Derby* in Pigs - breeding animals - unspecified - sows - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Pigs - breeding animals - unspecified - sows - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0														1											
Amphenicols - Florfenicol	16	1	0														1											
Cephalosporins - Cefotaxime	0.5	1	0									1																
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0														1											
Tetracyclines - Tetracycline	8	1	0												1													
Trimethoprim	2	1	0										1															
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0											1														
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of S. Derby in Pigs - breeding animals - unspecified - sows - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Derby Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory Antimicrobials:	Pigs - breeding animals - unspecified - sows - Farm - Surveillance	
	unknown	
	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Derby in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Pigs - fattening pigs - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096	
Aminoglycosides - Gentamicin		2	3	0												3												
Aminoglycosides - Kanamycin		16	3	0														3										
Aminoglycosides - Streptomycin		16	3	0															3									
Amphenicols - Chloramphenicol		16	3	0													2	1										
Amphenicols - Florfenicol		16	3	0													3											
Cephalosporins - Cefotaxime		0.5	3	0								2	1															
Fluoroquinolones - Ciprofloxacin		0.064	3	0							3																	
Penicillins - Ampicillin		8	3	0											3													
Quinolones - Nalidixic acid		16	3	0												1	1	1										
Tetracyclines - Tetracycline		8	3	0											2	1												
Trimethoprim		2	3	0									3															
Cephalosporins - Ceftazidime		2	3	0										2	1													
Polymyxins - Colistin	2	3	1												2	1												
Sulfonamides - Sulfamethoxazole	256	3	0															2	1									

Table Antimicrobial susceptibility testing of S. Derby in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

S. Derby	Pigs - fattening pigs - Slaughterhouse - Monitoring	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Derby* in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Pigs - unspecified - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	8	0												8													
Aminoglycosides - Kanamycin	16	8	0														8											
Aminoglycosides - Streptomycin	16	8	0															8										
Amphenicols - Chloramphenicol	16	8	0													5	3											
Amphenicols - Florfenicol	16	8	0													7	1											
Cephalosporins - Cefotaxime	0.5	8	0								7	1																
Fluoroquinolones - Ciprofloxacin	0.064	8	0						5	3																		
Penicillins - Ampicillin	8	8	0											8														
Quinolones - Nalidixic acid	16	8	0												4	4												
Tetracyclines - Tetracycline	8	8	0											4	4													
Trimethoprim	2	8	0									5	3															
Cephalosporins - Ceftazidime	2	8	0										6	2														
Polymyxins - Colistin	2	8	1										2	4	1	1												
Sulfonamides - Sulfamethoxazole	256	8	0															8										

Table Antimicrobial susceptibility testing of *S. Derby* in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Derby Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - unspecified - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Worthington* in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Worthington	Pigs - unspecified - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																		1							
Amphenicols - Chloramphenicol	16	1	0														1											
Amphenicols - Florfenicol	16	1	0														1											
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0						1																			
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	1																		1							
Trimethoprim	2	1	1															1										
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0												1													
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of *S. Worthington* in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Worthington Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - unspecified - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Infantis* in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Pigs - fattening pigs - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	1																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																1									
Amphenicols - Chloramphenicol	16	1	0														1											
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0						1																			
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0												1													
Sulfonamides - Sulfamethoxazole	256	1	0																1									

Table Antimicrobial susceptibility testing of *S. Infantis* in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

S. Infantis Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - fattening pigs - Slaughterhouse - Monitoring	
	1	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Infantis* in Quails - Farm - Domestic - Surveillance - Objective sampling - Official sampling - environmental sample - dust - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Quails - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0														1											
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0												1													
Trimethoprim	2	1	0										1															
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0											1														
Sulfonamides - Sulfamethoxazole	256	1	0																1									

Table Antimicrobial susceptibility testing of *S. Infantis* in Quails - Farm - Domestic - Surveillance - Objective sampling - Official sampling - environmental sample - dust - quantitative data [Dilution method]

S. Infantis Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Quails - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Dublin in Cattle (bovine animals) - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Dublin	Cattle (bovine animals) - unspecified - Farm - Clinical investigations																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	2	0											1	1													
Aminoglycosides - Kanamycin	16	2	0														2											
Aminoglycosides - Streptomycin	16	2	2																1		1							
Amphenicols - Chloramphenicol	16	2	0													2												
Amphenicols - Florfenicol	16	2	0													2												
Cephalosporins - Cefotaxime	0.5	2	0								2																	
Fluoroquinolones - Ciprofloxacin	0.064	2	0							2																		
Penicillins - Ampicillin	8	2	0											2														
Quinolones - Nalidixic acid	16	2	0													1		1										
Tetracyclines - Tetracycline	8	2	0											2														
Trimethoprim	2	2	0									1		1														
Cephalosporins - Ceftazidime	2	2	0										2															
Polymyxins - Colistin	2	2	0												2													
Sulfonamides - Sulfamethoxazole	256	2	0																2									

Table Antimicrobial susceptibility testing of S. Dublin in Cattle (bovine animals) - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Dublin	Cattle (bovine animals) - unspecified - Farm - Clinical investigations	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Sheep - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Sheep - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	2	0												2													
Aminoglycosides - Kanamycin	16	2	0														2											
Aminoglycosides - Streptomycin	16	2	0															2										
Amphenicols - Chloramphenicol	16	2	0												1		1											
Amphenicols - Florfenicol	16	2	0													1	1											
Cephalosporins - Cefotaxime	0.5	2	0							1		1																
Fluoroquinolones - Ciprofloxacin	0.064	2	0						1	1																		
Penicillins - Ampicillin	8	2	0											2														
Quinolones - Nalidixic acid	16	2	0													2												
Tetracyclines - Tetracycline	8	2	0											1	1													
Trimethoprim	2	2	0									1	1															
Cephalosporins - Ceftazidime	2	2	0										1	1														
Polymyxins - Colistin	2	2	0												2													
Sulfonamides - Sulfamethoxazole	256	2	0															1			1							

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Sheep - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Typhimurium Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Sheep - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in *Gallus gallus* (fowl) - laying hens - during rearing period - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - organ/tissue - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0												1													
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0							1																		
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	0																1									

Table Antimicrobial susceptibility testing of *S. Typhimurium* in *Gallus gallus* (fowl) - laying hens - during rearing period - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - organ/tissue - quantitative data [Dilution method]

S. Typhimurium Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory Antimicrobials:	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Surveillance	
	unknown	
	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in *Gallus gallus* (fowl) - laying hens - during rearing period - Farm - Domestic - Surveillance - Objective sampling - Official sampling - environmental sample - dust - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0												1													
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0												1													
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of *S. Typhimurium* in *Gallus gallus* (fowl) - laying hens - during rearing period - Farm - Domestic - Surveillance - Objective sampling - Official sampling - environmental sample - dust - quantitative data [Dilution method]

S. Typhimurium Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory Antimicrobials:	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Surveillance	
	unknown	
	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Cattle (bovine animals) - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Cattle (bovine animals) - unspecified - Farm - Clinical investigations																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0														1											
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0															1										
Tetracyclines - Tetracycline	8	1	0												1													
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0												1													
Sulfonamides - Sulfamethoxazole	256	1	0																1									

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Cattle (bovine animals) - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Typhimurium Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Cattle (bovine animals) - unspecified - Farm - Clinical investigations	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium*, monophasic in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium, monophasic	Pigs - unspecified - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																1									
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0							1																		
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0														1											
Tetracyclines - Tetracycline	8	1	0												1													
Trimethoprim	2	1	0										1															
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0											1														
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of S. Typhimurium, monophasic in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Typhimurium, monophasic Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - unspecified - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Choleraesuis* var. Kunzendorf in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Choleraesuis var. Kunzendorf	Pigs - fattening pigs - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0														1											
Tetracyclines - Tetracycline	8	1	0												1													
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of *S. Choleraesuis* var. Kunzendorf in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

S. Choleraesuis var. Kunzendorf Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - fattening pigs - Slaughterhouse - Monitoring	
	1	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Choleraesuis* var. *Kunzendorf* in Pigs - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Choleraesuis var. Kunzendorf	Pigs - unspecified - Farm - Clinical investigations																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	2	0												2													
Aminoglycosides - Kanamycin	16	2	0														2											
Aminoglycosides - Streptomycin	16	2	1															1	1									
Amphenicols - Chloramphenicol	16	2	0													2												
Amphenicols - Florfenicol	16	2	0													2												
Cephalosporins - Cefotaxime	0.5	2	0								1	1																
Fluoroquinolones - Ciprofloxacin	0.064	2	0							2																		
Penicillins - Ampicillin	8	2	0											2														
Quinolones - Nalidixic acid	16	2	0													1	1											
Tetracyclines - Tetracycline	8	2	0												2													
Trimethoprim	2	2	0									1	1															
Cephalosporins - Ceftazidime	2	2	0										2															
Polymyxins - Colistin	2	2	0										2															
Sulfonamides - Sulfamethoxazole	256	2	0															2										

Table Antimicrobial susceptibility testing of *S. Choleraesuis* var. Kunzendorf in Pigs - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Choleraesuis var. Kunzendorf Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - unspecified - Farm - Clinical investigations	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Enteritidis* in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	Pigs - fattening pigs - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	1																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0														1											
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0						1																			
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0											1														
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of *S. Enteritidis* in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

S. Enteritidis Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - fattening pigs - Slaughterhouse - Monitoring	
	1	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Agona* in Sheep - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - organ/tissue - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Sheep - Farm - Clinical investigations																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																		1							
Amphenicols - Chloramphenicol	16	1	0														1											
Amphenicols - Florfenicol	16	1	0														1											
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	1															1										
Quinolones - Nalidixic acid	16	1	0												1													
Tetracyclines - Tetracycline	8	1	0												1													
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of *S. Agona* in Sheep - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - organ/tissue - quantitative data [Dilution method]

S. Agona Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Sheep - Farm - Clinical investigations	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *diarizonae* in Sheep - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. enterica subsp. diarizonae	Sheep - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	10	0											1	9													
Aminoglycosides - Kanamycin	16	10	0														10											
Aminoglycosides - Streptomycin	16	10	5														1	4	5									
Amphenicols - Chloramphenicol	16	10	0												8	2												
Amphenicols - Florfenicol	16	10	0													10												
Cephalosporins - Cefotaxime	0.5	10	0						1	8	1																	
Fluoroquinolones - Ciprofloxacin	0.064	10	0						2	8																		
Penicillins - Ampicillin	8	10	0											10														
Quinolones - Nalidixic acid	16	10	0												1	9												
Tetracyclines - Tetracycline	8	10	0											9	1													
Trimethoprim	2	10	0										10															
Cephalosporins - Ceftazidime	2	10	0									8	2															
Polymyxins - Colistin	2	10	0										8	2														
Sulfonamides - Sulfamethoxazole	256	10	0															6	4									

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *diarizonae* in Sheep - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. enterica subsp. diarizonae Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Sheep - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in Pigs - fattening pigs - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. enterica subsp. enterica	Pigs - fattening pigs - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																		1							
Amphenicols - Chloramphenicol	16	1	0														1											
Amphenicols - Florfenicol	16	1	0														1											
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0													1												
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	1																		1							
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in Pigs - fattening pigs - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. enterica subsp. enterica Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - fattening pigs - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in *Gallus gallus* (fowl) - laying hens - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. enterica subsp. enterica	Gallus gallus (fowl) - laying hens - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0						1																			
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0										1															
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0												1													
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of *S. enterica* subsp. *enterica* in Gallus gallus (fowl) - laying hens - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. enterica subsp. enterica Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Derby* in Pigs - fattening pigs - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Pigs - fattening pigs - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																		1							
Amphenicols - Chloramphenicol	16	1	1																	1								
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	1																		1							
Quinolones - Nalidixic acid	16	1	0												1													
Tetracyclines - Tetracycline	8	1	1																		1							
Trimethoprim	2	1	1															1										
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0												1													
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of S. Derby in Pigs - fattening pigs - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Derby Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory Antimicrobials:	Pigs - fattening pigs - Farm - Surveillance	
	unknown	
	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Derby* in Pigs - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Pigs - unspecified - Farm - Clinical investigations																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	3	0											1	2													
Aminoglycosides - Kanamycin	16	3	0														3											
Aminoglycosides - Streptomycin	16	3	0															3										
Amphenicols - Chloramphenicol	16	3	0													2	1											
Amphenicols - Florfenicol	16	3	0													3												
Cephalosporins - Cefotaxime	0.5	3	0								3																	
Fluoroquinolones - Ciprofloxacin	0.064	3	0							3																		
Penicillins - Ampicillin	8	3	0											3														
Quinolones - Nalidixic acid	16	3	0													2	1											
Tetracyclines - Tetracycline	8	3	0												3													
Trimethoprim	2	3	0									2	1															
Cephalosporins - Ceftazidime	2	3	0										1	2														
Polymyxins - Colistin	2	3	0										1	1	1													
Sulfonamides - Sulfamethoxazole	256	3	0															2	1									

Table Antimicrobial susceptibility testing of *S. Derby* in Pigs - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Derby Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - unspecified - Farm - Clinical investigations	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Worthington* in Pigs - fattening pigs - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Worthington	Pigs - fattening pigs - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0															1										
Amphenicols - Florfenicol	16	1	0															1										
Cephalosporins - Cefotaxime	0.5	1	0									1																
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0														1											
Tetracyclines - Tetracycline	8	1	0													1												
Trimethoprim	2	1	1															1										
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of S. Worthington in Pigs - fattening pigs - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Worthington Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - fattening pigs - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Infantis* in Quails - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Quails - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	2	0												2													
Aminoglycosides - Kanamycin	16	2	0														2											
Aminoglycosides - Streptomycin	16	2	1															1	1									
Amphenicols - Chloramphenicol	16	2	0														2											
Amphenicols - Florfenicol	16	2	0														2											
Cephalosporins - Cefotaxime	0.5	2	0								1	1																
Fluoroquinolones - Ciprofloxacin	0.064	2	0							2																		
Penicillins - Ampicillin	8	2	0											2														
Quinolones - Nalidixic acid	16	2	0													2												
Tetracyclines - Tetracycline	8	2	0												2													
Trimethoprim	2	2	0										2															
Cephalosporins - Ceftazidime	2	2	0											2														
Polymyxins - Colistin	2	2	0											2														
Sulfonamides - Sulfamethoxazole	256	2	0															2										

Table Antimicrobial susceptibility testing of *S. Infantis* in Quails - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Infantis Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Quails - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Dublin in Cattle (bovine animals) - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Dublin	Cattle (bovine animals) - unspecified - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0									1																
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0											1														
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	0																1									

Table Antimicrobial susceptibility testing of S. Dublin in Cattle (bovine animals) - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Dublin	Cattle (bovine animals) - unspecified - Farm - Surveillance	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of S. Dublin in Cattle (bovine animals) - calves (under or around 1 year) - Farm - Domestic - Clinical investigations - Suspect sampling - Industry sampling - animal sample - organ/tissue - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Dublin	Cattle (bovine animals) - calves (under or around 1 year) - Farm - Clinical investigations																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0												1													
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0							1																		
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0														1											
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0									1																
Polymyxins - Colistin	2	1	0												1													
Sulfonamides - Sulfamethoxazole	256	1	0																1									

Table Antimicrobial susceptibility testing of S. Dublin in Cattle (bovine animals) - calves (under or around 1 year) - Farm - Domestic - Clinical investigations - Suspect sampling - Industry sampling - animal sample - organ/tissue - quantitative data [Dilution method]

S. Dublin	Cattle (bovine animals) - calves (under or around 1 year) - Farm - Clinical investigations	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Quails - Farm - Domestic - Surveillance - Objective sampling - Official sampling - environmental sample - boot swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Quails - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0												1													
Sulfonamides - Sulfamethoxazole	256	1	0																1									

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Quails - Farm - Domestic - Surveillance - Objective sampling - Official sampling - environmental sample - boot swabs - quantitative data [Dilution method]

S. Typhimurium Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Quails - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in *Gallus gallus* (fowl) - laying hens - during rearing period - Farm - Domestic - Surveillance - Objective sampling - Official sampling - environmental sample - boot swabs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																1									
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0														1											
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	0											1														
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	1													1												
Sulfonamides - Sulfamethoxazole	256	1	0															1										

Table Antimicrobial susceptibility testing of S. Typhimurium in Gallus gallus (fowl) - laying hens - during rearing period - Farm - Domestic - Surveillance - Objective sampling - Official sampling - environmental sample - boot swabs - quantitative data [Dilution method]

S. Typhimurium Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Cattle (bovine animals) - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Cattle (bovine animals) - unspecified - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	3	0												3													
Aminoglycosides - Kanamycin	16	3	0														3											
Aminoglycosides - Streptomycin	16	3	0															3										
Amphenicols - Chloramphenicol	16	3	0													3												
Amphenicols - Florfenicol	16	3	0													2	1											
Cephalosporins - Cefotaxime	0.5	3	0								3																	
Fluoroquinolones - Ciprofloxacin	0.064	3	0						2	1																		
Penicillins - Ampicillin	8	3	0											3														
Quinolones - Nalidixic acid	16	3	0												1	2												
Tetracyclines - Tetracycline	8	3	0											1	2													
Trimethoprim	2	3	0									3																
Cephalosporins - Ceftazidime	2	3	0										2	1														
Polymyxins - Colistin	2	3	0										1		2													
Sulfonamides - Sulfamethoxazole	256	3	0															1	1		1							

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Cattle (bovine animals) - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Typhimurium Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Cattle (bovine animals) - unspecified - Farm - Surveillance	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium* in *Gallus gallus* (fowl) - laying hens - Farm - Domestic - Clinical investigations - Suspect sampling - Industry sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Gallus gallus (fowl) - laying hens - Farm - Clinical investigations																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096	
Aminoglycosides - Gentamicin		2	1	0												1												
Aminoglycosides - Kanamycin		16	1	0														1										
Aminoglycosides - Streptomycin		16	1	0															1									
Amphenicols - Chloramphenicol		16	1	0													1											
Amphenicols - Florfenicol		16	1	0													1											
Cephalosporins - Cefotaxime		0.5	1	0								1																
Fluoroquinolones - Ciprofloxacin		0.064	1	0						1																		
Penicillins - Ampicillin		8	1	0											1													
Quinolones - Nalidixic acid		16	1	0														1										
Tetracyclines - Tetracycline		8	1	0											1													
Trimethoprim		2	1	0									1															
Cephalosporins - Ceftazidime		2	1	0										1														
Polymyxins - Colistin		2	1	0										1														
Sulfonamides - Sulfamethoxazole		256	1	0																1								

Table Antimicrobial susceptibility testing of S. Typhimurium in Gallus gallus (fowl) - laying hens - Farm - Domestic - Clinical investigations - Suspect sampling - Industry sampling - animal sample - faeces - quantitative data [Dilution method]

S. Typhimurium Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens - Farm - Clinical investigations	
	unknown	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium*, monophasic in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium, monophasic	Pigs - fattening pigs - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096	
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0															1										
Aminoglycosides - Streptomycin	16	1	1																			1						
Amphenicols - Chloramphenicol	16	1	0														1											
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0								1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	1																		1							
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	1															1										
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0											1														
Polymyxins - Colistin	2	1	0											1														
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of *S. Typhimurium*, monophasic in Pigs - fattening pigs - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - lymph nodes - quantitative data [Dilution method]

S. Typhimurium, monophasic Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - fattening pigs - Slaughterhouse - Monitoring	
	1	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Typhimurium*, monophasic in Pigs - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium, monophasic	Pigs - unspecified - Farm - Clinical investigations																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0												1													
Aminoglycosides - Kanamycin	16	1	0														1											
Aminoglycosides - Streptomycin	16	1	1																		1							
Amphenicols - Chloramphenicol	16	1	0													1												
Amphenicols - Florfenicol	16	1	0													1												
Cephalosporins - Cefotaxime	0.5	1	0									1																
Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
Penicillins - Ampicillin	8	1	1																		1							
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	8	1	1																		1							
Trimethoprim	2	1	0									1																
Cephalosporins - Ceftazidime	2	1	0										1															
Polymyxins - Colistin	2	1	0										1															
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

Table Antimicrobial susceptibility testing of S. Typhimurium, monophasic in Pigs - unspecified - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Typhimurium, monophasic Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Pigs - unspecified - Farm - Clinical investigations	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Choleraesuis* var. *Kunzendorf* in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Choleraesuis var. Kunzendorf	Pigs - unspecified - Farm - Surveillance																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	unknown																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	3	0												3													
Aminoglycosides - Kanamycin	16	3	0														3											
Aminoglycosides - Streptomycin	16	3	2															1			1	1						
Amphenicols - Chloramphenicol	16	3	0													3												
Amphenicols - Florfenicol	16	3	0													3												
Cephalosporins - Cefotaxime	0.5	3	0								2	1																
Fluoroquinolones - Ciprofloxacin	0.064	3	0						1	2																		
Penicillins - Ampicillin	8	3	0											3														
Quinolones - Nalidixic acid	16	3	0													2	1											
Tetracyclines - Tetracycline	8	3	0												3													
Trimethoprim	2	3	0									2	1															
Cephalosporins - Ceftazidime	2	3	0										3															
Polymyxins - Colistin	2	3	0										2		1													
Sulfonamides - Sulfamethoxazole	256	3	0														1	2										

Table Antimicrobial susceptibility testing of *S. Choleraesuis* var. Kunzendorf in Pigs - unspecified - Farm - Domestic - Surveillance - Objective sampling - Official sampling - animal sample - faeces - quantitative data [Dilution method]

S. Choleraesuis var. Kunzendorf Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory Antimicrobials:	Pigs - unspecified - Farm - Surveillance	
	unknown	
	lowest	highest
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Antimicrobial susceptibility testing of *S. Gallinarum* in *Gallus gallus* (fowl) - laying hens - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - eggs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Gallinarum		Gallus gallus (fowl) - laying hens - Farm - Clinical investigations																											
		Isolates out of a monitoring program (yes/no)																											
		Number of isolates available in the laboratory																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096			
	Aminoglycosides - Gentamicin	2	1	0											1														
	Aminoglycosides - Kanamycin	16	1	0													1												
	Aminoglycosides - Streptomycin	16	1	1																	1								
	Amphenicols - Chloramphenicol	16	1	0												1													
	Amphenicols - Florfenicol	16	1	0													1												
	Cephalosporins - Cefotaxime	0.5	1	0							1																		
	Fluoroquinolones - Ciprofloxacin	0.064	1	0							1																		
	Penicillins - Ampicillin	8	1	0											1														
	Quinolones - Nalidixic acid	16	1	0														1											
	Tetracyclines - Tetracycline	8	1	0											1														
	Trimethoprim	2	1	0									1																
	Cephalosporins - Ceftazidime	2	1	0									1																
Polymyxins - Colistin	2	1	1													1													
Sulfonamides - Sulfamethoxazole	256	1	0																		1								

Table Antimicrobial susceptibility testing of *S. Gallinarum* in *Gallus gallus* (fowl) - laying hens - Farm - Domestic - Clinical investigations - Suspect sampling - Official sampling - animal sample - eggs - quantitative data [Dilution method]

S. Gallinarum Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens - Farm - Clinical investigations	
	unknown	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.5	64
Aminoglycosides - Kanamycin	8	16
Aminoglycosides - Streptomycin	2	256
Amphenicols - Chloramphenicol	2	64
Amphenicols - Florfenicol	4	32
Cephalosporins - Cefotaxime	0.016	2
Fluoroquinolones - Ciprofloxacin	0.008	1
Penicillins - Ampicillin	1	128
Quinolones - Nalidixic acid	1	128
Tetracyclines - Tetracycline	1	128
Trimethoprim	0.12	16
Cephalosporins - Ceftazidime	0.25	16
Polymyxins - Colistin	0.5	4
Sulfonamides - Sulfamethoxazole	8	1024

Table Cut-off values for antibiotic resistance testing of Salmonella in Animals

Test Method Used		Standard methods used for testing		
		NCCLS/CLSI		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin	EFSA	2	
	Kanamycin		16	
	Streptomycin	NON-EFSA	16	
Amphenicols	Chloramphenicol	EFSA	16	
	Florfenicol		16	
Cephalosporins	Cefotaxime	EFSA	0.5	
	Ceftazidime	EFSA	2	
Fluoroquinolones	Ciprofloxacin	EFSA	0.064	
Penicillins	Ampicillin	EFSA	8	
Quinolones	Nalidixic acid	EFSA	16	
Sulfonamides	Sulfonamides	EFSA	256	
Tetracyclines	Tetracycline	EFSA	8	
Trimethoprim	Trimethoprim	EFSA	2	

Table Cut-off values for antibiotic resistance testing of Salmonella in Animals

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Polymyxins	Colistin		2	

Table Cut-off values for antibiotic resistance testing of Salmonella in Feed

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		32	
Amphenicols	Chloramphenicol		16	
Cephalosporins	Cefotaxime		0.5	
	Ceftazidime		2	
Fluoroquinolones	Ciprofloxacin		0.064	
Penicillins	Ampicillin		8	
Quinolones	Nalidixic acid		16	
Sulfonamides	Sulfonamides		256	
Tetracyclines	Tetracycline		8	
Trimethoprim	Trimethoprim		2	

Table Cut-off values for antibiotic resistance testing of Salmonella in Food

Test Method Used		Standard methods used for testing		
		NCCLS/CLSI		

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin	EFSA	2	
	Kanamycin		16	
	Streptomycin	NON-EFSA	16	
Amphenicols	Chloramphenicol	EFSA	16	
	Florfenicol		16	
Cephalosporins	Cefotaxime	EFSA	0.5	
	Ceftazidime	EFSA	2	
Fluoroquinolones	Ciprofloxacin	EFSA	0.064	
Penicillins	Ampicillin	EFSA	8	
Quinolones	Nalidixic acid	EFSA	16	
Sulfonamides	Sulfonamides	EFSA	256	
Tetracyclines	Tetracycline	EFSA	8	
Trimethoprim	Trimethoprim	EFSA	2	

Table Cut-off values for antibiotic resistance testing of Salmonella in Food

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Polymyxins	Colistin		2	

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 the most important zoonotic disease in Estonia. Since the year 2013 this disease is on the first position according to the number of registered cases in the country following salmonellosis. But the number of cases registered is increasing from year to year.

There were 385 human cases of campylobacteriosis registered in the year 2013 (in 2012 -268, 2011 - 214, 2010 - 197, 2009 - 170, 2008 - 154, 2007 - 114, 2006 - 124, 2005 - 124).

Campylobacter jejuni is the most frequently detected pathogen in humans and in poultry meat.

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

In 2013 no positive samples were found. In 2012 altogether 12,6% of the analysed poultry meat samples were Campylobacter positive (in 2011 - 4,4%).

In 2012 12,5% of the broiler slaughter batches analysed in the frames of the monitoring programme were found to be Campylobacter jejuni positive (2011 - 4,3% C.jejuni and 2% C.coli positive. In 2010 – 8,5%; 2009 – 6,2%; 2008 – 6,9%; 2007 – 2,2%. Campylobacter jejuni was found in all positive samples.)

In 2012 poultry meat Salmonella and Campylobacter national survey was carried out in accordance with the scientific report submitted to EFSA "Development of harmonized survey methods for food-borne pathogens in foodstuffs in the European Union". 380 samples were taken at retail. 12,9% of the samples tested were Campylobacter positive. Mostly C.jejuni was found. In 2011 2,3% of food samples taken in the frames of official food control were positive for C.jejuni (in 2010 – 7,3%; 2009 - 3,7%; 2008 - 6,1%; 2007 - 4%; 2006 - 2,4%; 2005 - 5,5%). All positive samples originated from broiler meat.

There are no official monitoring programmes on Campylobacter in feedingstuffs.

Campylobacter isolates were tested for antimicrobial resistance. In 2013, 2011 and 2010 all isolates were fully sensitive. In 2012 40% of the isolates were fully sensitive, 54% of the resistant isolates were resistant to 3 and more antimicrobials. 60% of the tested isolates were resistant to fluoroquinolones.

The number of foodborne outbreaks caused by Campylobacter is stable during years. 4 household outbreaks caused by Campylobacter were reported in 2013 (in 2012 - 3; 2011 - 2; 2010 - 6; 2009 - 3; 2008 - 4; 2007 - 1; 2006 - 4 outbreaks). C.jejuni was the causative agent in all cases.

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 Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

Neck skin were taken from 3 broiler carcasses belonging to the same slaughter batch for detection of Salmonella and Campylobacter. Sampling was performed in the frames of official monitoring programme. Samples were taken immediately after chilling, but before further processing such as freezing, cutting or packaging.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

neck skin

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

Neck skin were taken from 3 broiler carcasses belonging to the same slaughter batch at slaughterhouse.

Definition of positive finding

At slaughterhouse and cutting plant

A sample where Thermophilic Campylobacter was isolated.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

ISO 10272-1:2006

Control program/mechanisms

The control program/strategies in place

Sampling was performed randomly at slaughterhouse in the frames of official monitoring programme.

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

In 2013 no broiler slaughter batches investigated in the frames of Campylobacter monitoring were positive (in 2012 - 12,5%, 2011 - 6,4%, 2010 - 8,5%).

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 years it seems to be stable: 2012 - 265 samples - 13,2%, 2011 - 88 samples - 4,5%, 2010 - 85 samples - 8,2%, 2009 - 100 samples - 5%.

In 2005 and in 2007-2012 the prevalent Campylobacter specie found was *C.jejuni*, in 2006 - *C.coli*.

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

Most of the human campylobacteriosis cases are foodborne in Estonia and are caused by *C.jejuni*.

Table Campylobacter in other food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey (Milk filter was analysed (raw milk intended for direct human consumption))	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Batch	25 Millilitre	14	0		
Milk, cows' - raw milk - intended for direct human consumption - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Batch	25 Millilitre	3	0		
	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified								
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey (Milk filter was analysed (raw milk intended for direct human consumption))											
Milk, cows' - raw milk - intended for direct human consumption - Retail - Surveillance											

Table Campylobacter in poultry meat

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni
Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Monitoring	VFB	Objective sampling	Official sampling	food sample > neck skin	Domestic	Batch	25 Gram	12	0		
	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified								
Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Monitoring											

2.2.3 Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

Sampling was performed at slaughterhouse in the frames of the official monitoring programme. Sampling was based on random selection of slaughter batches regarding sampling days and batches to be sampled. Sampling was performed all the year round, more samples should be taken during may-october. All samples were taken from 1 slaughterhouse.

Sample taken was broiler intact caeca.

Caecal samples were taken at the time of evisceration. Each sample consisted of 10 intact caeca 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

intact caeca

Methods of sampling (description of sampling techniques)

At slaughter

Samples taken were intact caeca. Caecal samples were taken at the time of evisceration. Each sample consisted of 10 caeca taken from the birds belonging to the same slaughter batch.

Caecal samples were transported as intact caeca to the laboratory as soon as possible. At the laboratory, the caecal contents were 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

ISO 10272-1:2006(E)

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

In 2013 one caeca sample was positive for *C.jejuni*.

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

In the years 2006-2007 and 2009-2011 all analysed caeca samples were negative.

2% of caeca samples were positive in 2008 for *C.jejuni*. In 2012 no caeca samples were taken.

Table Campylobacter in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari
Cattle (bovine animals) - calves (under 1 year) - Farm - Monitoring	VFL	Census	Official sampling	animal sample		Animal	102	0			
Gallus gallus (fowl) - broilers - Slaughterhouse - Monitoring	VFB	Objective sampling	Official sampling	animal sample > caecum	Domestic	Slaughter batch	37	1		1	
Cattle (bovine animals) - breeding bulls - Artificial insemination station - Surveillance ¹⁾	VFB	Objective sampling	Official sampling	animal sample		Animal	193	0			
Pigs - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > faeces		Animal	2	1	1		
Sheep - animals under 1 year (lambs) - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > foetus/stillbirth		Animal	2	0			

	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Cattle (bovine animals) - calves (under 1 year) - Farm - Monitoring		
Gallus gallus (fowl) - broilers - Slaughterhouse - Monitoring		
Cattle (bovine animals) - breeding bulls - Artificial insemination station - Surveillance ¹⁾		
Pigs - unspecified - Farm - Clinical investigations		

Table Campylobacter in animals

	C. upsaliensis	Thermophilic Campylobact er spp., unspecified
Sheep - animals under 1 year (lambs) - Farm - Clinical investigations		

Comments:

¹⁾ Sperm sample.

2.2.4 Antimicrobial resistance in Campylobacter isolates

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

Laboratory used for detection for resistance

Antimicrobials included in monitoring

B. 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 susceptibility testing.

Procedures for the selection of isolates for antimicrobial testing

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

Methods used for collecting data

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

All isolates are tested in the VFL Central Laboratory.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials included in monitoring are tetracycline, nalidixic acid, ciprofloxacin, streptomycin, gentamicin, erythromycin.

Cut-off values used in testing

EUCAST

Control program/mechanisms

The control program/strategies in place

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

Results of the investigation

In 2013 no *Campylobacter* isolates were tested as there were no positive samples found.

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

Due to the small amount of *Campylobacter* isolates detected it is very difficult to make any decision.

In 2012 35 *C.jejuni* and 5 *C.coli* isolates were tested (16 isolates were found from poultry meat of Estonian origin). Amount of tested isolates was big, as during 2012 year the *Campylobacter* national monitoring in poultry meat was carried out at retail. 40% of the tested isolates were fully sensitive and 54% of the resistant isolates were resistant to 3 and more antimicrobials.

In 2011 3 *C.jejuni* and 1 *C.coli* and in 2010 4 *C.jejuni* isolates were tested and all of them were fully sensitive.

In 2009 3 *C.jejuni* strains were tested and two were found to be resistant to 2 antimicrobials, one isolate was fully sensitive. These two isolates were both found to be resistant to ciprofloxacin and nalidixic acid.

In 2008 5 *C.jejuni* and in 2007 1 *C.jejuni* strains, isolated from the broiler neck skin were tested. All isolates were 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 *C.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 and oxytetracycline. Resistance of C.jejuni (1 isolate) isolated from turkey meat was detected to ampicillin, nalidixic acid and enrofloxacin. 1 C.coli isolate was fully sensitive.

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

Human Campylobacter isolates were mostly resistant to ciprofloxacin and ampicillin during years:

2013 - 60,3% to ciprofloxacin, 59% to nalidixic acid and 34,7% to ampicillin;

2012 - 65%, 67%, 41%.

2011 - 57,3%, 28,8%; 35,5% accordingly.

C. Antimicrobial resistance in *Campylobacter jejuni* and *coli* in pigs

Results of the investigation

Antimicrobial resistance testing was not performed in 2013, as no samples for *Campylobacter* testing were taken from pigs.

D. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Sampling strategy used in monitoring

Frequency of the sampling

There is no programme for taking samples for antimicrobial susceptibility testing. Antimicrobial susceptibility testing of Campylobacter isolates that originate from samples that routinely come to the Veterinary and Food Laboratory in the frames of official control or monitoring programmes is performed.

Methods of sampling (description of sampling techniques)

Campylobacter isolates that are found in samples taken from poultry of Estonian origin in all local laboratories are included in AMR monitoring. Isolates are stored and then sent to the VFL central laboratory, which performs antimicrobial susceptibility testing.

Procedures for the selection of isolates for antimicrobial testing

Campylobacter isolates that are found in samples taken from poultry of Estonian origin are included in monitoring. Selection of isolates depends on the amount of isolates present in the laboratory. Usually 1 isolate per flock per year.

Methods used for collecting data

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

All isolates are tested in the VFL Central Laboratory.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials included in monitoring are tetracycline, nalidixic acid, ciprofloxacin, streptomycin, gentamicin, erythromycin.

Cut-off values used in testing

EUCAST

Control program/mechanisms

The control program/strategies in place

Only Campylobacter isolates derived from domestic poultry are included in monitoring.

Results of the investigation

In 2013 antimicrobial susceptibility testing of one Campylobacter jejuni isolate was performed as only one sample was found to be Campylobacter positive in 2013. The isolate was fully sensitive to all antimicrobials tested.

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

There were no Campylobacter found in samples taken from poultry during years 2005-2007 and also in 2009-2011 and in 2012 no samples were taken for Campylobacter, so no antimicrobial resistance testing was performed during these years. In 2008 2 Campylobacter jejuni isolates were tested with negative result (both of them were fully sensitive).

Table Antimicrobial susceptibility testing of *C. jejuni* in Gallus gallus (fowl) - broilers - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - caecum - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Gallus gallus (fowl) - broilers - Slaughterhouse - Monitoring																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	Cut-off value	N	n	<=0.002	<=0.004	0.008	0.015	0.016	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>4096		
Aminoglycosides - Gentamicin	2	1	0									1																
Aminoglycosides - Streptomycin	4	1	0											1														
Fluoroquinolones - Ciprofloxacin	0.5	1	0								1																	
Quinolones - Nalidixic acid	16	1	0													1												
Tetracyclines - Tetracycline	1	1	0									1																
Macrolides - Erythromycin	4	1	0											1														

C. jejuni Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers - Slaughterhouse - Monitoring	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.12	16
Aminoglycosides - Streptomycin	0.5	64
Fluoroquinolones - Ciprofloxacin	0.06	8
Quinolones - Nalidixic acid	1	64
Tetracyclines - Tetracycline	0.12	16
Macrolides - Erythromycin	0.5	64

Table Antimicrobial susceptibility testing of *C. jejuni* in Gallus gallus (fowl) - broilers - Slaughterhouse - Domestic - Monitoring - Objective sampling - Official sampling - animal sample - caecum - quantitative data [Dilution method]

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Animals

Test Method Used		Standard methods used for testing		

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Fluoroquinolones	Ciprofloxacin		0.5	
Macrolides	Erythromycin		8	
Quinolones	Nalidixic acid		16	
Tetracyclines	Tetracycline		2	

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Feed

Test Method Used		Standard methods used for testing		

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Fluoroquinolones	Ciprofloxacin		0.5	
Macrolides	Erythromycin		8	
Quinolones	Nalidixic acid		16	
Tetracyclines	Tetracycline		2	

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Food

Test Method Used		Standard methods used for testing		

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Fluoroquinolones	Ciprofloxacin		0.5	
Macrolides	Erythromycin		8	
Quinolones	Nalidixic acid		16	
Tetracyclines	Tetracycline		2	

Table Cut-off values used for antimicrobial susceptibility testing of *C. jejuni* in Animals

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Fluoroquinolones	Ciprofloxacin		0.5	
Macrolides	Erythromycin		4	
Quinolones	Nalidixic acid		16	
Tetracyclines	Tetracycline		1	

Table Cut-off values used for antimicrobial susceptibility testing of *C. jejuni* in Feed

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Fluoroquinolones	Ciprofloxacin		0.5	
Macrolides	Erythromycin		4	
Quinolones	Nalidixic acid		16	
Tetracyclines	Tetracycline		1	

Table Cut-off values used for antimicrobial susceptibility testing of C. jejuni in Food

Test Method Used		Standard methods used for testing		
		NCCLS/CLSI		

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin	EFSA	2	
	Streptomycin	EFSA	4	
Fluoroquinolones	Ciprofloxacin	EFSA	0.5	
Macrolides	Erythromycin	EFSA	4	
Quinolones	Nalidixic acid	EFSA	16	
Tetracyclines	Tetracycline	EFSA	1	

2.3 LISTERIOSIS

2.3.1 General evaluation of the national situation

A. Listeriosis general evaluation

History of the disease and/or infection in the country

During years the number of laboratory confirmed cases of Listeriosis in Estonia has been very low.

There were 2 cases of human listeriosis recorded in the year 2013: 2012 - 3, 2011 - 3, 2010 - 5, 2009 - 3, 2008 - 8, 2007 - 3, 2006 - 1, 2005 - 2, 2004 - 2.

No outbreaks involving *Listeria* spp. were reported during years.

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

No *Listeria* monitoring programme in animals exists in the country. Animals are investigated in the frames of clinical investigations or in case of BSE and rabies analyses negative results.

In the year 2013 15,8 % of samples taken from cattle (in 2012 - 6,7 %, 2011 - 10,8%; 2010 - 6,8%; 2009 - 25%; 2008 - 21,3%; 2007 - 11,8%), 14,8% of samples taken from sheep (in 2012 - 22%; 2011 - 8,3%; 2010 - 20,7%; 2009 - 43,7%; 2008 - 14,7%; 2007 - 24%) and 3 samples taken from goats were positive for *Listeria* spp. *Listeria monocytogenes* was found in 18 cases, except 1 sample taken from sheep, where *Listeria ivanovii* was found.

In 2013 national survey of raw cow's milk intended for direct human consumption taken at farm and at retail (at retail samples were taken from the same batches as at farm) was carried out. Raw cow's milk was the the most *Listeria* contaminated foodstuff in comparison with the other ready-to-eat products, on the second place were ready to eat fishery products.

Presence of *Listeria monocytogenes* was determined in 5,1% of ready-to-eat fishery products (in 2012 - 4,5%, 2011 - 4,6%; 2010 - 12,9%; 2009 - 4,9%; 2008- 6,4%).

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

The number of listeriosis human cases is very small. In all cases *Listeria monocytogenes* has been detected.

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

2.3.2 Listeria in foodstuffs

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for L. monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g
Milk, cows' - raw milk - intended for direct human consumption - Farm - Surveillance	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Single	25 Millilitre	38	5	26	5
Milk, cows' - pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Millilitre	3	0	3	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	13	0	13	0
Cheeses made from cows' milk - hard - made from raw or low heat-treated milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0
Cheeses made from cows' milk - hard - made from pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	11	0	11	0
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	3	0	3	0
Dairy products (excluding cheeses) - butter - made from pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	7	0	7	0
Dairy products (excluding cheeses) - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Millilitre	40	0	40	0
Dairy products (excluding cheeses) - cheese analogue - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	6	0	6	0

Table *Listeria monocytogenes* in milk and dairy products

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for <i>L. monocytogenes</i>	Units tested with detection method	<i>Listeria monocytogenes</i> presence in x g
Dairy products (excluding cheeses) - dairy products, not specified - ready-to-eat - Processing plant - Surveillance (made from goats milk)	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	6	0	6	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0
Dairy products (excluding cheeses) - yoghurt - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	5	0	5	0
Milk, cows' - raw milk - Farm - Surveillance	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Single	25 Millilitre	4	0	3	0
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Batch	25 Millilitre	5	4	5	4
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey (Milk filter was analysed)	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Batch	25 Millilitre	14	5	14	5
Milk, cows' - raw milk - intended for direct human consumption - Processing plant - Survey - national survey	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Single	25 Millilitre	1	0	0	0
Milk, cows' - raw milk - intended for direct human consumption - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample > milk	Domestic	Single	25 Millilitre	1	0	0	0
Milk, cows' - raw milk - intended for direct human consumption - Retail - Survey - national survey	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	Single	25 Millilitre	13	0	0	0
Milk, goats' - raw milk - intended for direct human consumption - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Millilitre	4	0	0	0

Table *Listeria monocytogenes* in milk and dairy products

	Units tested with enumeration method	> detection limit but ≤ 100 cfu/g	L. monocytogen es > 100 cfu/g
Milk, cows' - raw milk - intended for direct human consumption - Farm - Surveillance	12	0	0
Milk, cows' - pasteurised milk - Processing plant - Surveillance	0	0	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Cheeses made from cows' milk - hard - made from raw or low heat-treated milk - Processing plant - Surveillance	0	0	0
Cheeses made from cows' milk - hard - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - butter - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - cheese analogue - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - dairy products, not specified - ready-to-eat - Processing plant - Surveillance (made from goats milk)	0	0	0

Table *Listeria monocytogenes* in milk and dairy products

	Units tested with enumeration method	> detection limit but ≤ 100 cfu/g	L. monocytogen es > 100 cfu/g
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - yoghurt - Processing plant - Surveillance	0	0	0
Milk, cows' - raw milk - Farm - Surveillance	1	0	0
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey	0	0	0
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey (Milk filter was analysed)	0	0	0
Milk, cows' - raw milk - intended for direct human consumption - Processing plant - Survey - national survey	1	0	0
Milk, cows' - raw milk - intended for direct human consumption - Retail - Surveillance	1	0	0
Milk, cows' - raw milk - intended for direct human consumption - Retail - Survey - national survey	13	0	0
Milk, goats' - raw milk - intended for direct human consumption - Retail - Surveillance	4	0	0

Table *Listeria monocytogenes* in other foods

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for <i>L. monocytogenes</i>	Units tested with detection method	<i>Listeria monocytogenes</i> presence in x g
Meat from broilers (<i>Gallus gallus</i>) - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	14	0	14	0
Meat from broilers (<i>Gallus gallus</i>) - meat products - cooked, ready-to-eat - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	26	0	6	0
Meat from pig - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	67	1	57	1
Meat from pig - meat products - cooked, ready-to-eat - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	13	0	2	0
Meat from bovine animals - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	11	0	8	0
Meat from bovine animals - meat products - cooked, ready-to-eat - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	2	0	0	0
Infant formula - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	3	0	2	0
Bakery products - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0
Bakery products - cakes - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	5	0	4	0
Crustaceans - unspecified - Border inspection activities - Surveillance	VFB	Objective sampling	Official sampling	food sample	Imported from outside EU	Batch	25 Gram	2	0	2	0
Fish - smoked - cold-smoked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	9	1	8	1

Table *Listeria monocytogenes* in other foods

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for <i>L. monocytogenes</i>	Units tested with detection method	<i>Listeria monocytogenes</i> presence in x g
Fish - smoked - hot-smoked - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	20	0	14	0
Fishery products, unspecified - non-ready-to-eat - frozen - Processing plant - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	1	1	1
Fishery products, unspecified - non-ready-to-eat - frozen - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	2	1	2	1
Fishery products, unspecified - ready-to-eat - Border inspection activities - Surveillance	VFB	Objective sampling	Official sampling	food sample	Imported from outside EU	Batch	25 Gram	7	0	7	0
Fishery products, unspecified - ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	40	4	35	4
Fishery products, unspecified - ready-to-eat - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	25	0	3	0
Foodstuffs intended for special nutritional uses - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	1	0	0	0
Fruits - non-pre-cut - frozen - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0
Infant formula - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0
Meat from pig - meat preparation - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	1	0	1	0
Meat from rabbit - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0
Meat from turkey - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0

Table *Listeria monocytogenes* in other foods

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for <i>L. monocytogenes</i>	Units tested with detection method	<i>Listeria monocytogenes</i> presence in x g
Meat from wild game - land mammals - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	5	0	5	0
Meat, mixed meat - meat products - cooked, ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	29	0	25	0
Meat, mixed meat - meat products - cooked, ready-to-eat - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	8	0	3	0
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	26	2	14	2
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	33	0	5	0
Ready-to-eat salads - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	17	0	7	0
Ready-to-eat salads - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample		Single	25 Gram	70	0	7	0
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0
Surimi - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	1	0	1	0
Vegetables - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	7	0	2	0
Vegetables - pre-cut - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	6	0	6	0
Vegetables - products - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	4	0	3	0

Table *Listeria monocytogenes* in other foods

	Units tested with enumeration method	> detection limit but ≤ 100 cfu/g	L. monocytogen es > 100 cfu/g
Meat from broilers (<i>Gallus gallus</i>) - meat products - cooked, ready-to-eat - Processing plant - Surveillance	0	0	0
Meat from broilers (<i>Gallus gallus</i>) - meat products - cooked, ready-to-eat - Retail - Surveillance	20	0	0
Meat from pig - meat products - cooked, ready-to-eat - Processing plant - Surveillance	10	0	0
Meat from pig - meat products - cooked, ready-to-eat - Retail - Surveillance	11	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - Processing plant - Surveillance	3	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - Retail - Surveillance	2	0	0
Infant formula - Retail - Surveillance	1	0	0
Bakery products - Processing plant - Surveillance	0	0	0
Bakery products - cakes - Processing plant - Surveillance	1	0	0
Crustaceans - unspecified - Border inspection activities - Surveillance	0	0	0
Fish - smoked - cold-smoked - Processing plant - Surveillance	1	0	0
Fish - smoked - hot-smoked - Processing plant - Surveillance	6	0	0

Table *Listeria monocytogenes* in other foods

	Units tested with enumeration method	> detection limit but ≤ 100 cfu/g	L. monocytogen es > 100 cfu/g
Fishery products, unspecified - non-ready-to-eat - frozen - Processing plant - Surveillance	0	0	0
Fishery products, unspecified - non-ready-to-eat - frozen - Processing plant - Surveillance	0	0	0
Fishery products, unspecified - ready-to-eat - Border inspection activities - Surveillance	0	0	0
Fishery products, unspecified - ready-to-eat - Processing plant - Surveillance	5	0	0
Fishery products, unspecified - ready-to-eat - Retail - Surveillance	22	0	0
Foodstuffs intended for special nutritional uses - Retail - Surveillance	1	0	0
Fruits - non-pre-cut - frozen - Processing plant - Surveillance	0	0	0
Infant formula - Processing plant - Surveillance	0	0	0
Meat from pig - meat preparation - intended to be eaten cooked - Retail - Surveillance	0	0	0
Meat from rabbit - meat products - cooked, ready-to-eat - Processing plant - Surveillance	0	0	0
Meat from turkey - meat products - cooked, ready-to-eat - Processing plant - Surveillance	0	0	0
Meat from wild game - land mammals - meat products - cooked, ready-to-eat - Processing plant - Surveillance	0	0	0

Table *Listeria monocytogenes* in other foods

	Units tested with enumeration method	> detection limit but ≤ 100 cfu/g	L. monocytogen es > 100 cfu/g
Meat, mixed meat - meat products - cooked, ready-to-eat - Processing plant - Surveillance	4	0	0
Meat, mixed meat - meat products - cooked, ready-to-eat - Retail - Surveillance	5	0	0
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Processing plant - Surveillance	12	0	0
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - Retail - Surveillance	28	0	0
Ready-to-eat salads - Processing plant - Surveillance	10	0	0
Ready-to-eat salads - Retail - Surveillance	63	0	0
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance	0	0	0
Surimi - Processing plant - Surveillance	0	0	0
Vegetables - Processing plant - Surveillance	5	0	0
Vegetables - pre-cut - Processing plant - Surveillance	0	0	0
Vegetables - products - Processing plant - Surveillance	1	0	0

2.3.4 Listeria in animals

Table Listeria in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Listeria	L. monocytogenes	Listeria spp., unspecified	L. ivanovii
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	77	12	12		
Goats - animals over 1 year - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	4	3	3		
Pigs - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	4	0			
Rabbits - pet animals - Veterinary clinics - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	2	0			
Sheep - animals over 1 year - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	27	4	3		1
Squirrels - zoo animal - Zoo - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	1	0			
Wild boars - wild - Hunting - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > organ/tissue		Animal	1	1	1		

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 outbreaks registered in Estonia due to VT E.Coli. The number of human cases is not very significant. All of them were autochtone cases and all were laboratory confirmed.

There were 8 human cases registered in 2013 (in 2012 - 3, 2011 - 4, 2010 - 5, 2009 - 4, 2008 - 3, 2007 - 3).

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

In 2013 no positive samples taken from animals were found. In 2012 1 sample (2 animals) taken from cattle was positive for E.coli O157:H7. In 2011 4 cattle from 2 different herds were positive. No positive cases were discovered in 2010 and in 2007. One positive animal was detected in 2009, as in 2008. 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 2011 the VTEC O157 monitoring programme in cattle at slaughterhouse started. 3,6% of the hide samples taken in the frames of the VTEC O157 monitoring programme were positive (in 2012 - 5,3%, in 2011 - 3,3%).

In 2013 raw milk filters (milk was intended for direct human consumption) at farm were tested and in 7 cases VTEC was found. No positive other food samples have been detected since the year 2006.

In 2009-2010 the VTEC O157 monitoring programme in pig and cattle meat took place. Meat samples were taken at cutting plant. All meat samples taken from pigs and cattle in the frames of VTEC O157 monitoring programme in 2010 and in 2009 were negative.

Recent actions taken to control the zoonoses

Farm animals are tested in the case of suspicion.

In 2009-2010 the monitoring programme of VTEC O157 in food of animal origin took place. It was linked to the Salmonella Monitoring Programme for Food of Animal Origin. Samples were taken at cutting plants from the fresh pig and bovine meat cuts. As the results were negative, in 2011 the programme was changed and cattle hide swabs were taken at slaughterhouse.

In 2011 vegetable and fruit samples were taken due to the VTEC outbreak that took place in Germany. All samples were negative.

2.4.2 Escherichia coli, pathogenic in foodstuffs

Table VT E. coli in food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Sample weight	Units tested	Total units positive for Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157
Milk, cows' - raw milk - intended for direct human consumption - Farm - Surveillance	VFB	Suspect sampling	Official sampling	food sample > milk	Domestic	ISO/PRF TS 13136	Batch	25 Millilitre	9	0	
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	ISO 16654:2001	Single	25 Gram	1	0	
Juice - fruit juice - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Domestic	ISO 16654:2001	Single	25 Millilitre	1	0	
Meat from bovine animals - fresh - Slaughterhouse - Monitoring	VFB	Objective sampling	Official sampling	food sample > meat	Domestic	ISO 16654:2001	Single	25 Gram	1	0	
Meat from bovine animals - meat preparation - intended to be eaten cooked - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Intra EU trade	ISO 16654:2001	Single	25 Gram	1	0	
Meat from bovine animals - meat products - cooked, ready-to-eat - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Domestic	ISO 16654:2001	Single	25 Gram	1	0	
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey (Milk filter was analysed)	VFB	Objective sampling	Official sampling	food sample > milk	Domestic	ISO/PRF TS 13136	Batch	25 Millilitre	14	7	
Ready-to-eat salads - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Intra EU trade	ISO 16654:2001	Single	25 Gram	1	0	

Table VT E. coli in food

	Verotoxigenic E. coli (VTEC) - VTEC non- O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified	Verotoxigenic E. coli (VTEC) - VTEC O103 - eae negative	Verotoxigenic E. coli (VTEC) - VTEC O103 - eae positive vtx1 positive	Verotoxigenic E. coli (VTEC) - VTEC O103 - eae positive vtx2 positive	Verotoxigenic E. coli (VTEC) - VTEC O111	Verotoxigenic E. coli (VTEC) - VTEC O145 - eae positive vtx2 positive	Verotoxigenic E. coli (VTEC) - VTEC O157 - eae positive vtx2 positive	Verotoxigenic E. coli (VTEC) - VTEC O26 - eae positive vtx2 positive
Milk, cows' - raw milk - intended for direct human consumption - Farm - Surveillance			1						
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance									
Juice - fruit juice - Retail - Surveillance									
Meat from bovine animals - fresh - Slaughterhouse - Monitoring									
Meat from bovine animals - meat preparation - intended to be eaten cooked - Retail - Surveillance									
Meat from bovine animals - meat products - cooked, ready-to-eat - Retail - Surveillance									
Milk, cows' - raw milk - intended for direct human consumption - Farm - Survey - national survey (Milk filter was analysed)			1	1	4		6	4	1
Ready-to-eat salads - Retail - Surveillance									

2.4.3 Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

Sampling is performed in the frames of the official VTEC O157 monitoring programme. Samples were taken from cattle at slaughterhouse. Hide samples were taken according to EFSA Technical specifications for the monitoring of VTEC on animals and food.

Frequency of the sampling

Animals at slaughter (herd based approach)

Sampling distributed evenly throughout the year

Type of specimen taken

Animals at slaughter (herd based approach)

Hide swab

Methods of sampling (description of sampling techniques)

Animals at slaughter (herd based approach)

Swabs were taken from the brisket area of the animal after exsanguination and prior to de-hiding. The swab were taken using a pre-moistened sponge swab according to EFSA technical specifications.

Case definition

Animals at slaughter (herd based approach)

A herd from which VTEC O157 has been isolated.

Diagnostic/analytical methods used

Animals at slaughter (herd based approach)

Bacteriological method: ISO 16654:2001

Control program/mechanisms

The control program/strategies in place

Sampling is performed in the frames of the VTEC O157 monitoring programme for Food of Animal Origin.

Measures in case of the positive findings or single cases

The additional faeces samples could be taken from the farm from which animals originated whose hide swabs were positive. Biosecurity measures should be applied at the farm.

Notification system in place

VTEC detection is notifiable in animals and food since the year 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".

Results of the investigation

3,6% of hide swabs taken in the frames of monitoring programme were positive for VTEC O157 in 2013.

Table VT E. coli in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Sample weight	Units tested	Total units positive for Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157
Cattle (bovine animals) - meat production animals - Slaughterhouse - Monitoring (Hide swabs)	VFB	Objective sampling	Official sampling	animal sample > hide	Domestic	ISO 16654:2001	Animal	400 Square centimetre	253	9	
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > faeces		ISO 16654:2001	Animal		1	0	
Cattle (bovine animals) - unspecified - Farm - Surveillance	VFL	Objective sampling	Official sampling	animal sample > faeces		ISO 16654:2001	Animal		5	0	

	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified	Verotoxigenic E. coli (VTEC) - VTEC O157 - eae positive vtx1 and vtx2 positive	Verotoxigenic E. coli (VTEC) - VTEC O157 - eae positive vtx2 positive
Cattle (bovine animals) - meat production animals - Slaughterhouse - Monitoring (Hide swabs)			8	1
Cattle (bovine animals) - unspecified - Farm - Clinical investigations				
Cattle (bovine animals) - unspecified - Farm - Surveillance				

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 in Estonia was detected in 1986.

Human Tuberculosis Register has been created in 1997. No cases of human tuberculosis caused by *M.bovis* has ever been reported.

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

Estonia has regained officially tuberculosis-free member state status in 2010 according to the Commission Decision 2010/695.

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

Since bovine tuberculosis in cattle is eliminated in Estonia, there is no probability of contracting *M.bovis* infection from domestic animals or domestic animal products.

2.5.2 Mycobacterium in animals

A. Mycobacterium bovis in bovine animals

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

Since the 17th of November 2010 Estonia is declared as officially free of bovine tuberculosis. Estonia has regained officially free member state status according to Commission Decision 2010/695 of 17 November 2010 amending the Annexes to Decision 93/52/EEC as regards the recognition of Estonia, Latvia and the Autonomous Community of the Balearic Islands in Spain as officially free of brucellosis (*B. melitensis*) and amending Annexes I and II to Decision 2003/467/EC as regards the declaration of Estonia as officially tuberculosis-free and officially brucellosis-free as regards bovine herds.

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 24 months 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. According to the National Infectious Animal Disease Control Program in total 1/3 of bovines and 1/3 of bovine herds were tested with tuberculin in 2013. That scheme of investigation ensures that total 100% of herds are tested at an interval of 3 years.

Frequency of the sampling

All over 24 months 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 an interval of 3 years.

Type of specimen taken

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. 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 of bovine animals against tuberculosis" (made in

accordance with Community legislation) is in force since 2004.

Measures in case of the positive findings or single cases

Veterinary and Food Board apply following restrictions and measures:

- 1) declare OTF status invalid,
- 2) organize epidemiological investigation,
- 3) ensure that all at least 6 weeks old bovine animals native of tuberculosis positive herds should be tuberculin tested according to the EC Regulation 1226/2002,
- 4) all in point 3 mentioned tuberculosis positive animals should be slaughtered,
- 5) 60 days - 6 months after the positive animals are removed from the herd, all bovines over 6 weeks are tested with tuberculin. Positive animals are slaughtered. Testing is carried out at mentioned interval until the herd applies to the requirements of officially tuberculosis free herd,
- 6) bovine animals could be taken out from the herd only for slaughter,
- 7) disinfection is required,
- 8) 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

There were no positive results in 2013.

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

Estonia has regained officially tuberculosis-free member state status in 2010 according to the Commission Decision 2010/695.

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 2004).

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 were no farmed deer herds in Estonia in 2013.

Table Tuberculosis in other animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis
Cattle (bovine animals) - breeding bulls - Artificial insemination station - Surveillance ¹⁾	VFB	Objective sampling	Official sampling	animal sample			Animal	412	0		
	Mycobacterium spp., unspecified										
Cattle (bovine animals) - breeding bulls - Artificial insemination station - Surveillance ¹⁾											

Comments:

¹⁾ Analytical method used: intradermal skin test

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

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
Eesti	4206	261574	4206	100	0	0	every 36 months	43489	178	0	0
Total : ¹⁾	4206	261574	4206	100	0	0	0	43489	178	0	0

Comments:

¹⁾ 0

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

According to Commission Decision 2010/695 of 17 November 2010 amending the Annexes to Decision 93/52/EEC as regards the recognition of Estonia, Latvia and the Autonomous Community of the Balearic Islands in Spain as officially free of brucellosis (*B. melitensis*) and amending Annexes I and II to Decision 2003/467/EC as regards the declaration of Estonia as officially tuberculosis-free and officially brucellosis-free as regards bovine herds, Estonia has regained officially free member state status.

Since 2005 the brucellosis surveillance programme in bovine animals is 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 Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

According to Commission Decision 2010/695 of 17 November 2010 amending the Annexes to Decision 93/52/EEC as regards the recognition of Estonia, Latvia and the Autonomous Community of the Balearic Islands in Spain as officially free of brucellosis (*B. melitensis*) and amending Annexes I and II to Decision 2003/467/EC as regards the declaration of Estonia as officially tuberculosis-free and officially brucellosis-free as regards bovine herds, Estonia has regained officially free member state status.

Monitoring system

Sampling strategy

Compulsory bacteriological investigation of all abortions with suspicion of Brucellosis.

All over 24 month old bovines are subject to routine serological testing for brucellosis (except fattening bulls who are not used for breeding, are in separate epidemiological unit and will be slaughtered after rearing period). 20% of the herds are tested annually.

Dairy cows: milk samples are tested serologically.

Other bovines: 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) with interval not exceeding 5 years.

Bulls in the artificial insemination centres tested serologically - blood samples are taken once a year.

Type of specimen taken

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

Diagnostic test - serology (indirect ELISA) for monitoring purposes. If samples react positively in screening tests, confirmation is 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. Council Directive of 26 June 1964 on animal health problems affecting intra-Community trade in bovine animals and swine is applied.

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 of bovine animals against brucellosis" is in force since 2004.

Measures in case of the positive findings or single cases

Veterinary and Food Board apply following restrictions and measures:

- 1) declare OBF status invalid;
- 2) organize epidemiological investigation;
- 3) all bovine animals and brucellosis susceptible animals in the epidemic point should be culled, 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;
- 4) disposal of carcasses in accordance with Regulation (EC) No 1069/2009;
- 5) vehicles and animals to the epidemic point and out could be allowed only by authority of the Veterinary and Food Board;
- 6) disposal of equipment, animal products, waste and other objects which can not be disinfected and may be contaminated;
- 7) vehicles which are used for transport of bovines or other susceptible animals or for transport of possibly contaminated objects must be disinfected before and after the transport;
- 8) milk must be heat-treated before consumption or before using it for feed.

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 were negative in 2013.

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.

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 goats

Status as officially free of caprine brucellosis during the reporting year

The entire country free

According to Commission Decision 2010/695 of 17 November 2010 amending the Annexes to Decision 93/52/EEC as regards the recognition of Estonia, Latvia and the Autonomous Community of the Balearic Islands in Spain as officially free of brucellosis (*B. melitensis*) and amending Annexes I and II to Decision 2003/467/EC as regards the declaration of Estonia as officially tuberculosis-free and officially brucellosis-free as regards bovine herds, Estonia has regained officially free member state status.

Monitoring system

Sampling strategy

Each year 10 % of the goat herds and goats over the age 6 months are analyzed serologically. All abortions with brucellosis suspicion are tested bacteriologically.

Frequency of the sampling

10% of the herds are tested each year.

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Individual blood sample for serology.

Samples from abortion material, udder secretions or from tissues removed at post-mortem for bacteriology.

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.

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.

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 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 16 "Prevention of ovine and caprine animals against brucellosis" is in force since 2008.

Measures in case of the positive findings or single cases

Measures include notification, investigation of all suspected cases by veterinary authorities by serological testing of blood samples and microbiological testing in case of abortions, isolation of suspect cases and

herd restrictions, killing of positive herds and disinfection of the shed, restrictions on use of raw milk for human consumption, dead animals carcasses should be disposed in accordance with the requirements of the Regulation (EC) No 1069/2009.

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 2013 there were no positive cases.

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

B. melitensis in goats has never been reported.

Human cases of brucellosis had not be diagnosed during more than 50 years.

C. Brucella melitensis in sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

According to Commission Decision 2010/695 of 17 November 2010 amending the Annexes to Decision 93/52/EEC as regards the recognition of Estonia, Latvia and the Autonomous Community of the Balearic Islands in Spain as officially free of brucellosis (*B. melitensis*) and amending Annexes I and II to Decision 2003/467/EC as regards the declaration of Estonia as officially tuberculosis-free and officially brucellosis-free as regards bovine herds, Estonia has regained officially free member state status.

Monitoring system

Sampling strategy

10 % of the goat herds and goats over the age 6 months are analyzed serologically. All abortions with suspicion of brucellosis are tested bacteriologically.

Frequency of the sampling

10% of the herds are tested 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.

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 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 16 "Prevention of ovine and caprine animals against brucellosis" is in force since 2008.

Measures in case of the positive findings or single cases

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

human consumption, dead animals carcasses should be disposed in accordance with the requirements of the Regulation (EC) No 1069/2009.

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 were negative in 2013.

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

Surveillance programme for Brucella in sheep started since 1962. Until 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.

Table Brucellosis in other animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Brucella	B. abortus	B. melitensis	B. suis
All animals - zoo animals - Zoo - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > blood		Animal	117	0			
Cattle (bovine animals) - unspecified - Farm - Unspecified (animals for trading)	VFL	Objective sampling	Official sampling	animal sample > blood		Animal	376	0			
Dogs - pet animals - Veterinary clinics - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > blood		Animal	1	0			
Pigs - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > foetus/stillbirth		Animal	2	0			
Pigs - unspecified - Farm - Unspecified (animals for trading)	VFL	Objective sampling	Official sampling	animal sample > blood		Animal	177	0			
Sheep - animals over 1 year - Farm - Unspecified	VFL	Objective sampling	Official sampling	animal sample > blood		Animal	7	0			

	Brucella spp., unspecified
All animals - zoo animals - Zoo - Clinical investigations	
Cattle (bovine animals) - unspecified - Farm - Unspecified (animals for trading)	
Dogs - pet animals - Veterinary clinics - Clinical investigations	

Table Brucellosis in other animals

	Brucella spp., unspecified
Pigs - unspecified - Farm - Clinical investigations	
Pigs - unspecified - Farm - Unspecified (animals for trading)	
Sheep - animals over 1 year - Farm - Unspecified	

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

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of existing		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of herds	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbiologically	Number of animals positive microbiologically	Number of suspended herds
Eesti	2526	81279	2526	100	0	0	114	1503	0	0	0	0	0	0
Total : ¹⁾	2526	81279	2526	100	0	0	114	1503	0	0	0	0	0	0

Comments:

¹⁾ 0

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

If present, the row "Total -1" refers to analogous data of the previous year.

	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk			Information about			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds	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
Region																		Sero logically	BST		
Eesti	4206	261574	4206	100	0	0	1008	1495	0	1008	22261	0	1110	0	0	0	0	0	0	0	0
Total : ¹⁾	4206	261574	4206	100	0	0	1008	1495	0	1008	22261	0	1110	0	0	0	0	0	0	0	0

Comments:

¹⁾ 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. The peak was mentioned in 1999 (113 cases):

2013 - 72, 2012 - 47, 2011 - 69, 2010 - 58, 2009 - 54, 2008 - 42, 2007 - 76, 2006 - 42.

In 2011 1 household outbreak and in 2010 1 household outbreak were registered. There were no outbreaks registered in previous years.

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 usually related to the confirmation of the presence of cross-reacting antibody in case of positive Brucella serological reaction.

In 2013 5 samples taken from cattle and 40% of them were positive for Y. enterocolitica. In 2012 4 samples taken from cattle were tested. 50% of them were Y. enterocolitica positive. In 2011 no samples were taken from animals and food.

In 2010 no samples taken from cattle were positive. 100% (3 samples analysed) of samples taken from pigs were positive for Y. enterocolitica.

In 2009 54% of samples taken from cattle and 25% of the samples taken from pigs were positive for Yersinia enterocolitica.

In 2008 17,4% of samples taken from cattle were positive for Y. enterocolitica.

In 2007 25% of samples taken from cattle and in 2006 4,7% of samples taken from sheep were positive for Yersinia enterocolitica.

In 2013 Yersinia monitoring programme in pig meat taken at cutting plants took place. 5,7% of samples taken in the frames of monitoring programme were Yersinia enterocolitica positive. In 2009-2010 Yersinia monitoring programme in pig meat took place. 108 pig carcass swab samples were taken in 2010 and 80 carcass swab samples were taken in 2009 at slaughterhouses, no positive samples were found. Both programmes were linked to the Salmonella monitoring programme for food of animal origin. In 2013 meat samples were taken at retail, 6% of them were Yersinia enterocolitica positive.

The number of human cases is unstable and varies during years. A significant part of human infections is of domestic origin.

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

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

2.7.2 Yersinia in foodstuffs

Table Yersinia in food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Yersinia	Y. enterocolitica	Y. pseudotuberculosis
Meat from bovine animals - minced meat - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	8	1		
Meat from pig - fresh - Cutting plant - Monitoring	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	280	16		
Meat from pig - meat preparation - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	26	2		
Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	21	1	1	
Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample	Intra EU trade	Single	25 Gram	1	0		
Meat, mixed meat - minced meat - intended to be eaten cooked - Retail - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Single	25 Gram	9	0		
Milk, goats' - UHT milk - Retail - Surveillance	VFB	Suspect sampling	Official sampling	food sample	Intra EU trade	Single	25 Millilitre	1	0		

	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified	Y. enterocolitica - biotype 1A	Y. enterocolitica - biotype 2/O:9
Meat from bovine animals - minced meat - intended to be eaten cooked - Retail - Surveillance					1	
Meat from pig - fresh - Cutting plant - Monitoring				10	5	1

Table Yersinia in food

	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified	Y. enterocolitica - biotype 1A	Y. enterocolitica - biotype 2/O:9
Meat from pig - meat preparation - intended to be eaten cooked - Retail - Surveillance					2	
Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance						
Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance						
Meat, mixed meat - minced meat - intended to be eaten cooked - Retail - Surveillance						
Milk, goats' - UHT milk - Retail - Surveillance						

2.7.3 Yersinia in animals

Table Yersinia in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Yersinia	Y. enterocolitica	Y. pseudotuberculosis	Yersinia spp., unspecified
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > faeces		Animal	1	1	1		
Cattle (bovine animals) - unspecified - Farm - Surveillance	VFL	Objective sampling	Official sampling	animal sample > faeces		Animal	4	1	1		
Pigs - unspecified - Farm - Unspecified	VFL	Objective sampling	Official sampling	animal sample > faeces		Animal	1	0			
Rabbits - pet animals - Veterinary clinics - Clinical investigations	VFL	Suspect sampling	Official sampling	animal sample > faeces		Animal	2	0			

	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified
Cattle (bovine animals) - unspecified - Farm - Clinical investigations			
Cattle (bovine animals) - unspecified - Farm - Surveillance			
Pigs - unspecified - Farm - Unspecified			
Rabbits - pet animals - Veterinary clinics - Clinical investigations			

Table Yersinia in animals

2.8 TRICHINELLOSIS

2.8.1 General evaluation of the national situation

A. Trichinellosis general evaluation

History of the disease and/or infection in the country

The data of 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 was diagnosed in 1999. During years there have been no cases of trichinellosis found in farmed animals.

There are still cases of trichinellosis in wild animals diagnosed each year. Most affected are wild boars. Human trichinellosis is relatively rare disease in Estonia. The peak of incidence was noted in the year 1993, when 43 human cases of trichinellosis were diagnosed. Since that time the number of human cases per year is close to zero.

2013 - 1

2012 -2010 - 0 cases

2009 - 1

2008 - 2006 - 0

2005 - 1

2004 - 0.

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

Investigations show that during years no *Trichinella* was 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 close to zero as *Trichinella* has not been detected in farmed 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

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

2.8.2 Trichinella in animals

A. 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 2013 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.

The number of slaughtered horses is not very big (max 25 horses per year), as there is no tradition to consume horse meat in Estonia.

B. 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 slaughterhouse. Sampling is performed by authorized or official veterinarians at post-mortem inspection in accordance with the Commission Regulation 2075/2005.

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 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 slaughterhouse 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 Trichina larvae discover, 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 1069/2009.

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 in pigs were reported during years.

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 was 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.

Table Trichinella in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Units tested	Total units positive for Trichinella	T. spiralis	Trichinella spp., unspecified	T. britovi
Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Surveillance	VFB	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	443048	0			
Solipeds, domestic - horses - Slaughterhouse - Surveillance	VFB	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	23	0			
Badgers - wild - Hunting - Unspecified	VTL	Census	Not applicable	animal sample > organ/tissue	Domestic	Animal	2	2			2
Bears - wild - Unknown - Unspecified ¹⁾	VFB, VTL	Census	Not applicable	animal sample > organ/tissue	Domestic	Animal	42	15		1	8
Lynx - wild - Hunting - Unspecified ²⁾	VTL	Census	Not applicable	animal sample > organ/tissue	Domestic	Animal	9	7			6
Wild boars - wild - Hunting - Unspecified ³⁾	VFB, VTL	Census	Not applicable	animal sample > organ/tissue	Intra EU trade	Animal	517	4			4
Wild boars - wild - Unknown - Unspecified ⁴⁾	VFB, VTL	Census	Not applicable	animal sample > organ/tissue	Domestic	Animal	4781	77		4	68

	T. nativa	T. pseudospiralis
Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Surveillance		

Table Trichinella in animals

	T. nativa	T. pseudospiralis
Solipeds, domestic - horses - Slaughterhouse - Surveillance		
Badgers - wild - Hunting - Unspecified		
Bears - wild - Unknown - Unspecified ¹⁾	7	
Lynx - wild - Hunting - Unspecified ²⁾	5	
Wild boars - wild - Hunting - Unspecified ³⁾		
Wild boars - wild - Unknown - Unspecified ⁴⁾	6	1

Comments:

- ¹⁾ In 1 sample both T.britovi and T.nativa were found.
- ²⁾ In 4 samples both T.britovi and T.nativa were found.
- ³⁾ Samples originated from the other EU Member State
- ⁴⁾ In 2 samples both T.britovi and T.nativa were found.

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 2013-2008 and 2006-2004. In 2007 one case of liver echinococcosis was registered in cattle.

In 2005 2 cases of echinococcosis in wild moose had been diagnosed at post-mortem inspection.

11 cases of human echinococcosis have been reported since the year 1999. 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 to 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 rare disease in Estonia.

2.9.2 Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Region	Units tested	Total units positive for Echinococcus	E. granulosus	E. multilocularis
Sheep - Slaughterhouse - Surveillance	VFB	Census	Official sampling			Animal		5805	0		
Goats - Slaughterhouse - Surveillance	VFB	Census	Official sampling			Animal		78	0		
Solipeds, domestic - horses - Slaughterhouse - Surveillance	VFB	Census	Official sampling			Animal		23	0		
Cattle (bovine animals) - unspecified - Slaughterhouse - Surveillance	VFB	Census	Official sampling			Animal		34241	0		
Moose - wild - Game handling establishment - Surveillance	VFB	Census	Official sampling			Animal		2988	0		
Pigs - unspecified - Slaughterhouse - Surveillance	VFB	Census	Official sampling			Animal		443048	0		

	Echinococcus spp., unspecified
Sheep - Slaughterhouse - Surveillance	
Goats - Slaughterhouse - Surveillance	
Solipeds, domestic - horses - Slaughterhouse - Surveillance	
Cattle (bovine animals) - unspecified - Slaughterhouse - Surveillance	

Table Echinococcus in animals

	Echinococcus spp., unspecified
Moose - wild - Game handling establishment - Surveillance	
Pigs - unspecified - Slaughterhouse - Surveillance	

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. The number of human cases of toxoplasmosis varies during years. The highest incidence rate was detected in 2004 when 16 cases were registered. Since that time there is a decrease tendency in number of human cases of toxoplasmosis:

2013 -2011 - 0 cases

2010 - 3

2009 - 4

2008 - 1

2007 - 1

2006 - 3

2005 - 5.

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 programme for Toxoplasma monitoring in animals. Animals are investigated in case of suspicion. Blood samples are tested on presence of Toxoplasma antibodies.

In the years 2008-2010 no antibodies were detected in tested animals. In 2013 antibodies were found in 2 blood samples taken from cats, in 1 sample taken from dog and in 29 samples taken from zoo animals.

In 2012 there was 1 positive sample taken from zoo animal and in 2011 4 positive samples taken from cats.

There is no enough information about the most common sources of infection.

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

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

2.10.2 Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii	Toxoplasma spp., unspecified
All animals - zoo animals - Unknown - Unspecified ¹⁾	VTL	Unspecified	Not applicable	animal sample > blood		ELISA	Animal	69	27	27	
All animals - zoo animals - Unknown - Unspecified ²⁾	VTL	Unspecified	Not applicable	animal sample > blood		Direct agglutination (DA)	Animal	6	2	2	
Cats - pet animals - Unknown - Unspecified	VTL	Unspecified	Not applicable	animal sample > blood		Direct agglutination (DA)	Animal	6	1	1	
Dogs - pet animals - Unknown - Unspecified	VTL	Unspecified	Not applicable	animal sample > blood		Direct agglutination (DA)	Animal	2	1	1	
Pigs - unspecified - Unknown - Unspecified	VTL	Unspecified	Not applicable	animal sample > blood		Direct agglutination (DA)	Animal	20	0		

Comments:

¹⁾ animals from family Bovidae²⁾ animals from family Felidae, samples taken from leopard and lynx were positive

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

As Estonia complies with the conditions of OIE Terrestrial Animal Health Code, in 2013 Estonia self-declared its recovery of rabies-free status.

Rabies was 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. In Estonia rabies 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 was 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 oral vaccination programme started in 2004. Since that time the number of infections of farm animals has significantly decreased in bovines from 15 cases registered in 2004 and 19 cases in 2005 to no cases of infection registered in 2008 -2013.

In the dogs and cats category, the occurrence of rabies has a tendency to decrease: from 20 cases registered in 2004 to 0 cases in 2007, 1 case in 2008 and 0 cases in 2009-2013. This may be due to the improved awareness of pet owners, who vaccinate their cats alongside dogs.

Wild animals: In 2011 Rabies was diagnosed in raccoon dog near the border of Russia (in Põlva county, near Värskä). In 2013, 2012 and 2010 there were no positive cases. 3 cases were registered in red fox in 2009.

Although the last mortal case of rabies in humans was registered in Estonia more than 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). After the year 2003 there is noted a significant decrease in the number of attacks.

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

Rabies was widely distributed in all counties in Estonia, even in the islands Hiiumaa and Saaremaa.

During the years 2001-2003 the number of rabies cases among animals were growing very quickly, being 167 in 2001, 422 in 2002 and in year 2003 the numbers made a sad record - 814 rabies cases were diagnosed. Thus the oral vaccination program of wildlife was 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.

The decrease in number of cases has been noted since the year 2004: 2013/2012 - 0, 2011- 1, 2010 - 0, 2009- 3, 2008 - 3, 2007 - 4, 2006 - 114, 2005 - 266, 2004 - 314, 2003 - 814.

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 not so high, as it was some years ago, due to the vaccination programme of wild animals and mandatory vaccination of cats and dogs in the country.

There are still a lot of human cases of injury from animals every year, but the decrease tendency can be

noticed.

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). 2006-2010 the oral vaccination of wildlife was performed on the whole territory of the country twice a year. Since the year 2011 the vaccination is carried out only in the buffer zones (20-50 km from the border).

The investigations show a significant decrease in number of positive cases among animals and in number of attacks of humans by animals.

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 on the whole territory of the country.

The oral vaccination of wildlife shows a significant decrease in number of positive cases registered in animals. As Estonia complies with the conditions of OIE Terrestrial Animal Health Code, in 2013 Estonia self-declared its recovery of rabies-free status.

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

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 in a two years.

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 request.

If the veterinarian finds out that a cat or a dog is not vaccinated or that more than 24 months have passed from its vaccination, the animal has to be vaccinated as soon as possible.

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. Until 2010 the vaccination covered the whole territory, since 2011 the vaccination is done only in bordering areas. Vaccination of wild animals will be performed until no cases of rabies are registered in Estonia.

The decrease in number of positive cases registered in dogs is remarkable. There were no rabies cases registered in dogs in 2009-2013 (in 2008 - 3,1%; in 2007 - 0; in 2006 - 8,9%; in 2005 - 7,4%; in 2004 - 25%).

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 infected 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 of the 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.

Wild animals with suspicious behavior should be slaughtered pursuant to the orders of the veterinary supervisory official or the authorized veterinarian without damaging the animals 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 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

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)

A decrease in the number of dog bites can be noticed from year to year.

In 2013 1009 dog bites were registered: in 2012 - 1115, 2011 - 1247, 2010 - 1464, 2009 - 1665, 2008 - 1830, 2007 - 1924, 2006 - 2200, 2005 - 2407.

Table Rabies in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Region	Units tested	Total units positive for Lyssavirus (rabies)	Rabies virus (RABV)	EBLV-1
Badgers - wild - Natural habitat - Control and eradication programmes	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		4	0		
Cats - pet animals - Unknown - Clinical investigations	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		9	0		
Cattle (bovine animals) - unspecified - Farm - Clinical investigations	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		10	0		
Deer - wild - roe deer - Natural habitat - Control and eradication programmes	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		1	0		
Dogs - pet animals - Unknown - Clinical investigations	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		6	0		
Ferrets - wild - Natural habitat - Control and eradication programmes	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		4	0		
Foxes - wild - Natural habitat - Control and eradication programmes	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		47	0		
Goats - animals over 1 year - Farm - Clinical investigations	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		1	0		
Marten - wild - Natural habitat - Control and eradication programmes	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		1	0		
Raccoon dogs - wild - Natural habitat - Control and eradication programmes	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		106	0		
Sheep - animals over 1 year - Farm - Clinical investigations	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		2	0		

Table Rabies in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Region	Units tested	Total units positive for Lyssavirus (rabies)	Rabies virus (RABV)	EBLV-1
Solipeds, domestic - horses - Farm - Clinical investigations	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		1	0		
Squirrels - wild - Natural habitat - Control and eradication programmes	VFB	Suspect sampling	Official sampling	animal sample > brain		Animal		1	0		

	EBLV-2	Lyssavirus (unspecified virus)
Badgers - wild - Natural habitat - Control and eradication programmes		
Cats - pet animals - Unknown - Clinical investigations		
Cattle (bovine animals) - unspecified - Farm - Clinical investigations		
Deer - wild - roe deer - Natural habitat - Control and eradication programmes		
Dogs - pet animals - Unknown - Clinical investigations		
Ferrets - wild - Natural habitat - Control and eradication programmes		
Foxes - wild - Natural habitat - Control and eradication programmes		
Goats - animals over 1 year - Farm - Clinical investigations		

Table Rabies in animals

	EBLV-2	Lyssavirus (unspecified virus)
Marten - wild - Natural habitat - Control and eradication programmes		
Raccoon dogs - wild - Natural habitat - Control and eradication programmes		
Sheep - animals over 1 year - Farm - Clinical investigations		
Solipeds, domestic - horses - Farm - Clinical investigations		
Squirrels - wild - Natural habitat - Control and eradication programmes		

2.13 Q-FEVER

2.13.1 General evaluation of the national situation

A. *Coxiella burnetii* (Q-fever) general evaluation

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

Q-fever in animals is not monitored in Estonia. This disease has never been diagnosed in the country.

2.14 CYSTICERCOSIS, TAENIOSIS

2

2.14.1 Cysticerci in animals

A. Cysticerci spp., unspecified in Animals

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

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 Board about isolation of zoonotic agents.

Local Veterinary centres notify the local offices of the Health Board about isolation of zoonotic agents in food and animals.

Results of the investigation

No cases of *Cysticerci* of *Taenia saginata* and *Taenia solium* were reported in 2013.

In 2013 *Cysticercus tenuicollis* was found in 2 samples taken from wild boar and sheep.

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

Cysticercosis is very rare disease in animals in Estonia.

No cases of *Cysticerci* of *Taenia saginata* and *Taenia solium* were reported during years.

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1 ESCHERICHIA COLI, NON-PATHOGENIC

3.1.1 General evaluation of the national situation

3.1.2 Antimicrobial resistance in Escherichia coli, non-pathogenic

A. Antimicrobial resistance of E.coli, non-pathogenic, unspecified in Animals

Sampling strategy used in monitoring

Frequency of the sampling

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.

Methods of sampling (description of sampling techniques)

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 and 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. 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.

Methods used for collecting data

There is no special programme for faeces sampling 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, tetracycline, 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.

Cut-off values 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

In 2013 antimicrobial resistance testing of E.coli isolates was not performed.

Table Cut-off values used for antimicrobial susceptibility testing of *Escherichia coli*, non-pathogenic in Animals

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		16	
Amphenicols	Chloramphenicol		16	
Cephalosporins	Cefotaxime		0.25	
	Ceftazidime		0.5	
Fluoroquinolones	Ciprofloxacin		0.064	
Penicillins	Ampicillin		8	
Quinolones	Nalidixic acid		16	
Sulfonamides	Sulfonamides		256	
	Sulfamethoxazole		64	
Tetracyclines	Tetracycline		8	
Trimethoprim	Trimethoprim		2	

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Animals

Table Cut-off values used for antimicrobial susceptibility testing of *Escherichia coli*, non-pathogenic in Feed

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		2	
	Streptomycin		16	
Amphenicols	Chloramphenicol		16	
Cephalosporins	Cefotaxime		0.25	
	Ceftazidime		0.5	
Fluoroquinolones	Ciprofloxacin		0.064	
Penicillins	Ampicillin		8	
Quinolones	Nalidixic acid		16	
Sulfonamides	Sulfonamides		256	
	Sulfamethoxazole		64	
Tetracyclines	Tetracycline		8	
Trimethoprim	Trimethoprim		2	

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Feed

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Food

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin	NON-EFSA		
	Streptomycin	NON-EFSA		
Amphenicols	Chloramphenicol	NON-EFSA		
Cephalosporins	Cefotaxime	NON-EFSA		
	Ceftazidime	NON-EFSA		
Fluoroquinolones	Ciprofloxacin	NON-EFSA		
Penicillins	Ampicillin	NON-EFSA		
Quinolones	Nalidixic acid	NON-EFSA		
Sulfonamides	Sulfonamides	NON-EFSA		
	Sulfamethoxazole	NON-EFSA		
Tetracyclines	Tetracycline	NON-EFSA		
Trimethoprim	Trimethoprim	NON-EFSA		

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Food

3.2 ENTEROCOCCUS, NON-PATHOGENIC

3.2.1 General evaluation of the national situation

3.2.2 Antimicrobial resistance in Enterococcus, non-pathogenic isolates

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

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 Enterococcus monitoring programme 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. 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 faeces sampling 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 faeces sampling 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, tetracycline, 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.

Cut-off values 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

In 2013 antimicrobial resistance testing of *Enterococcus* strains was not performed.

Test Method Used	Standard methods used for testing

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Table Cut-off values for antibiotic resistance of E. faecalis in Feed

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		512	
Amphenicols	Chloramphenicol		32	
Fluoroquinolones	Ciprofloxacin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Tetracyclines	Tetracycline		4	

Table Cut-off values for antibiotic resistance of E. faecalis in Food

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		512	
Amphenicols	Chloramphenicol		32	
Fluoroquinolones	Ciprofloxacin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Tetracyclines	Tetracycline		4	

Table Cut-off values for antibiotic resistance of *E. faecium* in Animals

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		128	
Amphenicols	Chloramphenicol		32	
Fluoroquinolones	Ciprofloxacin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		4	

Table Cut-off values for antibiotic resistance of E. faecium in Feed

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		128	
Amphenicols	Chloramphenicol		32	
Fluoroquinolones	Ciprofloxacin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		4	

Table Cut-off values for antibiotic resistance of E. faecium in Food

Test Method Used		Standard methods used for testing		
			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin		32	
	Streptomycin		128	
Amphenicols	Chloramphenicol		32	
Fluoroquinolones	Ciprofloxacin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Oxazolidines	Linezolid		4	
Penicillins	Ampicillin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		4	

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1 CRONOBACTER

4.1.1 General evaluation of the national situation

A. Cronobacter 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 hard to make any conclusion, as the number of samples analyzed is very small. In 2011 no batches were analysed, in 2013, 2012, 2010, 2009 and 2008 1 batch, in 2007 3 batches and in 2006 2 batches were analyzed.

No positive batches were detected in 2007, 2008, 2009, 2012 and 2013. One batch was found to be positive for *E.sakazakii* in the year 2010 and one batch in the year 2006.

4.1.2 Cronobacter in foodstuffs

A. Cronobacter in foodstuffs

Monitoring system

Type of specimen taken

dried infant formula

Methods of sampling (description of sampling techniques)

According to the Regulation 2073/2005.

Definition of positive finding

According to the Regulation 2073/2005.

Measures in case of the positive findings or single cases

The positive batch should be destroyed.

Results of the investigation

No positive batches found in 2013.

Table Cronobacter in food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Cronobacter	Cronobacter sakazakii	Cronobacter spp, unspecified
Infant formula - dried - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Batch	10 Gram	1	0		

4.2 HISTAMINE

4.2.1 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.

No positive samples were detected during the last years.

4.2.2 Histamine in foodstuffs

A. Histamine in foodstuffs

Monitoring system

Sampling strategy

Samples are taken in the frames of import control or at processing plant. 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

fish, 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 positive batch should be removed from the market.

Results of the investigation

14 samples were analyzed in 2013, no unsatisfactory samples were detected.

Table Histamine in food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units in non-conformity	<= 100 mg/kg	>100 - <= 200 mg/kg
Fish - raw - chilled - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Batch	5 Gram	1			
Fishery products, unspecified - raw - frozen - Border inspection activities - Surveillance	VFB	Objective sampling	Official sampling	food sample	Imported from outside EU	Batch	5 Gram	3		2	
Fishery products, unspecified - raw - frozen - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Batch	5 Gram	3			0
Fishery products, unspecified - ready-to-eat - Border inspection activities - Surveillance	VFB	Objective sampling	Official sampling	food sample	Imported from outside EU	Batch	5 Gram	4			
Fishery products, unspecified - ready-to-eat - Processing plant - Surveillance	VFB	Objective sampling	Official sampling	food sample	Domestic	Batch	5 Gram	3			0

	>200 - <= 400 mg/kg	> 400 mg/kg
Fish - raw - chilled - Processing plant - Surveillance		0
Fishery products, unspecified - raw - frozen - Border inspection activities - Surveillance		
Fishery products, unspecified - raw - frozen - Processing plant - Surveillance		
Fishery products, unspecified - ready-to-eat - Border inspection activities - Surveillance		0
Fishery products, unspecified - ready-to-eat - Processing plant - Surveillance		

Table Histamine in food

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 coagulase-positive Staphylococci detected in amount $> 10(5)$ cfu/g during last years. Thus staphylococcal enterotoxins were not analyzed.

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 according to the Regulation 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 on presence of Staphylococcal enterotoxins.

Definition of positive finding

According to the Commission Regulations 2073/2005 and 1441/2007, which amends Regulation (EC) 2073/2005 on microbiological criteria for foodstuffs.

Results of the investigation

No values of coagulase-positive staphylococci > 10(5) cfu/g were detected in foodstuffs in the year 2013, so no analyzes on staphylococcal enterotoxins were performed.

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

No analyzes on Staphylococcal enterotoxins were performed during last years, as there were no samples in which the amount of coagulase-positive Staphylococci was above 10(5) cfu/g.

5. FOODBORNE

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

A. Foodborne outbreaks

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

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 2003) local offices of the Health Board provide obligatory information to the Veterinary and Food Board local Services (VFB) about all cases of zoonoses diagnosed in humans (standard form).

Obligatory reported zoonoses:

Brucellosis,

Echinococcosis,

Campylobacter enteritis,

Cryptosporidiosis,

Leptospirosis,

Rabies,

Salmonellosis,

Anthrax,

Trichinellosis,

Tuberculosis (*Mycobacterium bovis*),

Tularemia.

The HB 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 in place for information exchange on outbreaks investigation.

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

The number of outbreaks in 2013 were 14 affecting 304 people. In comparison with the year 2012 the number of outbreaks decreased, but the number of persons involved in outbreaks increased, the number of hospitalized persons decreased 5 times.

During years the predominant causative agent of outbreaks in Estonia is *Salmonella* spp (mainly *S. Enteritidis*) and on the second place is *Campylobacter* spp. In the year 2013 64,2% (in 2012 - 76,5%, 2011 - 69,2%, 2010 - 73,3%) of all foodborne outbreaks acquired in Estonia were caused by *Salmonella* spp. (n=9), 33% (in 2012 - 61,5%, 2011 - 77,8%, 2010 - 81,8%) thereof by serotype *Enteritidis* (n=7). 28,5% (in 2012 - 17,6%, 2011 - 15%, 2010 - 20%) of all foodborne outbreaks were caused by *Campylobacter* spp. (n=4, *C. jejuni* in all cases). There were 1 outbreak caused by norovirus.

Year	Number of	Number of
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	foodborne outbreaks	human cases involved
2013	14	304
2012	17	181
2011	13	155
2010	30	215
2009	23	63
2008	51	111

Evaluation of the severity and clinical picture of the human cases

In 2013 3,9% of patients affected by foodborne outbreaks were reported as hospitalized (2012 - 27%, 2011 - 38,4%, 2010 - 13,1%; 2009 - 41%; 2008 - 36,8%). There were no lethal cases registered during years.

Clinical picture for diarrhoeal diseases - diarrhoea, abdominal pain, vomiting, fever, anorexia, dehydration may be severe. Occasionally - complications in different body systems.

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 Board and Veterinary Food Board.

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

Table Foodborne Outbreaks: summarised data

	Weak evidence or no vehicle outbreaks				Strong evidence Number of Outbreaks	Total number of outbreaks
	Number of outbreaks	Human cases	Hospitalized	Deaths		
Salmonella - S. Typhimurium	1	2	1	0	1	2
Salmonella - S. Enteritidis	3	8	7	0	0	3
Salmonella - Other serovars	4	9	0	0	0	4
Campylobacter	4	9	2	0	0	4
Listeria - Listeria monocytogenes	0	unknown	unknown	unknown	0	0
Listeria - Other Listeria	0	unknown	unknown	unknown	0	0
Yersinia	0	unknown	unknown	unknown	0	0
Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0	unknown	unknown	unknown	0	0
Bacillus - B. cereus	0	unknown	unknown	unknown	0	0
Bacillus - Other Bacillus	0	unknown	unknown	unknown	0	0
Staphylococcal enterotoxins	0	unknown	unknown	unknown	0	0
Clostridium - Cl. botulinum	0	unknown	unknown	unknown	0	0
Clostridium - Cl. perfringens	0	unknown	unknown	unknown	0	0

	Weak evidence or no vehicle outbreaks				Strong evidence Number of Outbreaks	Total number of outbreaks
	Number of outbreaks	Human cases	Hospitalized	Deaths		
Clostridium - Other Clostridia	0	unknown	unknown	unknown	0	0
Other Bacterial agents - Brucella	0	unknown	unknown	unknown	0	0
Other Bacterial agents - Shigella	0	unknown	unknown	unknown	0	0
Other Bacterial agents - Other Bacterial agents	0	unknown	unknown	unknown	0	0
Parasites - Trichinella	0	unknown	unknown	unknown	0	0
Parasites - Giardia	0	unknown	unknown	unknown	0	0
Parasites - Cryptosporidium	0	unknown	unknown	unknown	0	0
Parasites - Anisakis	0	unknown	unknown	unknown	0	0
Parasites - Other Parasites	0	unknown	unknown	unknown	0	0
Viruses - Norovirus	1	248	0	0	0	1
Viruses - Hepatitis viruses	0	unknown	unknown	unknown	0	0
Viruses - Other Viruses	0	unknown	unknown	unknown	0	0
Other agents - Histamine	0	unknown	unknown	unknown	0	0
Other agents - Marine biotoxins	0	unknown	unknown	unknown	0	0
Other agents - Other Agents	0	unknown	unknown	unknown	0	0

Unknown agent

Weak evidence or no vehicle outbreaks				Strong evidence Number of Outbreaks	Total number of outbreaks
Number of outbreaks	Human cases	Hospitalized	Deaths		
0	unknown	unknown	unknown	0	0

Table Foodborne Outbreaks: detailed data for Salmonella

Please use CTRL for multiple selection fields

S. Typhimurium

Value

FBO Code	
Number of outbreaks	1
Number of human cases	28
Number of hospitalisations	2
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	raw pig meat
Nature of evidence	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans
Outbreak type	Household
Setting	Household
Place of origin of problem	Household
Origin of food vehicle	Unknown
Contributory factors	Cross-contamination
Mixed Outbreaks (Other Agent)	S. Livingstone
Additional information	