

## HUNGARY

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: Hungary

Reporting Year: 2013

Laboratory name	Description	Contribution
Central Agricultural Office		Responsible authority for zoonoses data collection and reporting



## 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 Hungary 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.

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



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## 1. ANIMAL POPULATIONS

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



## A. Information on susceptible animal population

### Sources of information

Data on susceptible animal populations were taken from official publications of the Hungarian Central Statistical Office unless it was collected by the Directorate of Food Chain Safety and Animal Health of the National Food Chain Safety Office.

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

The figures relate to year 2013.

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

Data of December 2013 show that the number of cattle continued to grow. The pig stock – after 3 years of decrease and a slightly rose in 2012 is stable. The stock of poultry increased compared to December of the previous year.

### Additional information



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)	- in total	17573				848338			
Ducks	- in total					5868518			
Gallus gallus (fowl)	- in total					34113345			
Goats	- in total	785				15190			
Pigs	- in total	29046				2954264			
Sheep	- in total	7001				829171			
Solipeds, domestic	horses - in total					59200			
Turkeys	- in total					4668994			



## 2. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

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



## 2.1 SALMONELLOSIS

### 2.1.1 General evaluation of the national situation

#### A. General evaluation

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

In 1992 the Veterinary Science Committee of the Hungarian Academy of Sciences has established its Salmonella Subcommittee with the main aim to support the work of the Hungarian Ministry of Agriculture and Rural Development in the control of Salmonella with regards to poultry flocks.

This subcommittee has formed a working group with EU experts to prepare the Integrated Quality Chain System for Salmonella Control in the Hungarian Poultry Sector (Edel-Wray-Nagy et al, 1995).

This has been issued by the Ministry for use in the poultry sector and distributed to the County Animal Health and Food Control Stations in 1995. In further years the Salmonella Subcommittee has arranged several courses and lectures to distribute the booklet for wider use. The Basic Document of this Guideline contained the adaptation of Council directive 92/117/EEC. The Guidelines contained general and specific instructions for hatcheries, breeding flocks, broilers, layers, egg packaging plants, slaughterhouses and feedmills. A special chapter was devoted to disinfection and cleaning.

Based on the above Guidelines several large Hungarian poultry farming systems (Babolna, Boly, Nadudvar) have built up and started their Salmonella Reduction Programs between 1996 and 2002. Besides, the Salmonella subcommittee has agreed with the Ministry of Agriculture and Rural Development to review the situation and to propose a Hungarian Salmonella Reduction Plan for Hungary, which was published by Nagy et al. in 1997.

Directive 92/117/EEC and the basics of the above mentioned Guidelines served the basis for the first ministerial decree [49/2002. (V.24) FVM] on the control of salmonellosis in poultry flocks, which referred to Salmonella Enteritidis and S. Typhimurium in Gallus gallus. The amendment to this Directive [97/2003. (VIII.19) FVM] made the application of the Order compulsory for breeding flocks and hatcheries, and continued to define the above 2 Salmonella serovars to be regarded as Salmonella for the purposes of that decree. The amendment also made the vaccination of table egg producing laying flocks compulsory. After the accession the EC regulations became directly applicable in Hungary as well. From that time EC regulations are followed. The implementation of these regulations is regulated by Decree 180/2009. (XII.29.) of Ministry of Agriculture.

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

Significant decrease could be seen as in the prevalence of salmonella in all types of flocks under scope of national control plans as in meat, meat products, table eggs and egg products of Gallus gallus.

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

Vaccination is not compulsory in flocks of Gallus gallus and Meleagris gallopavo. The rules of using vaccination and treatment are laid down in Commission Regulation (EC) No 200/2010 of implementing Regulation (EC) No 2160/2003 of the European Parliament and of the Council as regards requirements for the use of specific control methods in the framework of the national programmes for the control of salmonella in poultry.



## 2.1.2 Salmonellosis in humans

### A. Salmonellosis in humans

#### Reporting system in place for the human cases

There are around 80 communicable diseases notifiable in Hungary based on legal background. The physician (in primary health care, specialist care, inpatient medical institution or pathology) who first diagnoses a case of a notifiable communicable disease (even the suspicion of the disease!) immediately reports data of case to the first level of the epidemiological network (municipal institute) of National Public Health and Medical Officer's Service (NPHMOS). Data must be reported both at the beginning and at end of the illness (recovery/death, result of laboratory test). The NPHMOS has a nationwide electronic system for registering and analysing data of communicable diseases in a combined national database, so the system provides online connection amid the three levels (municipal, county and national level – National Centre of Epidemiology - NCE) of the organization. The NCE prepares reports regularly (weekly, monthly, yearly) to the Chief Medical Officer, the MoH and the Hungarian Central Statistical Office.

#### Case definition

Confirmed case: a clinically compatible case when the salmonella infection is laboratory confirmed.

Probable case: a clinically compatible case that is not confirmed by laboratory investigation, but it has an epidemiological link to a confirmed salmonellosis outbreak.

#### Diagnostic/analytical methods used

Salmonella isolates are obtained by culturing the faeces samples of the patients on selective-differentiating media, followed by biochemical testing and serotyping. Since 2003 the Hungarian and the Colindale sets of phages have been parallel used for phage typing of the human *S. Enteritidis* isolates received by the Phage-typing and Molecular Epidemiology Department of the 'Johan Bela' National Centre for Epidemiology. For *S. Typhimurium* isolates the schemes of Felix and Callow as well as Anderson et al. are also in use.

#### Notification system in place

Human cases have been notifiable since 1959. The physician reports data of case on a "case report form" by mail to the municipal institute of NPHMOS. The specialist of the institute records data immediately in the electronic system of the NPHMOS. Hungary has also a laboratory based surveillance system, and the NPHMOS has representative dataset from most of the microbiological laboratories about the laboratory investigated cases (since 2003 antibiotic resistances have also been reported from 5 regional laboratory of NPHMOS and from a number of laboratories from universities or hospitals).

The illness is reported first as enteritis infectiosa syndrome on the basis of the symptoms. Having the results of the laboratory tests this syndrome-based diagnose is modified to etiology-based diagnose. In some cases reporting follows only the available laboratory test results.

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

Human cases have been notifiable since 1959. The isolated strains have been phage-typed since the 1960s. The number of the recorded cases has continuously increased from 1959 to 1996 (with a maximum of 28 046 reported case/year, incidence: 274,6/100 000 inhabitant/year). The number of the recorded outbreaks has also increased in a similar way (outbreak = two epidemiologically linked cases of salmonellosis, maximum number of reported outbreaks: 3450 outbreaks in 1995). Since 1996 both the number of the recorded cases and the outbreaks has continuously decreased. The mortality has



increased only in the period of 1972-1994 (10-20 death/year, case fatality rate: 0.1-0.4%). In the other years the mortality was 5-10 death cases per year (case fatality rate: 0.03-0.09%). The age-specific incidence was the highest for the infants in all periods, and it declined with the progressing of the age. The investigation of the outbreaks mostly demonstrated a food-borne origin. The ratio of the person-to-person transmission is insignificant. In the history of human salmonellosis in Hungary there were less than 10 outbreaks caused by contaminated water.

Up to 1980 the serotype *S. Typhimurium* predominated, and pork was identified as the main source of infection. At that time the infection has spread by homemade foods and also by the products of food-industry. Since 1980 the serotype *S. Enteritidis* has become predominant and poultry has been identified as the main source of the infection. Since then the prevalence of this serotype has remained about 70-80%. Between 1975 and 1980 the *S. Enteritidis* phage type 7 (according to the Hungarian scheme) has predominated. In the period of 1980-1990 strains characterized with phage type 1, from 1990 to 1996 strains characterized with phage type 1, 6 and 6b (according to the Hungarian scheme) were most frequently identified. After 1997 the phage type 6 (acc. to the Hungarian scheme) has become the most frequently occurring phage type.

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

The epidemiological situation of the salmonellosis in Hungary has continuously improved till 2004. The number of cases has decreased from 11 507 to 7557 since 2000 (incidence ranged between 114,3 – 74,7/100 000 inhabitants/year), the case fatality ratio changed between 0,01 – 0,08%. The decrease in the number of salmonellosis cases was mainly due to the decrease in the number of cases caused by *S. Enteritidis*. Eighty percent of the cases were sporadic. There were 6 – 700 community/institutional and family acquired outbreaks recorded. The number of the outbreaks declined more significantly than that of the sporadic cases. The investigation of the outbreaks has showed that in most cases the source of the infection was poultry. Mainly poultry eggs, and foods that contained eggs used without adequate heat-treatment and that were prepared at private home or at canteen/catering trade caused outbreaks. There were only very few outbreaks caused by foods of industrial origin in the past ten years and there were no outbreaks caused by contaminated water.

### Relevance as zoonotic disease

In the outbreaks a person-to-person transmission has been detected only in very few cases (in specific communities). In most case the outbreaks were suspectedly or conformedly caused by strains originated from poultry, via contaminated food.

### Additional information

At the Phage-typing and Molecular Epidemiology Department of the 'Johan Bela' National Center for Epidemiology, the phage typing reactions for *S. Enteritidis* and *S. Typhimurium* are prepared parallel both with a Hungarian and the international (Ward et al., Colindale) and the Felix-Callow as well as Anderson et al. sets of phages, respectively.



## 2.1.3 Salmonella in foodstuffs

### A. Salmonella spp. in broiler meat and products thereof

#### Monitoring system

##### Sampling strategy

###### At slaughterhouse and cutting plant

The sampling strategy in the slaughterhouses is based on the previous years' data on production volume. The monitoring plan prepared by the CAO Food and Feed Safety Directorate determines the number of samples/county/month. The monitoring samples are thrown by the regional veterinary authority and are examined in the official control laboratories belonging to the Central Agricultural Office (CAO). It is a permanent monitoring scheme, data are reported by the official laboratories to CAO and the Ministry of Agriculture and Rural Development in the frame of an annual laboratory report. All the Salmonella strains isolated are serotyped by the NRL Salmonella.

###### At meat processing plant

The sampling strategy in processing plants is randomised based on the previous years' data on production volume. The samples are thrown by the veterinary authority and are examined in the official food control laboratory. It is a permanent monitoring scheme, data are reported by the official laboratories to the Ministry of Agriculture and Rural Development in the frame of an annual laboratory report.

###### At retail

Retail is also sampled by the authority on a regular basis. The total number of samples is determined in the annual monitoring plan. About 60 % of the official control samples in a product group are taken at retail.

#### 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

Fresh meat

##### At meat processing plant

minced meat, meat prep., meat products

##### At retail

minced meat, meat prep., meat products

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

##### At slaughterhouse and cutting plant



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At least 500 grams of meat is sent to the laboratory. The test portion is 25 grams.

At meat processing plant

Batch sampling with 5 subsamples. Test portion is 5 x 10 or 25 grams according to Regulation 2073/2005/EC.

### Definition of positive finding

At slaughterhouse and cutting plant

a sample or a batch is positive if salmonella was isolated

At meat processing plant

a sample or a batch is positive if salmonella was isolated

At retail

a sample or a batch is positive if salmonella was isolated

### Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

At meat processing plant

Bacteriological method: ISO 6579:2002

At retail

Bacteriological method: ISO 6579:2002

### Preventive measures in place

According to 2073/2005/EC Reg.

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

According to Reg.2073/2005/EC.

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

Based on the monitoring results, salmonella prevalence is high in broiler meat in Hungary. The dominance of Salmonella Infantis strains is well-known in the past years. 90 % of the isolated strains are belonging to this serovar now.

From 1995, the rate of Salmonella Infantis/Enteritidis is showing a continuous increase for Infantis (1% to 90 %), and a decreasing trend for S. Enteritidis (from 60 % to 5%).

The marked increase of Salmonella Infantis serovar in broiler meat was not caused a significant increase in human Salmonella Infantis incidence. The dominating serovar in human infections is continuously S. Enteritidis which has been responsible for 70-80 % of the human infections for many years.



## B. Salmonella spp. in pig meat and products thereof

### Monitoring system

#### Sampling strategy

##### At slaughterhouse and cutting plant

The sampling strategy in the slaughterhouses is based on the previous years' data on production volume. The monitoring plan prepared by the CAO Food and Feed Safety Directorate determines the number of samples/county/month. The monitoring samples are thrown by the regional veterinary authority and are examined in the official control laboratories belonging to the Central Agricultural Office (CAO). It is a permanent monitoring scheme, data are reported by the official laboratories to CAO and the Ministry of Agriculture and Regional Development in the frame of an annual laboratory report. All the Salmonella strains isolated are serotyped by the NRL Salmonella.

##### At meat processing plant

The sampling strategy in processing plants is randomised based on the previous years' data on production volume. The samples are thrown by the veterinary authority and are examined in the official food control laboratory. It is a permanent monitoring scheme, data are reported by the official laboratories to the Ministry of Agriculture and Regional Development in the frame of an annual laboratory report.

#### 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

#### Type of specimen taken

##### At slaughterhouse and cutting plant

Fresh meat

##### At meat processing plant

Surface of carcass

#### Diagnostic/analytical methods used

##### At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

##### At meat processing plant

Bacteriological method: NMKL No 71:1999



## C. Salmonella spp. in bovine meat and products thereof

### Monitoring system

#### Sampling strategy

##### At slaughterhouse and cutting plant

Food business operators perform continuous sampling system determined in their HACCP plans, and nearby there is an official control system of the competent authorities with a randomised sampling as well. The data of self control processes are checked in the frame of official control of course, but are not collected to a database, therefore these are not involved in this report. The test results of samples examined by competent authorities in their own laboratories are reported, but the data collection system do not allow to report the data separately for the different stages of food chain (slaughterhouses, processing plants, retail). Based on the structure of the EU zoonosis report, the data collection system will be restructured this year. This year all the data on fresh meat are reported in the table of slaughterhouses.

##### At meat processing plant

The sampling strategy is randomised and continuous, performed by the competent authorities. Food producers operate their own continuous sampling system determined in their HACCP plans as well, with the same remarks as in the case of slaughterhouses.

#### 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

Fresh meat

##### At meat processing plant

Surface of carcass

##### At retail

fresh meat and all kinds of meat products

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

##### At slaughterhouse and cutting plant

500 grams of sample is sent to the laboratory, the test portion is 25 grams

##### At meat processing plant

Batch sampling with 5 subsamples. Test portion is 10 or 25 grams determined by 2073/2005/EC Regulation.

#### Diagnostic/analytical methods used

##### At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

##### At meat processing plant



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Bacteriological method: ISO 6579:2002

At retail

Bacteriological method: ISO 6579:2002



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) - carcase - Slaughterhouse - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > neck skin	Domestic	Single	25 g	213	37	0	0
Meat from broilers (Gallus gallus) - fresh - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	263	61	0	0
Meat from broilers (Gallus gallus) - fresh - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	325	106	0	0
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	41	7	0	0
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	80	24	0	0
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	79	1	0	0
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	182	0	0	0
Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	16	0	0	0
Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	112	2	0	0
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	4	4	0	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 broilers (Gallus gallus) - minced meat - intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	2	0	0	0
Meat from turkey - carcase - Slaughterhouse - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > neck skin	Domestic	Single	25 g	81	12	0	0
Meat from turkey - fresh - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	119	16	0	0
Meat from turkey - fresh - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	172	18	0	0
Meat from turkey - meat products - cooked, ready-to-eat - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	74	0	0	0
Meat from turkey - meat products - cooked, ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	177	0	0	0
Meat from turkey - meat products - raw but intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	12	0	0	0
Meat from turkey - meat products - raw but intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	77	1	0	0
Meat from duck - carcase - Slaughterhouse - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	33	4	0	2
Meat from geese - carcase - Slaughterhouse - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	21	3	0	1
Meat from duck - fresh - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	118	10	0	2
Meat from geese - fresh - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	18	2	0	1



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 turkey - meat preparation - intended to be eaten cooked - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	33	2	0	0
Meat from turkey - minced meat - intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	14	0	0	0
Meat from turkey - minced meat - intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	99	23	0	0
Meat from wild game - birds - fresh - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	24	2	0	1

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. Bredeney	S. Infantis	S. Kentucky	S. Stanley
Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Surveillance	0	0	0	0	37	0	0
Meat from broilers (Gallus gallus) - fresh - Processing plant - Surveillance	0	0	4	0	57	0	0
Meat from broilers (Gallus gallus) - fresh - Retail - Surveillance	0	2	0	0	101	3	0
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	0	0	1	0	6	0	0
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Retail - Surveillance	0	1	1	0	19	3	0



Table Salmonella in poultry meat and products thereof

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. Bredeney	S. Infantis	S. Kentucky	S. Stanley
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Processing plant - Surveillance	0	0	0	0	1	0	0
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Retail - Surveillance	0	0	0	0	0	0	0
Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - Processing plant - Surveillance	0	0	0	0	0	0	0
Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - Retail - Surveillance	0	0	0	0	1	0	1
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - Processing plant - Surveillance	0	0	0	0	4	0	0
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - Retail - Surveillance	0	0	0	0	0	0	0
Meat from turkey - carcase - Slaughterhouse - Surveillance	0	0		1	2	7	2
Meat from turkey - fresh - Processing plant - Surveillance	0	0	3	1	8	1	3
Meat from turkey - fresh - Retail - Surveillance	0	0	6	1	3	4	4
Meat from turkey - meat products - cooked, ready-to-eat - Processing plant - Surveillance	0	0	0	0	0	0	0
Meat from turkey - meat products - cooked, ready-to-eat - Retail - Surveillance	0	0	0	0	0	0	0



Table Salmonella in poultry meat and products thereof

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. Bredeney	S. Infantis	S. Kentucky	S. Stanley
Meat from turkey - meat products - raw but intended to be eaten cooked - Processing plant - Surveillance	0	0	0	0	0	0	0
Meat from turkey - meat products - raw but intended to be eaten cooked - Retail - Surveillance	0	0	0	0	1	0	0
Meat from duck - carcase - Slaughterhouse - Surveillance	0	0	2	0	0	0	0
Meat from geese - carcase - Slaughterhouse - Surveillance	0	0	2	0	0	0	0
Meat from duck - fresh - Retail - Surveillance	0	0	7	0	1	0	0
Meat from geese - fresh - Retail - Surveillance	0	0	1	0	0	0	0
Meat from turkey - meat preparation - intended to be eaten cooked - in total - Surveillance	0	0	0	0	1	1	0
Meat from turkey - minced meat - intended to be eaten cooked - Processing plant - Surveillance	0	0	0	0	0	0	0
Meat from turkey - minced meat - intended to be eaten cooked - Retail - Surveillance	0	1	2	1	2	4	13
Meat from wild game - birds - fresh - in total - Surveillance	1	0	0	0	0	0	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 - Farm - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > milk	Domestic	Single	25 ml	194	0	0	0
Milk, goats' - raw milk - intended for direct human consumption - Farm - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > milk	Domestic	Single	25 ml	4	0	0	0
Dairy products (excluding cheeses) - milk powder and whey powder - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	8	0	0	0
Dairy products (excluding cheeses) - milk powder and whey powder - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	62	0	0	0
Cheeses made from cows' milk - curd - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	85	0	0	0
Cheeses made from cows' milk - fresh - made from pasteurised milk - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	12	0	0	0
Cheeses made from cows' milk - hard - made from pasteurised milk - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	16	0	0	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	175	0	0	0
Cheeses made from goats' milk - in total	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	7	0	0	0
Cheeses made from sheep's milk - fresh - made from pasteurised milk - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	65	0	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	3	0	0	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
Dairy products (excluding cheeses) - dairy desserts - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	119	0	0	0
Dairy products (excluding cheeses) - fermented dairy products - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	28	0	0	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Catering - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	49	0	0	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	37	0	0	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	287	0	0	0

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Milk, cows' - raw milk - intended for direct human consumption - Farm - Surveillance	0	0
Milk, goats' - raw milk - intended for direct human consumption - Farm - Surveillance	0	0
Dairy products (excluding cheeses) - milk powder and whey powder - Processing plant - Surveillance	0	0
Dairy products (excluding cheeses) - milk powder and whey powder - Retail - Surveillance	0	0



Table Salmonella in milk and dairy products

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Cheeses made from cows' milk - curd - in total - Surveillance	0	0
Cheeses made from cows' milk - fresh - made from pasteurised milk - in total - Surveillance	0	0
Cheeses made from cows' milk - hard - made from pasteurised milk - in total - Surveillance	0	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - in total - Surveillance	0	0
Cheeses made from goats' milk - in total	0	0
Cheeses made from sheep's milk - fresh - made from pasteurised milk - in total - Surveillance	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - in total - Surveillance	0	0
Dairy products (excluding cheeses) - dairy desserts - in total - Surveillance	0	0
Dairy products (excluding cheeses) - fermented dairy products - in total - Surveillance	0	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Catering - Surveillance	0	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance	0	0



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 - Retail - Surveillance	0	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
Eggs - table eggs - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Batch	25 g	458	0	0	0
Eggs - raw material (liquid egg) for egg products - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 ml	49	0	0	0
Fishery products, unspecified - cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	41	0	0	0
Fish - smoked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	71	0	0	0
Crustaceans - unspecified - cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	13	0	0	0
Molluscan shellfish - raw - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	9	0	0	0
Molluscan shellfish - cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	51	0	0	0
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	1	0	0	0
Seeds, sprouted - ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	69	0	0	0
Vegetables - pre-cut - ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	205	0	0	0
Infant formula - dried - intended for infants below 6 months - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	50	0	0	0
Bakery products - cakes - Catering - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	172	0	0	0
Bakery products - cakes - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	158	1	1	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
Cereals and meals - flakes - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	55	0	0	0
Chocolate - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	251	0	0	0
Cocoa and cocoa preparations, coffee and tea - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	266	0	0	0
Coconut - coconut products - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	78	0	0	0
Egg products - dried - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	56	1	0	0
Egg products - liquid - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 ml	25	0	0	0
Follow-on formulae - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	73	0	0	0
Foodstuffs intended for special nutritional uses - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	32	0	0	0
Foodstuffs intended for special nutritional uses - processed cereal-based food for infants and young children - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	18	0	0	0
Fruits - non-pre-cut - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	36	0	0	0
Nuts and nut products - dried - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	95	0	0	0
Other processed food products and prepared dishes - meat based dishes - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	394	0	0	0
Other processed food products and prepared dishes - sandwiches - with meat - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	243	0	0	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
Ready-to-eat salads - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	389	1	0	0
Spices and herbs - dried - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	187	0	0	0

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Mbandaka
Eggs - table eggs - Retail - Surveillance	0	0	0
Eggs - raw material (liquid egg) for egg products - Processing plant - Surveillance	0	0	0
Fishery products, unspecified - cooked - Retail - Surveillance	0	0	0
Fish - smoked - Retail - Surveillance	0	0	0
Crustaceans - unspecified - cooked - Retail - Surveillance	0	0	0
Molluscan shellfish - raw - Retail - Surveillance	0	0	0
Molluscan shellfish - cooked - Retail - Surveillance	0	0	0
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance	0	0	0
Seeds, sprouted - ready-to-eat - Retail - Surveillance	0	0	0
Vegetables - pre-cut - ready-to-eat - Retail - Surveillance	0	0	0



Table Salmonella in other food

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Mbandaka
Infant formula - dried - intended for infants below 6 months - Retail - Surveillance	0	0	0
Bakery products - cakes - Catering - Surveillance	0	0	0
Bakery products - cakes - Retail - Surveillance	0	0	0
Cereals and meals - flakes - in total - Surveillance	0	0	0
Chocolate - in total - Surveillance	0	0	0
Cocoa and cocoa preparations, coffee and tea - in total - Surveillance	0	0	0
Coconut - coconut products - in total - Surveillance	0	0	0
Egg products - dried - in total - Surveillance	0	0	1
Egg products - liquid - Processing plant - Surveillance	0	0	0
Follow-on formulae - Retail - Surveillance	0	0	0
Foodstuffs intended for special nutritional uses - in total - Surveillance	0	0	0
Foodstuffs intended for special nutritional uses - processed cereal-based food for infants and young children - Retail - Surveillance	0	0	0
Fruits - non-pre-cut - Retail - Surveillance	0	0	0
Nuts and nut products - dried - in total - Surveillance	0	0	0



Table Salmonella in other food

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Mbandaka
Other processed food products and prepared dishes - meat based dishes - in total - Surveillance	0	0	0
Other processed food products and prepared dishes - sandwiches - with meat - in total - Surveillance	0	0	0
Ready-to-eat salads - in total - Surveillance	0	1	0
Spices and herbs - dried - in total - Surveillance	0	0	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 pig - carcase - Slaughterhouse - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > carcase swabs	Domestic	Single	400 cm2	239	2	0	2
Meat from pig - fresh - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	182	2	0	1
Meat from pig - fresh - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	193	4	0	1
Meat from pig - minced meat - intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	10 g	53	0	0	0
Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	10 g	172	6	0	1
Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	10 g	81	3	0	0
Meat from pig - meat preparation - intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	10 g	103	2	0	2
Meat from pig - meat products - raw but intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	7	0	0	0
Meat from pig - meat products - raw but intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	20	0	0	0
Meat from pig - meat products - cooked, ready-to-eat - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	54	0	0	0
Meat from pig - meat products - cooked, ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	116	0	0	0
Meat from bovine animals - carcase - Slaughterhouse - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > carcase swabs	Domestic	Single	400 cm2	233	0	0	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 - fresh - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	97	2	0	1
Meat from bovine animals - fresh - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	190	1	0	0
Meat from bovine animals - minced meat - intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	10 g	14	0	0	0
Meat from bovine animals - minced meat - intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	10 g	133	0	0	0
Meat from bovine animals - meat products - raw but intended to be eaten cooked - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	9	0	0	0
Meat from bovine animals - meat products - raw but intended to be eaten cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	48	0	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	2	0	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	42	0	0	0
Meat from sheep - fresh - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	5	0	0	0
Other products of animal origin - gelatin and collagen - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	63	0	0	0
Meat from horse - meat products - fermented sausages - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	3	0	0	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 pig - meat products - fermented sausages - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	443	5	0	2
Meat from pig - meat products - fermented sausages - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	568	5	0	1
Meat from pig - meat products - raw and intended to be eaten raw - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	88	0	0	0
Meat from pig - meat products - raw and intended to be eaten raw - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	56	0	0	0
Meat from wild boar - fresh - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	54	1	1	0
Meat from wild game - land mammals - fresh - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	75	0	0	0

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. Bredeney	S. Derby
Meat from pig - carcass - Slaughterhouse - Surveillance	0	0	0	0	0
Meat from pig - fresh - Processing plant - Surveillance	0	0	0	0	1
Meat from pig - fresh - Retail - Surveillance	0	0	0	1	2
Meat from pig - minced meat - intended to be eaten cooked - Processing plant - Surveillance	0	0	0	0	0



Table Salmonella in red meat and products thereof

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. Bredeney	S. Derby
Meat from pig - minced meat - intended to be eaten cooked - Retail - Surveillance	2	0	1	0	2
Meat from pig - meat preparation - intended to be eaten cooked - Processing plant - Surveillance	0	0	1	0	2
Meat from pig - meat preparation - intended to be eaten cooked - Retail - Surveillance	0	0	0	0	0
Meat from pig - meat products - raw but intended to be eaten cooked - Processing plant - Surveillance	0	0	0	0	0
Meat from pig - meat products - raw but intended to be eaten cooked - Retail - Surveillance	0	0	0	0	0
Meat from pig - meat products - cooked, ready-to-eat - Processing plant - Surveillance	0	0	0	0	0
Meat from pig - meat products - cooked, ready-to-eat - Retail - Surveillance	0	0	0	0	0
Meat from bovine animals - carcase - Slaughterhouse - Surveillance	0	0	0	0	0
Meat from bovine animals - fresh - Processing plant - Surveillance	0	0	0	0	1
Meat from bovine animals - fresh - Retail - Surveillance	0	0	0	0	1
Meat from bovine animals - minced meat - intended to be eaten cooked - Processing plant - Surveillance	0	0	0	0	0



Table Salmonella in red meat and products thereof

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. Bredeney	S. Derby
Meat from bovine animals - minced meat - intended to be eaten cooked - Retail - Surveillance	0	0	0	0	0
Meat from bovine animals - meat products - raw but intended to be eaten cooked - Processing plant - Surveillance	0	0	0	0	0
Meat from bovine animals - meat products - raw but intended to be eaten cooked - Retail - Surveillance	0	0	0	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - Processing plant - Surveillance	0	0	0	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - Retail - Surveillance	0	0	0	0	0
Meat from sheep - fresh - Retail - Surveillance	0	0	0	0	0
Other products of animal origin - gelatin and collagen - Retail - Surveillance	0	0	0	0	0
Meat from horse - meat products - fermented sausages - in total - Surveillance	0	0	0	0	0
Meat from pig - meat products - fermented sausages - Processing plant - Surveillance	1	0	2	0	0
Meat from pig - meat products - fermented sausages - Retail - Surveillance	1	0	3	0	0
Meat from pig - meat products - raw and intended to be eaten raw - Processing plant - Surveillance	0	0	0	0	0



Table Salmonella in red meat and products thereof

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. Bredeney	S. Derby
Meat from pig - meat products - raw and intended to be eaten raw - Retail - Surveillance	0	0	0	0	0
Meat from wild boar - fresh - in total - Surveillance	0	0	0	0	0
Meat from wild game - land mammals - fresh - in total - Surveillance	0	0	0	0	0



## 2.1.4 Salmonella in animals

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, unspecified - adult - Control and eradication programmes	890	county reports	Census	Official and industry sampling	environmental sample > boot swabs and dust	Domestic	yes	Flock	890	17	7
Gallus gallus (fowl) - breeding flocks, unspecified - day-old chicks - Farm - Control and eradication programmes	108	county reports	Census	Industry sampling	environmental sample > boot swabs and dust	Domestic	no	Flock	108	0	0
Gallus gallus (fowl) - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes	277	county reports	Census	Official and industry sampling	environmental sample > boot swabs and dust	Domestic	no	Flock	277	0	0

  

	S. Hadar	S. Infantis	S. Typhimurium	S. Virchow	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Gallus gallus (fowl) - breeding flocks, unspecified - adult - Control and eradication programmes	0	4	3	0	0	3
Gallus gallus (fowl) - breeding flocks, unspecified - day-old chicks - Farm - Control and eradication programmes	0	0	0	0	0	0
Gallus gallus (fowl) - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes	0	0	0	0	0	0



Table Salmonella in breeding flocks of Gallus gallus



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:-
Partridges - farmed - Farm - Monitoring	NFC SO VDD	Unspecified	Not applicable	animal sample	Domestic	Animal	16	0	0	0	0
Pheasants - wild	NFC SO VDD	Unspecified	Not applicable	animal sample	Domestic	Animal	134	34	0	0	0
Pigeons - Farm	NFC SO VDD	Unspecified	Not applicable	animal sample	Domestic	Animal	17	7	0	0	0
	Salmonella spp., unspecified										
Partridges - farmed - Farm - Monitoring	0										
Pheasants - wild	34										
Pigeons - Farm	7										



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:-
Cattle (bovine animals) - Farm - Clinical investigations	NFC SO VDD	Suspect sampling	Not applicable	animal sample	Domestic	Animal	73	25	1	13	0
Pigs - Farm - Clinical investigations	NFC SO VDD	Suspect sampling	Not applicable	animal sample	Domestic	Animal	138	52	0	11	0
	Salmonella spp., unspecified										
Cattle (bovine animals) - Farm - Clinical investigations	11										
Pigs - Farm - Clinical investigations	41										



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 - day-old chicks - Control and eradication programmes	14	county reports	Census	Industry sampling	environmental sample > delivery box liner	Domestic	no	Flock	14	2	0
Gallus gallus (fowl) - laying hens - during rearing period - Control and eradication programmes	53	county reports	Census	Official and industry sampling	environmental sample > boot swabs and dust	Domestic	no	Flock	53	1	1
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	1055	county reports	Census	Official and industry sampling	environmental sample > boot swabs and dust	Domestic	yes	Flock	1055	68	19
Gallus gallus (fowl) - broilers - day-old chicks - Control and eradication programmes	7873	county reports	Unspecified	Industry sampling	environmental sample > delivery box liner	Domestic	yes	Flock	109	5	2
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes	7873	county reports	Census	Official and industry sampling	environmental sample > boot swabs and dust	Domestic	yes	Flock	7873	1274	3
Turkeys - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes	41	county reports	Census	Official and industry sampling	environmental sample > boot swabs and dust	Domestic	no	Flock	41	0	0
Turkeys - breeding flocks, unspecified - adult - Farm - Control and eradication programmes	212	county reports	Census	Official and industry sampling	environmental sample > boot swabs and dust	Domestic	yes	Flock	212	51	0
Turkeys - fattening flocks - before slaughter - Farm - Control and eradication programmes	2456	county reports	Census	Official and industry sampling	environmental sample > boot swabs and dust	Domestic	yes	Flock	2456	876	1



Table Salmonella in other poultry

	S. Typhimurium	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Gallus gallus (fowl) - laying hens - day-old chicks - Control and eradication programmes	2	0	0
Gallus gallus (fowl) - laying hens - during rearing period - Control and eradication programmes	0	0	0
Gallus gallus (fowl) - laying hens - adult - Farm - Control and eradication programmes	2	0	47
Gallus gallus (fowl) - broilers - day-old chicks - Control and eradication programmes	3	0	0
Gallus gallus (fowl) - broilers - before slaughter - Farm - Control and eradication programmes	4	0	1267
Turkeys - breeding flocks, unspecified - during rearing period - Farm - Control and eradication programmes	0	0	0
Turkeys - breeding flocks, unspecified - adult - Farm - Control and eradication programmes	0	0	51
Turkeys - fattening flocks - before slaughter - Farm - Control and eradication programmes	0	0	875



## 2.1.5 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	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	33	1	0	0
Compound feedingstuffs for pigs - final product - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	183	2	1	0
Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	62	0	0	0
Compound feedingstuffs for poultry - breeders - final product - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	6	0	0	0
Compound feedingstuffs for poultry - laying hens - final product - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	47	2	0	0
Compound feedingstuffs for poultry - broilers - final product - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	71	0	0	0
	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Lille	S. Loenga	S. Senftenberg						
Compound feedingstuffs for cattle - final product - Feed mill - Surveillance	0	0	0	1	0						
Compound feedingstuffs for pigs - final product - Feed mill - Surveillance	0	0	0	0	1						



Table Salmonella in compound feedingstuffs

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Lille	S. Loenga	S. Senftenberg
Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Surveillance	0	0	0	0	0
Compound feedingstuffs for poultry - breeders - final product - Feed mill - Surveillance	0	0	0	0	0
Compound feedingstuffs for poultry - laying hens - final product - Feed mill - Surveillance	0	0	1	0	1
Compound feedingstuffs for poultry - broilers - final product - Feed mill - Surveillance	0	0	0	0	0



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 land animal origin - dairy products - Feed mill - Surveillance	NFC SO FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	1	0	0	0
Feed material of land animal origin - meat meal - Feed mill - Surveillance	NFC SO FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	13	0	0	0
Feed material of land animal origin - animal fat - Feed mill - Surveillance	NFC SO FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	1	0	0	0
Feed material of marine animal origin - fish meal - Feed mill - Surveillance	NFC SO FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	3	0	0	0

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Feed material of land animal origin - dairy products - Feed mill - Surveillance	0	0
Feed material of land animal origin - meat meal - Feed mill - Surveillance	0	0
Feed material of land animal origin - animal fat - Feed mill - Surveillance	0	0
Feed material of marine animal origin - fish meal - Feed mill - Surveillance	0	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
Feed material of cereal grain origin - wheat derived - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	12	0		
Feed material of cereal grain origin - maize derived - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	22	0		
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	1	1		
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	4	0		
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	4	1	0	0
Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	2	0		
Other feed material - forages and roughages - Feed mill - Surveillance	NFCSD FFSD	Objective sampling	Official sampling	feed sample	Unknown	Batch	1 kg	1	0		
	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Lille	S. Thompson							
Feed material of cereal grain origin - wheat derived - Feed mill - Surveillance											
Feed material of cereal grain origin - maize derived - Feed mill - Surveillance											
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Surveillance											1



Table Salmonella in other feed matter

	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. Lille	S. Thompson
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	0	0	1	0
Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - Surveillance				
Other feed material - forages and roughages - Feed mill - Surveillance				



## 2.1.6 Antimicrobial resistance in Salmonella isolates

### A. Antimicrobial resistance in Salmonella in poultry

#### Sampling strategy used in monitoring

##### Methods used for collecting data

Testing and data collection was the task of the NRL Salmonella.

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

ISO 6579 - isolation, biochemical and serological confirmation. ISO 6579 - isolation, biochemical and serological confirmation.

#### Laboratory used for detection for resistance

##### Antimicrobials included in monitoring

Disc diffusion method according to NCCLS is used. The inhibitive zone diameters are measured by a computerised system.

#### Results of the investigation



## B. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

### Sampling strategy used in monitoring

#### Frequency of the sampling

Frequency: as described previously in prevalence tables. As only Salmonella Enteritidis and Typhimurium strains are involved in the resistance monitoring program in foodstuff, and the number of isolates belonging to these serovars is very limited because of the 90% dominance of Salmonella Infantis in broiler chicken, only a limited number of isolates are available for the tests.

#### Type of specimen taken

Fresh meat at slaughterhouses, minced meat, meat preparations, meat products at processing level and at the market. There is no direct sampling program for antimicrobial resistance, it is connected to prevalence monitoring.

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

As described earlier.

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

S. Enteritidis and Salmonella Infantis strains are selected. All the S. Enteritidis strains of broiler origin were tested. As S. Infantis shows a characteristic dominance in Hungary, the number of the strains available is just 2000. Therefore only 10 % of the isolates were selected for testing.

#### Methods used for collecting data

All the strains isolated from food are serotyped in the NRL Salmonella. Antimicrobial resistance testing is performed in the NRL.

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

ISO 6579 - isolation, biochemical and serological confirmation.

### Laboratory used for detection for resistance

#### Antimicrobials included in monitoring

Disc diffusion method according to NCCLS is used. The inhibitive zone diameters are measured by a computerised system.

### Preventive measures in place

There are no specific preventive measures in place.

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

Because of the very low number of Salmonella Enteritidis isolates the information available is limited. There is no significant change in level of resistance in the past four years.



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

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

S. Enteritidis	Gallus gallus (fowl) - laying hens																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	20																											
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	20	0									9	9	2														
Aminoglycosides - Streptomycin	16	20	0												6	14												
Amphenicols - Chloramphenicol	16	20	0												1	5	12	2										
Cephalosporins - Cefotaxime	0.5	20	0							10	9	1																
Fluoroquinolones - Ciprofloxacin	0.064	20	1				5		13	1			1															
Penicillins - Ampicillin	8	20	1										1	2	15	1			1									
Quinolones - Nalidixic acid	16	20	1													17	2			1								
Tetracyclines - Tetracycline	8	20	1											6	12	1				1								
Trimethoprim	2	20	1										19						1									
Sulfonamides - Sulfamethoxazole	256	20	2																3	10	5				2			

S. Enteritidis	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



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

<b>S. Enteritidis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	20	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Havana	Gallus gallus (fowl) - broilers																											
	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 - Streptomycin	16	1	0													1												
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																		1							

S. Havana	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Havana* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Havana</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Mbandaka in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Mbandaka	Gallus gallus (fowl) - laying hens																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	4																											
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 - Streptomycin	16	4	0														3	1										
Amphenicols - Chloramphenicol	16	4	0														4											
Cephalosporins - Cefotaxime	0.5	4	0							2	2																	
Fluoroquinolones - Ciprofloxacin	0.064	4	0				4																					
Penicillins - Ampicillin	8	4	0											3	1													
Quinolones - Nalidixic acid	16	4	0													4												
Tetracyclines - Tetracycline	8	4	0												4													
Trimethoprim	2	4	0										4															
Sulfonamides - Sulfamethoxazole	256	4	0																	3	1							

S. Mbandaka	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Mbandaka* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Mbandaka</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	4	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Anatum in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Anatum	Gallus gallus (fowl) - laying hens																											
	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 - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																		1							

S. Anatum	Gallus gallus (fowl) - laying hens	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Anatum* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Anatum</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Indiana in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Indiana	Gallus gallus (fowl) - laying hens																											
	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 - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

S. Indiana	Gallus gallus (fowl) - laying hens	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Indiana* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Indiana</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Kentucky in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Kentucky	Turkeys - fattening flocks																										
	Isolates out of a monitoring program (yes/no)																										
	Number of isolates available in the laboratory																										
	25																										
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	25	22										3					20	2								
Aminoglycosides - Streptomycin	16	25	22														2	1	8	13	1						
Amphenicols - Chloramphenicol	16	25	0													7	18										
Cephalosporins - Cefotaxime	0.5	25	0							3	19	3															
Fluoroquinolones - Ciprofloxacin	0.064	25	25														25										
Penicillins - Ampicillin	8	25	25																25								
Quinolones - Nalidixic acid	16	25	25																	25							
Tetracyclines - Tetracycline	8	25	22											1	2					22							
Trimethoprim	2	25	0										25														
Sulfonamides - Sulfamethoxazole	256	25	22																3						22		

S. Kentucky	Turkeys - fattening flocks	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Kentucky* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Kentucky</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Turkeys - fattening flocks	
	25	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Bovismorbificans in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Bovismorbificans	Turkeys - fattening flocks																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	5																											
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	5	0									1	4															
Aminoglycosides - Streptomycin	16	5	0														5											
Amphenicols - Chloramphenicol	16	5	0													4		1										
Cephalosporins - Cefotaxime	0.5	5	0							3	2																	
Fluoroquinolones - Ciprofloxacin	0.064	5	0				1		3	1																		
Penicillins - Ampicillin	8	5	0											4	1													
Quinolones - Nalidixic acid	16	5	0													4		1										
Tetracyclines - Tetracycline	8	5	0											4	1													
Trimethoprim	2	5	0										5															
Sulfonamides - Sulfamethoxazole	256	5	0																	1	4							

S. Bovismorbificans	Turkeys - fattening flocks	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Bovismorbificans* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Bovismorbificans</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Turkeys - fattening flocks	
	5	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Bredeney	Gallus gallus (fowl) - broilers																										
	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 - Streptomycin	16	3	0													1	2									
	Amphenicols - Chloramphenicol	16	3	0													3										
	Cephalosporins - Cefotaxime	0.5	3	0								3															
	Fluoroquinolones - Ciprofloxacin	0.064	3	3									3														
	Penicillins - Ampicillin	8	3	3															3								
	Quinolones - Nalidixic acid	16	3	3																3							
	Tetracyclines - Tetracycline	8	3	3																	3						
	Trimethoprim	2	3	0										3													
	Sulfonamides - Sulfamethoxazole	256	3	0																3							

S. Bredeney	Gallus gallus (fowl) - broilers	
	Gallus gallus (fowl) - broilers	
	3	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Bredeney* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Bredeney</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	3	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Newport in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Newport	Gallus gallus (fowl) - laying hens																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	2																											
	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 - Streptomycin	16	2	0													1	1											
Amphenicols - Chloramphenicol	16	2	0														2											
Cephalosporins - Cefotaxime	0.5	2	0							2																		
Fluoroquinolones - Ciprofloxacin	0.064	2	2										2															
Penicillins - Ampicillin	8	2	2																2									
Quinolones - Nalidixic acid	16	2	1															1	1									
Tetracyclines - Tetracycline	8	2	2																	2								
Trimethoprim	2	2	0										2															
Sulfonamides - Sulfamethoxazole	256	2	0																	2								

S. Newport	Gallus gallus (fowl) - laying hens	
	2	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Newport* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Newport</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	2	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Kottbus	Gallus gallus (fowl) - broilers																										
	Isolates out of a monitoring program (yes/no)																										
	Number of isolates available in the laboratory																										
	5																										
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	5	0										5														
Aminoglycosides - Streptomycin	16	5	2														2	1	2								
Amphenicols - Chloramphenicol	16	5	0													4	1										
Cephalosporins - Cefotaxime	0.5	5	0							4	1																
Fluoroquinolones - Ciprofloxacin	0.064	5	5									5															
Penicillins - Ampicillin	8	5	0											4	1												
Quinolones - Nalidixic acid	16	5	5																	5							
Tetracyclines - Tetracycline	8	5	0											1	4												
Trimethoprim	2	5	0										5														
Sulfonamides - Sulfamethoxazole	256	5	0																3	2							

S. Kottbus	Gallus gallus (fowl) - broilers	
	5	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Kottbus* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Kottbus</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	5	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Lille in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Lille	Gallus gallus (fowl) - laying hens																											
	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 - Streptomycin	16	2	0														2											
Amphenicols - Chloramphenicol	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													2												
Tetracyclines - Tetracycline	8	2	0												2													
Trimethoprim	2	2	0										2															
Sulfonamides - Sulfamethoxazole	256	2	0																			2						

S. Lille	Gallus gallus (fowl) - laying hens	
	2	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of S. Lille in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

S. Lille  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	2	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Stanley in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Stanley	Turkeys - fattening flocks																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	25																											
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	25	0										24	1														
Aminoglycosides - Streptomycin	16	25	1														18	6	1									
Amphenicols - Chloramphenicol	16	25	0													10	15											
Cephalosporins - Cefotaxime	0.5	25	0							19	5		1															
Fluoroquinolones - Ciprofloxacin	0.064	25	25								8	14	3															
Penicillins - Ampicillin	8	25	7											12	5	1			7									
Quinolones - Nalidixic acid	16	25	25																25									
Tetracyclines - Tetracycline	8	25	0											9	14	2												
Trimethoprim	2	25	0										25															
Sulfonamides - Sulfamethoxazole	256	25	3															1	5	16				3				

S. Stanley	Turkeys - fattening flocks	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Stanley* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Stanley</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Turkeys - fattening flocks	
	25	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Thompson in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Thompson	Turkeys - fattening flocks																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	1																											
	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	16	1	0													1											
	Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

S. Thompson	Turkeys - fattening flocks	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Thompson* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Thompson</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Turkeys - fattening flocks	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Senftenberg in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Senftenberg	Turkeys - fattening flocks																											
	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 - Streptomycin	16	1	0														1											
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

S. Senftenberg	Turkeys - fattening flocks	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Senftenberg* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Senftenberg</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Turkeys - fattening flocks	
	1	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of *S. enterica* subsp. *salamae* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

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

S. enterica subsp. salamae  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  Antimicrobials:	Gallus gallus (fowl) - laying hens																											
	1																											
	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	16	1	0													1												
Amphenicols - Chloramphenicol	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																
Sulfonamides - Sulfamethoxazole	256	1	0																1									

<div>S. enterica subsp. salamae</div> <div>Isolates out of a monitoring program (yes/no)</div> <div>Number of isolates available in the laboratory</div> <div>Antimicrobials:</div>	Gallus gallus (fowl) - laying hens	
	1	
	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. enterica* subsp. *salamae* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. enterica subsp. salamae</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	1	
	lowest	highest
<b>Antimicrobials:</b>		
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Tennessee	Gallus gallus (fowl) - broilers																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	3																											
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 - Streptomycin	16	3	0															3										
Amphenicols - Chloramphenicol	16	3	0														3											
Cephalosporins - Cefotaxime	0.5	3	0								3																	
Fluoroquinolones - Ciprofloxacin	0.064	3	0				2		1																			
Penicillins - Ampicillin	8	3	0											2	1													
Quinolones - Nalidixic acid	16	3	0													3												
Tetracyclines - Tetracycline	8	3	0												3													
Trimethoprim	2	3	0										3															
Sulfonamides - Sulfamethoxazole	256	3	0																1		2							

S. Tennessee	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	Antimicrobials:	lowest highest
Aminoglycosides - Gentamicin		0.25 32
Aminoglycosides - Streptomycin		2 128
Amphenicols - Chloramphenicol		2 64



Table Antimicrobial susceptibility testing of *S. Tennessee* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Tennessee</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Gallus gallus (fowl) - broilers	
	3	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Tennessee in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Tennessee	Turkeys - fattening flocks																										
	Isolates out of a monitoring program (yes/no)																										
	Number of isolates available in the laboratory																										
	3																										
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 - Streptomycin	16	3	0														1	2									
Amphenicols - Chloramphenicol	16	3	0														3										
Cephalosporins - Cefotaxime	0.5	3	0							2	1																
Fluoroquinolones - Ciprofloxacin	0.064	3	1				2					1															
Penicillins - Ampicillin	8	3	0											3													
Quinolones - Nalidixic acid	16	3	1													2				1							
Tetracyclines - Tetracycline	8	3	1											1	1					1							
Trimethoprim	2	3	0										3														
Sulfonamides - Sulfamethoxazole	256	3	0																	3							

S. Tennessee	Turkeys - fattening flocks	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Tennessee* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Tennessee</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Turkeys - fattening flocks	
	3	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Virchow in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Virchow	Gallus gallus (fowl) - laying hens																											
	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 - Streptomycin	16	1	1																	1								
Amphenicols - Chloramphenicol	16	1	1																	1								
Cephalosporins - Cefotaxime	0.5	1	0							1																		
Fluoroquinolones - Ciprofloxacin	0.064	1	1								1																	
Penicillins - Ampicillin	8	1	0											1														
Quinolones - Nalidixic acid	16	1	1																	1								
Tetracyclines - Tetracycline	8	1	1																	1								
Trimethoprim	2	1	1																1									
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

S. Virchow	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Virchow* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Virchow</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Infantis	Gallus gallus (fowl) - broilers																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	148																											
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	148	0									101	44	3														
Aminoglycosides - Streptomycin	16	148	119													6	14	9	96	21	2							
Amphenicols - Chloramphenicol	16	148	5												1	16	56	70	5									
Cephalosporins - Cefotaxime	0.5	148	0							5	58	73	12															
Fluoroquinolones - Ciprofloxacin	0.064	148	148									28	91	22	4	2	1											
Penicillins - Ampicillin	8	148	12											23	65	47	1		12									
Quinolones - Nalidixic acid	16	148	148																	148								
Tetracyclines - Tetracycline	8	148	122												7	17	2		1	121								
Trimethoprim	2	148	0										146	2														
Sulfonamides - Sulfamethoxazole	256	148	126																4	16	2				126			

S. Infantis	Gallus gallus (fowl) - broilers	
	148	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Infantis* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Infantis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	148	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Infantis in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Infantis	Turkeys - fattening flocks																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	33																											
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	33	0									22	9	2														
Aminoglycosides - Streptomycin	16	33	31														1	1	22	7	2							
Amphenicols - Chloramphenicol	16	33	1													3	12	17	1									
Cephalosporins - Cefotaxime	0.5	33	0							1	10	19	3															
Fluoroquinolones - Ciprofloxacin	0.064	33	32			1						8	15	8		1												
Penicillins - Ampicillin	8	33	2										1	2	14	13	1		2									
Quinolones - Nalidixic acid	16	33	33																	33								
Tetracyclines - Tetracycline	8	33	33																1	32								
Trimethoprim	2	33	0										33															
Sulfonamides - Sulfamethoxazole	256	33	32																	1					32			

S. Infantis	Turkeys - fattening flocks	
	33	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Infantis* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Infantis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Turkeys - fattening flocks	
	33	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Brandenburg in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Brandenburg	Gallus gallus (fowl) - laying hens																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	1																											
	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	16	1	0													1											
	Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

S. Brandenburg	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Brandenburg* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Brandenburg</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Gallus gallus (fowl) - laying hens	
	1	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Montevideo in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Montevideo	Gallus gallus (fowl) - laying hens																											
	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 - Streptomycin	16	2	0															2										
Amphenicols - Chloramphenicol	16	2	0													1	1											
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															
Sulfonamides - Sulfamethoxazole	256	2	0																1	1								

S. Montevideo	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Montevideo* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Montevideo</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	2	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Szentes	Gallus gallus (fowl) - broilers																											
	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 - Streptomycin	16	1	0														1											
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

S. Szentes	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



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

S. Szentes	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Typhimurium in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Typhimurium	Gallus gallus (fowl) - laying hens																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	5																											
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	5	0									1	4															
Aminoglycosides - Streptomycin	16	5	0														3	2										
Amphenicols - Chloramphenicol	16	5	0													4	1											
Cephalosporins - Cefotaxime	0.5	5	0							5																		
Fluoroquinolones - Ciprofloxacin	0.064	5	0				2		3																			
Penicillins - Ampicillin	8	5	0											1	4													
Quinolones - Nalidixic acid	16	5	0													5												
Tetracyclines - Tetracycline	8	5	0											1	4													
Trimethoprim	2	5	0										5															
Sulfonamides - Sulfamethoxazole	256	5	0																	5								

S. Typhimurium	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Typhimurium* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Typhimurium</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Gallus gallus (fowl) - laying hens	
	5	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Enteritidis	Gallus gallus (fowl) - broilers																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	3																											
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 - Streptomycin	16	3	0												1	2												
Amphenicols - Chloramphenicol	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											2	1													
Quinolones - Nalidixic acid	16	3	0													3												
Tetracyclines - Tetracycline	8	3	0											2	1													
Trimethoprim	2	3	0										3															
Sulfonamides - Sulfamethoxazole	256	3	0																1	2								

S. Enteritidis	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



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

<b>S. Enteritidis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	3	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Enteritidis in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Enteritidis	Turkeys - fattening flocks																											
	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 - Streptomycin	16	1	0													1												
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

S. Enteritidis	Turkeys - fattening flocks	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Enteritidis* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Enteritidis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Turkeys - fattening flocks	
	1	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Mbandaka	Gallus gallus (fowl) - broilers																											
	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 - Streptomycin	16	2	0														2											
Amphenicols - Chloramphenicol	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													2												
Tetracyclines - Tetracycline	8	2	0												2													
Trimethoprim	2	2	0										2															
Sulfonamides - Sulfamethoxazole	256	2	0																	1	1							

S. Mbandaka	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Mbandaka* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Mbandaka</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	2	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Abony in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Abony	Gallus gallus (fowl) - laying hens																											
	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	16	1	1																1									
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																1									

S. Abony	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Abony* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Abony</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Gallus gallus (fowl) - laying hens	
	1	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Indiana	Gallus gallus (fowl) - broilers																											
	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 - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

S. Indiana	Gallus gallus (fowl) - broilers	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Indiana* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Indiana</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Infantis	Meat from broilers (Gallus gallus)																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	yes																											
Antimicrobials:	145																											
	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	145	0									95	35	15														
Aminoglycosides - Streptomycin	32	145	82											1		2	13	10	37	54	25	3						
Amphenicols - Chloramphenicol	16	145	0												13	45	72	15										
Cephalosporins - Cefotaxime	0.5	145	0								86	49	10															
Fluoroquinolones - Ciprofloxacin	0.064	145	145								5	32	65	34	9													
Penicillins - Ampicillin	8	145	15										12	24	37	30	27	11			4							
Quinolones - Nalidixic acid	16	145	145																	1	144							
Sulfonamides	256	145	112													1	2	3	6	8	6	7	8	104				
Tetracyclines - Tetracycline	8	145	124											10	5	6			4	31	60	29						
Trimethoprim	2	145	0									14	74	50	7													
Resistant to 2 antimicrobials		12	12	12																								
Resistant to 3 antimicrobials		15	15	15																								
Resistant to 4 antimicrobials		43	43	43																								
Resistant to >4 antimicrobials		75	75	75																								



Table Antimicrobial susceptibility testing of *S. Infantis* in Meat from broilers (*Gallus gallus*) - food sample - meat - quantitative data [Dilution method]

S. Infantis	Meat from broilers ( <i>Gallus gallus</i> )	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		
Resistant to >4 antimicrobials		



Table Antimicrobial susceptibility testing of S. Infantis in Meat from turkey - food sample - meat - quantitative data [Dilution method]

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

S. Infantis	Meat from turkey																											
	yes																											
	17																											
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	17	0									9	8															
Aminoglycosides - Streptomycin	32	17	11														1	1	4	10		1						
Amphenicols - Chloramphenicol	16	17	0												2	3	11	1										
Cephalosporins - Cefotaxime	0.5	17	0								6	9	2															
Fluoroquinolones - Ciprofloxacin	0.064	17	17									5	2	9	1													
Penicillins - Ampicillin	8	17	4											1	3	3	6	3			1							
Quinolones - Nalidixic acid	16	17	17																			17						
Sulfonamides	256	17	10													1			2		1	3	1	9				
Tetracyclines - Tetracycline	8	17	16												1				2	1	8	5						
Trimethoprim	2	17	0									2	7	6	2													
Resistant to 2 antimicrobials		3	3	3																								
Resistant to 3 antimicrobials		6	6	6																								
Resistant to 4 antimicrobials		5	5	5																								
Resistant to >4 antimicrobials		3	3	3																								



Table Antimicrobial susceptibility testing of *S. Infantis* in Meat from turkey - food sample - meat - quantitative data [Dilution method]

<b>S. Infantis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Meat from turkey	
	yes	
	17	
	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		
Resistant to >4 antimicrobials		



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

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

S. Kentucky	Gallus gallus (fowl) - broilers																											
	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	2															2										
Aminoglycosides - Streptomycin	16	2	2																	2								
Amphenicols - Chloramphenicol	16	2	0													1	1											
Cephalosporins - Cefotaxime	0.5	2	0								2																	
Fluoroquinolones - Ciprofloxacin	0.064	2	2														2											
Penicillins - Ampicillin	8	2	2																2									
Quinolones - Nalidixic acid	16	2	2																	2								
Tetracyclines - Tetracycline	8	2	2																	2								
Trimethoprim	2	2	0										2															
Sulfonamides - Sulfamethoxazole	256	2	2																					2				

S. Kentucky	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Kentucky* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Kentucky</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	2	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Bovismorbificans in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Bovismorbificans	Gallus gallus (fowl) - laying hens																											
	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 - Streptomycin	16	2	0														2											
Amphenicols - Chloramphenicol	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	0											1	1													
Trimethoprim	2	2	0										2															
Sulfonamides - Sulfamethoxazole	256	2	0																	1		1						

S. Bovismorbificans	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of S. Bovismorbificans in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

<div>S. Bovismorbificans</div> <div>Isolates out of a monitoring program (yes/no)</div> <div>Number of isolates available in the laboratory</div> <div>Antimicrobials:</div>	Gallus gallus (fowl) - laying hens	
	2	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Enteritidis in All foodstuffs - food sample - quantitative data [Dilution method]

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

S. Enteritidis	All foodstuffs																											
	no																											
	9																											
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	9	0									5	4															
Aminoglycosides - Streptomycin	32	9	0												3	3	3											
Amphenicols - Chloramphenicol	16	9	0												5	2	2											
Cephalosporins - Cefotaxime	0.5	9	0								8	1																
Fluoroquinolones - Ciprofloxacin	0.064	9	1						8			1																
Penicillins - Ampicillin	8	9	0										1	3	2	3												
Quinolones - Nalidixic acid	16	9	1												3	5						1						
Sulfonamides	256	9	1															1	2	3	2		1					
Tetracyclines - Tetracycline	8	9	0											8	1													
Trimethoprim	2	9	0									3	5	1														
Fully sensitive		7	7	7																								
Resistant to 1 antimicrobial		1	1	1																								
Resistant to 2 antimicrobials		1	1	1																								



Table Antimicrobial susceptibility testing of *S. Enteritidis* in All foodstuffs - food sample - quantitative data [Dilution method]

<b>S. Enteritidis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	All foodstuffs	
	no	
	9	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Fully sensitive		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		



Table Antimicrobial susceptibility testing of S. Braenderup in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Braenderup	Gallus gallus (fowl) - laying hens																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
Antimicrobials:	3																											
	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 - Streptomycin	16	3	0													3											
	Amphenicols - Chloramphenicol	16	3	0													3											
	Cephalosporins - Cefotaxime	0.5	3	0							3																	
	Fluoroquinolones - Ciprofloxacin	0.064	3	0				3																				
	Penicillins - Ampicillin	8	3	0											2	1												
	Quinolones - Nalidixic acid	16	3	0													3											
	Tetracyclines - Tetracycline	8	3	0												3												
Trimethoprim	2	3	0										3															
Sulfonamides - Sulfamethoxazole	256	3	0																	3								

S. Braenderup	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of S. Braenderup in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

<div>S. Braenderup</div> <div>Isolates out of a monitoring program (yes/no)</div> <div>Number of isolates available in the laboratory</div> <div>Antimicrobials:</div>	Gallus gallus (fowl) - laying hens	
	3	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Bredeney in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Bredeney	Turkeys - fattening flocks																										
	Isolates out of a monitoring program (yes/no)																										
	Number of isolates available in the laboratory																										
	23																										
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	23	1									1	20	1				1									
Aminoglycosides - Streptomycin	16	23	1														18	4	1								
Amphenicols - Chloramphenicol	16	23	0													7	9	7									
Cephalosporins - Cefotaxime	0.5	23	0							11	8	4															
Fluoroquinolones - Ciprofloxacin	0.064	23	23								5	10	7				1										
Penicillins - Ampicillin	8	23	22											1					22								
Quinolones - Nalidixic acid	16	23	23																	23							
Tetracyclines - Tetracycline	8	23	23																	23							
Trimethoprim	2	23	0										22	1													
Sulfonamides - Sulfamethoxazole	256	23	1															4	15	3				1			

S. Bredeney	Turkeys - fattening flocks	
	23	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Bredeney* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Bredeney</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Turkeys - fattening flocks	
	23	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Newport in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Newport	Turkeys - fattening flocks																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	13																											
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	13	0									5	7	1														
Aminoglycosides - Streptomycin	16	13	0													2	9	2										
Amphenicols - Chloramphenicol	16	13	0													7	6											
Cephalosporins - Cefotaxime	0.5	13	0							8	4	1																
Fluoroquinolones - Ciprofloxacin	0.064	13	12				1						11	1														
Penicillins - Ampicillin	8	13	13																13									
Quinolones - Nalidixic acid	16	13	9													1		3	9									
Tetracyclines - Tetracycline	8	13	13																	13								
Trimethoprim	2	13	0										12	1														
Sulfonamides - Sulfamethoxazole	256	13	0																1	8	4							

S. Newport	Turkeys - fattening flocks	
	13	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Newport* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Newport</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Turkeys - fattening flocks	
	13	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Agona in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Agona	Gallus gallus (fowl) - laying hens																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	3																											
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 - Streptomycin	16	3	0														2	1										
Amphenicols - Chloramphenicol	16	3	0														3											
Cephalosporins - Cefotaxime	0.5	3	0								2	1																
Fluoroquinolones - Ciprofloxacin	0.064	3	0				2		1																			
Penicillins - Ampicillin	8	3	0											2	1													
Quinolones - Nalidixic acid	16	3	0													2	1											
Tetracyclines - Tetracycline	8	3	0												3													
Trimethoprim	2	3	0										3															
Sulfonamides - Sulfamethoxazole	256	3	0															1	1	1								

S. Agona	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Agona* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Agona</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	3	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Kottbus in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Kottbus	Turkeys - fattening flocks																										
	Isolates out of a monitoring program (yes/no)																										
	Number of isolates available in the laboratory																										
	8																										
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 - Streptomycin	16	8	0														4	4									
Amphenicols - Chloramphenicol	16	8	0												1	7											
Cephalosporins - Cefotaxime	0.5	8	0							7	1																
Fluoroquinolones - Ciprofloxacin	0.064	8	8									8															
Penicillins - Ampicillin	8	8	0											7	1												
Quinolones - Nalidixic acid	16	8	8																	8							
Tetracyclines - Tetracycline	8	8	0											8													
Trimethoprim	2	8	0										8														
Sulfonamides - Sulfamethoxazole	256	8	0															3	3	2							

S. Kottbus	Turkeys - fattening flocks	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Kottbus* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Kottbus</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Turkeys - fattening flocks	
	8	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Stanley	Gallus gallus (fowl) - broilers																											
	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 - Streptomycin	16	2	0														2											
Amphenicols - Chloramphenicol	16	2	0													1	1											
Cephalosporins - Cefotaxime	0.5	2	0							2																		
Fluoroquinolones - Ciprofloxacin	0.064	2	2									2																
Penicillins - Ampicillin	8	2	1											1					1									
Quinolones - Nalidixic acid	16	2	2																	2								
Tetracyclines - Tetracycline	8	2	0											1	1													
Trimethoprim	2	2	0										2															
Sulfonamides - Sulfamethoxazole	256	2	0																1	1								

S. Stanley	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Stanley* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Stanley</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	2	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Thompson	Gallus gallus (fowl) - broilers																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	3																											
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 - Streptomycin	16	3	0														3											
Amphenicols - Chloramphenicol	16	3	0														3											
Cephalosporins - Cefotaxime	0.5	3	0							3																		
Fluoroquinolones - Ciprofloxacin	0.064	3	1				2				1																	
Penicillins - Ampicillin	8	3	1											1	1				1									
Quinolones - Nalidixic acid	16	3	1													1	1			1								
Tetracyclines - Tetracycline	8	3	0												3													
Trimethoprim	2	3	0										3															
Sulfonamides - Sulfamethoxazole	256	3	0																	3								

S. Thompson	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Thompson* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Thompson</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Gallus gallus (fowl) - broilers	
	3	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Senftenberg	Gallus gallus (fowl) - broilers																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	4																											
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									1	3															
Aminoglycosides - Streptomycin	16	4	0														4											
Amphenicols - Chloramphenicol	16	4	1															3	1									
Cephalosporins - Cefotaxime	0.5	4	0									3	1															
Fluoroquinolones - Ciprofloxacin	0.064	4	0						1	3																		
Penicillins - Ampicillin	8	4	0												2	2												
Quinolones - Nalidixic acid	16	4	0														4											
Tetracyclines - Tetracycline	8	4	0													4												
Trimethoprim	2	4	0										4															
Sulfonamides - Sulfamethoxazole	256	4	0																	4								

S. Senftenberg	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Senftenberg* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Senftenberg</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	4	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



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

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

S. Derby	Gallus gallus (fowl) - broilers																											
	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 - Streptomycin	16	1	0															1										
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

S. Derby	Gallus gallus (fowl) - broilers	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



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

S. Derby	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Saintpaul in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Saintpaul	Turkeys - fattening flocks																										
	Isolates out of a monitoring program (yes/no)																										
	Number of isolates available in the laboratory																										
	10																										
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									2	7	1													
Aminoglycosides - Streptomycin	16	10	9															1	8	1							
Amphenicols - Chloramphenicol	16	10	0														9	1									
Cephalosporins - Cefotaxime	0.5	10	0							4	6																
Fluoroquinolones - Ciprofloxacin	0.064	10	0				1		9																		
Penicillins - Ampicillin	8	10	1											1	7	1			1								
Quinolones - Nalidixic acid	16	10	0													9	1										
Tetracyclines - Tetracycline	8	10	10																	10							
Trimethoprim	2	10	1										9						1								
Sulfonamides - Sulfamethoxazole	256	10	10																					10			

S. Saintpaul	Turkeys - fattening flocks	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Saintpaul* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Saintpaul</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Turkeys - fattening flocks	
	10	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Tennessee in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Tennessee   Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  Antimicrobials:	Gallus gallus (fowl) - laying hens																											
	13																											
	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	13	0									12	1															
Aminoglycosides - Streptomycin	16	13	3														10	3										
Amphenicols - Chloramphenicol	16	13	0													10	3											
Cephalosporins - Cefotaxime	0.5	13	0							4	9																	
Fluoroquinolones - Ciprofloxacin	0.064	13	0				11		2																			
Penicillins - Ampicillin	8	13	0										9	4														
Quinolones - Nalidixic acid	16	13	0												10	3												
Tetracyclines - Tetracycline	8	13	0											13														
Trimethoprim	2	13	0									13																
Sulfonamides - Sulfamethoxazole	256	13	0																10	3								

S. Tennessee	Gallus gallus (fowl) - laying hens	
	13	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Tennessee* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Tennessee</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	13	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Veneziana in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Veneziana	Gallus gallus (fowl) - laying hens																											
	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 - Streptomycin	16	1	0													1												
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																1									

S. Veneziana	Gallus gallus (fowl) - laying hens	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Veneziana* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Veneziana</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. 4,5:i:- in Meat from pig - food sample - meat - quantitative data [Dilution method]

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

S. 4,5:i:-  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from pig																											
	no																											
	4																											
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 - Streptomycin	32	4	3																1		1	2						
Amphenicols - Chloramphenicol	16	4	1													2	1				1							
Cephalosporins - Cefotaxime	0.5	4	0								4																	
Fluoroquinolones - Ciprofloxacin	0.064	4	1						3				1															
Penicillins - Ampicillin	8	4	3													1					3							
Quinolones - Nalidixic acid	16	4	1													2	1					1						
Sulfonamides	256	4	3																	1					2	1		
Tetracyclines - Tetracycline	8	4	3											1						1	2							
Trimethoprim	2	4	0									2	2															
Fully sensitive		1	1	1																								
Resistant to 4 antimicrobials		2	2	2																								
Resistant to >4 antimicrobials		1	1	1																								



Table Antimicrobial susceptibility testing of S. 4,5:i:- in Meat from pig - food sample - meat - quantitative data [Dilution method]

S. 4,5:i:-  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from pig	
	no	
	4	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Fully sensitive		
Resistant to 4 antimicrobials		
Resistant to >4 antimicrobials		



Table Antimicrobial susceptibility testing of S. Virchow in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Virchow	Turkeys - fattening flocks																											
	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 - Streptomycin	16	1	1																	1								
Amphenicols - Chloramphenicol	16	1	1																	1								
Cephalosporins - Cefotaxime	0.5	1	0							1																		
Fluoroquinolones - Ciprofloxacin	0.064	1	1								1																	
Penicillins - Ampicillin	8	1	0												1													
Quinolones - Nalidixic acid	16	1	1																	1								
Tetracyclines - Tetracycline	8	1	1																	1								
Trimethoprim	2	1	1																1									
Sulfonamides - Sulfamethoxazole	256	1	1																					1				

S. Virchow	Turkeys - fattening flocks	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Virchow* in Turkeys - fattening flocks - quantitative data [Dilution method]

<b>S. Virchow</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  <b>Antimicrobials:</b>	Turkeys - fattening flocks	
	1	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Infantis in Gallus gallus (fowl) - laying hens - quantitative data [Dilution method]

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

S. Infantis	Gallus gallus (fowl) - laying hens																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	6																											
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	6	0									5	1															
Aminoglycosides - Streptomycin	16	6	5														1		4	1								
Amphenicols - Chloramphenicol	16	6	0														3	3										
Cephalosporins - Cefotaxime	0.5	6	0								2	4																
Fluoroquinolones - Ciprofloxacin	0.064	6	5						1			1	4															
Penicillins - Ampicillin	8	6	0											1	2	3												
Quinolones - Nalidixic acid	16	6	5													1				5								
Tetracyclines - Tetracycline	8	6	5												1					5								
Trimethoprim	2	6	0										6															
Sulfonamides - Sulfamethoxazole	256	6	5																	1					5			

S. Infantis	Gallus gallus (fowl) - laying hens	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	6	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Infantis* in *Gallus gallus* (fowl) - laying hens - quantitative data [Dilution method]

<b>S. Infantis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - laying hens	
	6	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from pig - food sample - meat - quantitative data [Dilution method]

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

S. Typhimurium	Meat from pig																											
	no																											
	13																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	2	13	0								4	7	2															
Aminoglycosides - Streptomycin	32	13	9														2	2		2	7							
Amphenicols - Chloramphenicol	16	13	2											2	8		1		1	1								
Cephalosporins - Cefotaxime	0.5	13	0							13																		
Fluoroquinolones - Ciprofloxacin	0.064	13	0						13																			
Penicillins - Ampicillin	8	13	11										1		1				1	10								
Quinolones - Nalidixic acid	16	13	0											4	5	2	2											
Sulfonamides	256	13	10															1		2		2	7	1				
Tetracyclines - Tetracycline	8	13	11										2					2	2	3	4							
Trimethoprim	2	13	2								3	4	4				2											
Fully sensitive		1	1	1																								
Resistant to 1 antimicrobial		2	2	2																								
Resistant to 4 antimicrobials		8	8	8																								
Resistant to >4 antimicrobials		2	2	2																								



Table Antimicrobial susceptibility testing of *S. Typhimurium* in Meat from pig - food sample - meat - quantitative data [Dilution method]

<b>S. Typhimurium</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from pig	
	no	
	13	
	lowest	highest
<b>Antimicrobials:</b>		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Fully sensitive		
Resistant to 1 antimicrobial		
Resistant to 4 antimicrobials		
Resistant to >4 antimicrobials		



Table Antimicrobial susceptibility testing of S. Kedougou in Turkeys - fattening flocks - quantitative data [Dilution method]

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

S. Kedougou	Turkeys - fattening flocks																										
	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 - Streptomycin	16	1	0														1										
Amphenicols - Chloramphenicol	16	1	0														1										
Cephalosporins - Cefotaxime	0.5	1	0							1																	
Fluoroquinolones - Ciprofloxacin	0.064	1	1										1														
Penicillins - Ampicillin	8	1	0												1												
Quinolones - Nalidixic acid	16	1	1																1								
Tetracyclines - Tetracycline	8	1	0												1												
Trimethoprim	2	1	0										1														
Sulfonamides - Sulfamethoxazole	256	1	0																		1						

S. Kedougou	Turkeys - fattening flocks	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of S. Kedougou in Turkeys - fattening flocks - quantitative data [Dilution method]

S. Kedougou  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  Antimicrobials:	Turkeys - fattening flocks	
	1	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from other poultry species - food sample - quantitative data [Dilution method]

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

S. Typhimurium	Meat from other poultry species																											
	no																											
	9																											
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	9	0									2	4	3														
Aminoglycosides - Streptomycin	32	9	2														1	3	3	2								
Amphenicols - Chloramphenicol	16	9	0												3	5	1											
Cephalosporins - Cefotaxime	0.5	9	0								9																	
Fluoroquinolones - Ciprofloxacin	0.064	9	1						8			1																
Penicillins - Ampicillin	8	9	1											7		1					1							
Quinolones - Nalidixic acid	16	9	1												1	4	3					1						
Sulfonamides	256	9	4																1	4				4				
Tetracyclines - Tetracycline	8	9	1											2	5	1					1							
Trimethoprim	2	9	0									2	6	1														
Fully sensitive		5	5	5																								
Resistant to 1 antimicrobial		2	2	2																								
Resistant to 2 antimicrobials		1	1	1																								
Resistant to >4 antimicrobials		1	1	1																								



Table Antimicrobial susceptibility testing of *S. Typhimurium* in Meat from other poultry species - food sample - quantitative data [Dilution method]

S. Typhimurium	Meat from other poultry species	
	no	
	9	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Fully sensitive		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		
Resistant to >4 antimicrobials		



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

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

S. Montevideo	Gallus gallus (fowl) - broilers																											
	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 - Streptomycin	16	2	0														1	1										
Amphenicols - Chloramphenicol	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													2												
Tetracyclines - Tetracycline	8	2	0												2													
Trimethoprim	2	2	0										2															
Sulfonamides - Sulfamethoxazole	256	2	0																	2								

S. Montevideo	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



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

<div>S. Montevideo</div> <div>Isolates out of a monitoring program (yes/no)</div> <div>Number of isolates available in the laboratory</div> <div>Antimicrobials:</div>	Gallus gallus (fowl) - broilers	
	2	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from bovine animals - food sample - meat - quantitative data [Dilution method]

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

S. Typhimurium	Meat from bovine animals																											
	yes																											
	1																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	2	1	0									1																
Aminoglycosides - Streptomycin	32	1	0															1										
Amphenicols - Chloramphenicol	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														
Sulfonamides	256	1	0																	1								
Tetracyclines - Tetracycline	8	1	0										1															
Trimethoprim	2	1	0									1																
Fully sensitive		1	1	1																								

S. Typhimurium	Meat from bovine animals	
	yes	
	1	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		



Table Antimicrobial susceptibility testing of *S. Typhimurium* in Meat from bovine animals - food sample - meat - quantitative data [Dilution method]

<b>S. Typhimurium</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from bovine animals	
	yes	
	1	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Fully sensitive		



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

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

S. Ohio	Gallus gallus (fowl) - broilers																											
	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 - Streptomycin	16	1	0													1												
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																	1								

S. Ohio	Gallus gallus (fowl) - broilers	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



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

S. Ohio  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory  Antimicrobials:	Gallus gallus (fowl) - broilers	
	1	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Typhimurium, monophasic in Meat from other poultry species - food sample - meat - quantitative data [Dilution method]

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

S. Typhimurium, monophasic	Meat from other poultry species																											
	no																											
	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 - Streptomycin	32	1	1																		1							
Amphenicols - Chloramphenicol	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												
Sulfonamides	256	1	1																					1				
Tetracyclines - Tetracycline	8	1	1																		1							
Trimethoprim	2	1	0										1															
Resistant to 4 antimicrobials		1	1	1																								

S. Typhimurium, monophasic  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from other poultry species	
	no	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		



Table Antimicrobial susceptibility testing of *S. Typhimurium*, monophasic in Meat from other poultry species - food sample - meat - quantitative data [Dilution method]

S. Typhimurium, monophasic	Meat from other poultry species	
	no	
	1	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory		
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Resistant to 4 antimicrobials		



Table Antimicrobial susceptibility testing of S. Derby in Meat from pig - food sample - meat - quantitative data [Dilution method]

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

S. Derby	Meat from pig																										
	yes																										
	7																										
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									2	3	1	1												
Aminoglycosides - Streptomycin	32	7	3															1	3		2	1					
Amphenicols - Chloramphenicol	16	7	3													2	1	1	1		2						
Cephalosporins - Cefotaxime	0.5	7	0								6	1															
Fluoroquinolones - Ciprofloxacin	0.064	7	1						6				1														
Penicillins - Ampicillin	8	7	2											1	3	1			1		1						
Quinolones - Nalidixic acid	16	7	1											1	1	3	1					1					
Sulfonamides	256	7	4																1	1	1			4			
Tetracyclines - Tetracycline	8	7	5														2			2	2	1					
Trimethoprim	2	7	3										1	2	1	1		2									
Fully sensitive		1	1	1																							
Resistant to 1 antimicrobial		2	2	2																							
Resistant to 4 antimicrobials		1	1	1																							
Resistant to >4 antimicrobials		3	3	3																							



Table Antimicrobial susceptibility testing of *S. Derby* in Meat from pig - food sample - meat - quantitative data [Dilution method]

<b>S. Derby</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from pig	
	yes	
	7	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Fully sensitive		
Resistant to 1 antimicrobial		
Resistant to 4 antimicrobials		
Resistant to >4 antimicrobials		



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

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

S. Typhimurium	Gallus gallus (fowl) - broilers																											
	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 - Streptomycin	16	1	0														1											
Amphenicols - Chloramphenicol	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															
Sulfonamides - Sulfamethoxazole	256	1	0																1									

S. Typhimurium	Gallus gallus (fowl) - broilers	
	1	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of *S. Typhimurium* in *Gallus gallus* (fowl) - broilers - quantitative data [Dilution method]

<b>S. Typhimurium</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	1	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of S. Kentucky in Meat from turkey - food sample - meat - quantitative data [Dilution method]

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

S. Kentucky	Meat from turkey																											
	yes																											
	16																											
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	16	16														5	11										
Aminoglycosides - Streptomycin	32	16	15																1	1	10	4						
Amphenicols - Chloramphenicol	16	16	0													16												
Cephalosporins - Cefotaxime	0.5	16	0								14	2																
Fluoroquinolones - Ciprofloxacin	0.064	16	16														10	6										
Penicillins - Ampicillin	8	16	16																		16							
Quinolones - Nalidixic acid	16	16	16																			16						
Sulfonamides	256	16	16																					15	1			
Tetracyclines - Tetracycline	8	16	16																	1	12	3						
Trimethoprim	2	16	0									1	7	8														
Resistant to >4 antimicrobials		16	16	16																								

S. Kentucky	Meat from turkey	
	yes	
	16	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		



Table Antimicrobial susceptibility testing of *S. Kentucky* in Meat from turkey - food sample - meat - quantitative data [Dilution method]

<b>S. Kentucky</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from turkey	
	yes	
	16	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Resistant to >4 antimicrobials		



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

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

S. Kentucky	Meat from broilers (Gallus gallus)																											
	yes																											
	10																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	2	10	10													2	7	1										
Aminoglycosides - Streptomycin	32	10	10																3	6	1							
Amphenicols - Chloramphenicol	16	10	0												10													
Cephalosporins - Cefotaxime	0.5	10	0							10																		
Fluoroquinolones - Ciprofloxacin	0.064	10	10													7	3											
Penicillins - Ampicillin	8	10	10																	10								
Quinolones - Nalidixic acid	16	10	10																		10							
Sulfonamides	256	10	10																				10					
Tetracyclines - Tetracycline	8	10	10																1	9								
Trimethoprim	2	10	0								3	2	5															
Resistant to >4 antimicrobials		10	10	10																								

S. Kentucky	Meat from broilers (Gallus gallus)	
	yes	
	10	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		



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

S. Kentucky  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from broilers (Gallus gallus)	
	yes	
	10	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Resistant to >4 antimicrobials		



Table Antimicrobial susceptibility testing of S. Stanley in Meat from turkey - food sample - meat - quantitative data [Dilution method]

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

S. Stanley	Meat from turkey																											
	Isolates out of a monitoring program (yes/no)																											
	yes																											
	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	26	0									11	10	5														
Aminoglycosides - Streptomycin	32	26	1														6	12	7	1								
Amphenicols - Chloramphenicol	16	26	0												4	11	11											
Cephalosporins - Cefotaxime	0.5	26	0								26																	
Fluoroquinolones - Ciprofloxacin	0.064	26	25							1	16	8	1															
Penicillins - Ampicillin	8	26	8										5	5	3	5		1			7							
Quinolones - Nalidixic acid	16	26	26																	1	4	21						
Sulfonamides	256	26	5														2	1	7	6	5		1	3	1			
Tetracyclines - Tetracycline	8	26	0											15	11													
Trimethoprim	2	26	0									4	13	9														
Resistant to 1 antimicrobial		1	1	1																								
Resistant to 2 antimicrobials		14	14	14																								
Resistant to 3 antimicrobials		8	8	8																								
Resistant to 4 antimicrobials		3	3	3																								



Table Antimicrobial susceptibility testing of *S. Stanley* in Meat from turkey - food sample - meat - quantitative data [Dilution method]

<b>S. Stanley</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from turkey	
	yes	
	26	
	lowest	highest
<b>Antimicrobials:</b>		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		



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

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 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		
Broth dilution		EFSA		

  

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Gentamicin	EFSA	2	
	Streptomycin	EFSA	32	
Amphenicols	Chloramphenicol	EFSA	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	







## 2.2 CAMPYLOBACTERIOSIS

### 2.2.1 General evaluation of the national situation

#### A. Thermophilic Campylobacter general evaluation

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

The main source of human campylobacter infections in Hungary is raw meat especially poultry meat. The seasonal prevalence of campylobacters in raw chicken meat shows a strong correlation with the seasonal distribution of human cases. The prevalence in raw milk is low, but it can mean a possible source in some cases. As typing of Campylobacter of food origin is not performed at a large scale, PFGE and other molecular based methods are used mainly for outbreak investigations and in small scale regional studies, the identification of sources should be improved in the future.

#### Recent actions taken to control the zoonoses

Actions specifically used for the control of campylobacters are not implemented in Hungary. Hygienic measurements used in the primary production (all in -all out systems, cleaning, disinfection, pest control) HACCP and GHP systems at slaughterhouses, improvement of the packaging of raw meat, labelling the minced meat and meat preparations with the requirement of heat treatment before consumption are the main actions in use.



## 2.2.2 Campylobacteriosis in humans

### A. Thermophilic Campylobacter in humans

#### Reporting system in place for the human cases

There are around 80 communicable diseases notifiable in Hungary based on legal background. The physician (in primary health care, specialist care, inpatient medical institution or pathology) who first diagnoses a case of a notifiable communicable disease (even the suspicion of the disease!) immediately reports data of case to the first level of the epidemiological network (municipal institute) of National Public Health and Medical Officer's Service (NPHMOS). Data must be reported both at the beginning and at end of the illness (recovery/death, result of laboratory test). The NPHMOS has a nationwide electronic system for registering and analysing data of communicable diseases in a combined national database, so the system provides online connection between the three levels (municipal, regional and national level – National Centre of Epidemiology - NCE) of the organization. The NCE prepares reports regularly (weekly, monthly, yearly) to the Chief Medical Officer, the MoH and the Hungarian Central Statistical Office.

#### Case definition

Confirmed case: a clinically compatible case when the campylobacter infection is laboratory confirmed.  
Probable case: a clinically compatible case that is not confirmed by laboratory investigation, but it has an epidemiological link to a confirmed campylobacter outbreak.

#### Diagnostic/analytical methods used

Campylobacter isolates are obtained by culturing the faeces samples of the patients on selective-differentiating media, using reduced oxygen tension and special incubation temperature, followed by biochemical tests.

#### Notification system in place

The laboratories of NPHMOS have been able to identify campylobacters since 1987. Human cases have been notifiable since 1998. The physician reports data of case on a "case report form" by mail to the municipal institute of NPHMOS. The specialist of the institute records data immediately in the electronic system of the NPHMOS. Hungary has also a laboratory based surveillance system, and the NPHMOS has representative dataset from most of the microbiological laboratories about the laboratory investigated cases (since 2003 antibiotic resistances have also been reported from 5 regional laboratories of NPHMOS and from a number of laboratories of universities or hospitals).

The illness is reported first as enteritis infectiosa syndrome on the basis of the symptoms. Having the results of the laboratory tests this syndrome-based diagnose is modified to etiology-based diagnose. In some cases the reporting follows only the available laboratory test results.

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

The laboratories of NPHMOS have been able to identify campylobacters since 1987. In 1990 the National Centre for Epidemiology prepared a guideline on campylobacter enteritis, and then the collection of data on campylobacteriosis was started on this basis. The number of isolates increased from 5 500/year in 1990 to 12 000/year in 1996. Since 1998 this number has varied between 9 500 – 11 500 /year. Human cases have been notifiable since 1998, so the laboratory and clinical surveillance have been linked in this year.

The number of registered cases remained around 8 300-9 200 between 1998 and 2004 (incidence: 81,6 –



91,0 /100 000 inhabitants/year).

Altogether four death cases were registered between 1998 and 2004 (case fatality rate ranged between 0,0 – 0,02%/year). The highest age-specific incidence was observed among children under five years in all periods, and the incidence has declined with the progressing of the age.

The 95% of cases were sporadic, widespread outbreaks were observed very rarely; outbreaks mostly appeared in families (200 – 300/year). The most of the outbreaks were caused by poultry prepared with inadequate heat treatment or additionally contaminated food. There has not been any evidence in Hungary for outbreaks caused by ready-to-eat foods of industrial origin.

[In 1998 a single outbreak was investigated that occurred among consumers exposed to non-pasteurised milk (cow) consumed on a livestock market and exhibition (51 cases)]

75-80% of isolated strains were *C.jejuni*, around 10% were *C.coli*, 4-5% were *C.lari*, the distribution of campylobacter specieses did not changed significantly during the last five years.

### Relevance as zoonotic disease

It is supposed that person-to-person transmission of campylobacter occur only in very few cases (infants, etc). Most of the outbreaks originated from poultry, via contaminated food. However, this facts have not based on statistical or laboratory evidences in Hungary.



## 2.2.3 Campylobacter in foodstuffs

### A. Thermophilic Campylobacter in Broiler meat and products thereof

#### Monitoring system

##### Sampling strategy

###### At slaughterhouse and cutting plant

There is an annual monitoring program based on the production capacity of the region. The monitoring plan is prepared by the central authority. The samples are taken by the regional authorities. Only one sample unit is taken from a batch, 25 grams are examined in the laboratory. These official samples are examined in the NRL Campylobacter with a presence-absence test followed by species identification and antimicrobial resistance.

###### At retail

To be reported via ECDC.

##### Frequency of the sampling

###### At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

##### Type of specimen taken

###### At slaughterhouse and cutting plant

Fresh meat

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

###### At slaughterhouse and cutting plant

At least 500 grams of fresh meat is sampled in a sterile plastic bag. The sample is transported to the laboratory in a cool box by courier.

##### Definition of positive finding

###### At slaughterhouse and cutting plant

When a strain of thermophilic Campylobacter is isolated from the sample (25g) after enrichment.

##### Diagnostic/analytical methods used

###### At slaughterhouse and cutting plant

Bacteriological method: ISO 10272:1995

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

Thermophilic Campylobacter - as in many countries - shows a high prevalence in broiler meat with a marked seasonal distribution of 30 % in winter to more than 60% in the summer months.



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
Meat from pig - fresh - Slaughterhouse		Objective sampling	Official sampling	food sample > meat		Single	25 grams	33	5	4	1
Meat from pig - fresh - Processing plant		Objective sampling	Official sampling	food sample > meat		Single	25 grams	151	3	1	2
Meat from pig - fresh - Retail		Objective sampling	Official sampling	food sample > meat		Single	25 grams	94	2	1	1
Milk, goats' - raw milk for manufacture - intended for manufacture of raw or low heat-treated products - Processing plant		Objective sampling	Official sampling	food sample > milk		Single	25 ml	3	0	0	0
Meat from bovine animals - fresh - Processing plant - Monitoring - active		Objective sampling	Official sampling	food sample > meat		Single	25 grams	51	3	3	0
Meat from bovine animals - fresh - Retail - Monitoring - active		Objective sampling	Official sampling	food sample > meat		Single	25 grams	19	0	0	0
Meat from bovine animals - fresh - Slaughterhouse - Monitoring - active		Selective sampling	Official sampling	food sample > meat		Single	25 grams	19	1	1	0
Milk, cows' - raw milk - Retail		Objective sampling	Official sampling	food sample > milk		Single	25 ml	55	0	0	0
Milk, cows' - raw milk for manufacture - intended for manufacture of raw or low heat-treated products - Monitoring - active		Objective sampling	Official and industry sampling	food sample > milk		Single	25 ml	132	0	0	0

	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from pig - fresh - Slaughterhouse	0	0	0
Meat from pig - fresh - Processing plant	0	0	0



Table Campylobacter in other food

	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from pig - fresh - Retail	0	0	0
Milk, goats' - raw milk for manufacture - intended for manufacture of raw or low heat-treated products - Processing plant	0	0	0
Meat from bovine animals - fresh - Processing plant - Monitoring - active	0	0	0
Meat from bovine animals - fresh - Retail - Monitoring - active	0	0	0
Meat from bovine animals - fresh - Slaughterhouse - Monitoring - active	0	0	0
Milk, cows' - raw milk - Retail	0	0	0
Milk, cows' - raw milk for manufacture - intended for manufacture of raw or low heat-treated products - Monitoring - active	0	0	0



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) - fresh - Processing plant		Objective sampling	Official sampling	food sample > meat		Single	25 grams	243	60	37	19
Meat from broilers (Gallus gallus) - fresh - Retail		Objective sampling	Official sampling	food sample > meat		Single	25 grams	280	66	39	15
Meat from duck - fresh - Retail		Objective sampling	Official sampling	food sample > meat		Single	25 grams	38	4	3	1
Meat from geese - fresh - Retail		Objective sampling	Official sampling	food sample > meat		Single	25 grams	4	0	0	0
Meat from duck - fresh - Processing plant		Objective sampling	Official sampling	food sample > meat		Single	25 grams	25	10	3	5
Meat from geese - fresh - Processing plant		Objective sampling	Official sampling	food sample > meat		Single	25 grams	24	6	0	3
Meat from turkey - fresh - Processing plant - Monitoring - active		Objective sampling	Official sampling	food sample > meat		Single	25 grams	112	22	8	7
Meat from turkey - fresh - Retail - Monitoring - active		Objective sampling	Official sampling	food sample > meat		Single	25 grams	77	14	8	4

	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus) - fresh - Processing plant			4
Meat from broilers (Gallus gallus) - fresh - Retail			12
Meat from duck - fresh - Retail			
Meat from geese - fresh - Retail	0	0	0



Table Campylobacter in poultry meat

	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from duck - fresh - Processing plant	0	0	2
Meat from geese - fresh - Processing plant	0	0	3
Meat from turkey - fresh - Processing plant - Monitoring - active	0	0	7
Meat from turkey - fresh - Retail - Monitoring - active	0	0	2



## 2.2.4 Campylobacter in animals

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
Pigs - fattening pigs - Slaughterhouse - Monitoring	NFC SO VDD	Unspecified	Not applicable	animal sample	Domestic	Holding	163	73	70	3	0
Gallus gallus (fowl) - broilers - Slaughterhouse - Monitoring	NFC SO VDD	Unspecified	Not applicable	animal sample	Domestic	Flock	159	118	53	65	0
	C. upsaliensis	Thermophilic Campylobacter spp., unspecified									
Pigs - fattening pigs - Slaughterhouse - Monitoring	0	0									
Gallus gallus (fowl) - broilers - Slaughterhouse - Monitoring	0	0									



## 2.2.5 Antimicrobial resistance in Campylobacter isolates

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

#### Sampling strategy used in monitoring

##### Frequency of the sampling

Isolates derive from monitoring system performed for measurement of prevalence of campylobacters in fresh poultry meat. The sampling is random , performed by the regional competent authorities. The samples are taken in slaughterhouses, and is a part of a permanent monitoring scheme.

##### Type of specimen taken

500 grams of fresh poultry meat.

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

Almost every isolated strains are tested.

##### Methods used for collecting data

All the tests are performed by the NRL.

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

Disc diffusion method on horseblood agar plates. Control strains are used.



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

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

C. coli	Pigs - fattening pigs																									
	60																									
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	60	1								1	2	5	42	9			1								
Aminoglycosides - Streptomycin	4	60	49												1	10	3	46								
Fluoroquinolones - Ciprofloxacin	0.5	60	31							2	19	6	2			31										
Tetracyclines - Tetracycline	2	60	56									2	2					56								
Macrolides - Erythromycin	8	60	9										19	20	9	2	1	1	8							

C. coli	Pigs - fattening pigs	
	60	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.12	16
Aminoglycosides - Streptomycin	1	16
Fluoroquinolones - Ciprofloxacin	0.06	4
Tetracyclines - Tetracycline	0.25	16
Macrolides - Erythromycin	0.5	32



Table Antimicrobial susceptibility testing of C. jejuni in Pigs - fattening pigs - quantitative data [Dilution method]

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

C. jejuni	Pigs - fattening pigs																										
	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														
Tetracyclines - Tetracycline	1	1	0											1													
Macrolides - Erythromycin	4	1	0											1													

C. jejuni	Pigs - fattening pigs	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.12	16
Aminoglycosides - Streptomycin	1	16
Fluoroquinolones - Ciprofloxacin	0.06	4
Tetracyclines - Tetracycline	0.25	16
Macrolides - Erythromycin	0.5	32



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

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

C. coli	Gallus gallus (fowl) - broilers																										
	Isolates out of a monitoring program (yes/no)																										
	Number of isolates available in the laboratory																										
Antimicrobials:	51																										
	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	51	0							7	1	18	24	1												
	Aminoglycosides - Streptomycin	4	51	8										6	10	27	2	6									
	Fluoroquinolones - Ciprofloxacin	0.5	51	47							1	2	1				47										
	Tetracyclines - Tetracycline	2	51	27									15	6	2	1			27								
	Macrolides - Erythromycin	8	51	0										38	9	4											

C. coli	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.12	16
Aminoglycosides - Streptomycin	1	16
Fluoroquinolones - Ciprofloxacin	0.06	4
Tetracyclines - Tetracycline	0.25	16
Macrolides - Erythromycin	0.5	32



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

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

C. jejuni	Gallus gallus (fowl) - broilers																										
	Isolates out of a monitoring program (yes/no)																										
	Number of isolates available in the laboratory																										
Antimicrobials:	56																										
	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	56	0								5	7	35	8	1												
Aminoglycosides - Streptomycin	4	56	7											17	22	10	2	5									
Fluoroquinolones - Ciprofloxacin	0.5	56	48							2	4	2				48											
Tetracyclines - Tetracycline	1	56	28									18	9	1				28									
Macrolides - Erythromycin	4	56	0										51	5													

C. jejuni	Gallus gallus (fowl) - broilers	
	56	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.12	16
Aminoglycosides - Streptomycin	1	16
Fluoroquinolones - Ciprofloxacin	0.06	4
Tetracyclines - Tetracycline	0.25	16
Macrolides - Erythromycin	0.5	32



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

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

C. jejuni	Meat from broilers (Gallus gallus)																											
	yes																											
	24																											
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	24	0								9	9	5	1														
Aminoglycosides - Streptomycin	4	24	2											9	6	7	1	1										
Amphenicols - Chloramphenicol	16	24	0											3	11	7	3											
Fluoroquinolones - Ciprofloxacin	0.5	24	18								2	4	0	0	2	6	10											
Quinolones - Nalidixic acid	16	24	19													2	3	0	2	9	8							
Tetracyclines - Tetracycline	1	24	13										5	6	3	0	1	2	6	1								
Fully sensitive		4	4	4																								
Macrolides - Erythromycin	4	24	0										11	9	4													
Resistant to 1 antimicrobial		2	2	2																								
Resistant to 2 antimicrobials		6	6	6																								
Resistant to 3 antimicrobials		10	10	10																								
Resistant to 4 antimicrobials		2	2	2																								

C. jejuni	Meat from broilers (Gallus gallus)	
	yes	
	24	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		



Table Antimicrobial susceptibility testing of *C. jejuni* in Meat from broilers (*Gallus gallus*) - Objective sampling - Official sampling - food sample  
- quantitative data [Dilution method]

C. jejuni	Meat from broilers ( <i>Gallus gallus</i> )	
	yes	
	24	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Fluoroquinolones - Ciprofloxacin		
Quinolones - Nalidixic acid		
Tetracyclines - Tetracycline		
Fully sensitive		
Macrolides - Erythromycin		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		



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

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

C. coli	Meat from broilers (Gallus gallus)																											
	yes																											
	56																											
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	56	2								25	17	8	4			2											
Aminoglycosides - Streptomycin	4	56	13										1	25	13	4	3	6	1	3								
Amphenicols - Chloramphenicol	16	56	1											8	26	16	3	2	1									
Fluoroquinolones - Ciprofloxacin	0.5	56	48								5	1	2	1	3	12	32											
Quinolones - Nalidixic acid	16	56	47													2	4	3	10	14	23							
Tetracyclines - Tetracycline	2	56	32									1	12	9	2	2	3	5	22									
Fully sensitive		3	3	3																								
Macrolides - Erythromycin	8	56	2									1	27	21	3	2			2									
Resistant to 1 antimicrobial		6	6	6																								
Resistant to 2 antimicrobials		12	12	12																								
Resistant to 3 antimicrobials		29	29	29																								
Resistant to 4 antimicrobials		2	2	2																								
Resistant to >4 antimicrobials		4	4	4																								



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

C. coli	Meat from broilers ( <i>Gallus gallus</i> )	
	yes	
	56	
Isolates out of a monitoring program (yes/no)		
Number of isolates available in the laboratory		
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Fluoroquinolones - Ciprofloxacin		
Quinolones - Nalidixic acid		
Tetracyclines - Tetracycline		
Fully sensitive		
Macrolides - Erythromycin		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		
Resistant to >4 antimicrobials		



Table Antimicrobial susceptibility testing of C. jejuni in Meat from turkey - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

C. jejuni	Meat from turkey																											
	yes																											
	10																											
	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								5	3	1	1														
Aminoglycosides - Streptomycin	4	10	2										1	4	3	0	1	1										
Amphenicols - Chloramphenicol	16	10	0												3	4	1	2										
Fluoroquinolones - Ciprofloxacin	0.5	10	8									1	1	1		3	4											
Quinolones - Nalidixic acid	16	10	7													1	2	0	1	2	4							
Tetracyclines - Tetracycline	1	10	5										2	3	1	3			1									
Fully sensitive		1	1	1																								
Macrolides - Erythromycin	4	10	0										6	3	1													
Resistant to 1 antimicrobial		2	2	2																								
Resistant to 2 antimicrobials		2	2	2																								
Resistant to 3 antimicrobials		4	4	4																								
Resistant to 4 antimicrobials		1	1	1																								

C. jejuni	Meat from turkey	
	yes	
	10	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		



Table Antimicrobial susceptibility testing of *C. jejuni* in Meat from turkey - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

<b>C. jejuni</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from turkey	
	yes	
	10	
	lowest	highest
<b>Antimicrobials:</b>		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Fluoroquinolones - Ciprofloxacin		
Quinolones - Nalidixic acid		
Tetracyclines - Tetracycline		
Fully sensitive		
Macrolides - Erythromycin		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		



Table Antimicrobial susceptibility testing of C. coli in Meat from turkey - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

C. coli	Meat from turkey																											
	yes																											
	11																											
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	11	0								5	3	2	1														
Aminoglycosides - Streptomycin	4	11	3											4	2	2	1	1	1									
Amphenicols - Chloramphenicol	16	11	0											1	4	3	3											
Fluoroquinolones - Ciprofloxacin	0.5	11	8								2		1			2	6											
Quinolones - Nalidixic acid	16	11	6													2		3		2	4							
Tetracyclines - Tetracycline	2	11	5										2	2	2	1	0	0	3	0	1							
Fully sensitive		3	3	3																								
Macrolides - Erythromycin	8	11	1										2	5	3				1									
Resistant to 2 antimicrobials		2	2	2																								
Resistant to 3 antimicrobials		5	5	5																								
Resistant to 4 antimicrobials		1	1	1																								

C. coli	Meat from turkey	
	yes	
	11	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		



Table Antimicrobial susceptibility testing of *C. coli* in Meat from turkey - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

C. coli	Meat from turkey	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol		
Fluoroquinolones - Ciprofloxacin		
Quinolones - Nalidixic acid		
Tetracyclines - Tetracycline		
Fully sensitive		
Macrolides - Erythromycin		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		



Table Antimicrobial susceptibility testing of C. jejuni in Meat from pig - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

C. jejuni	Meat from pig																											
	yes																											
	3																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	2	3	0								2	1																
Aminoglycosides - Streptomycin	4	3	1											1	1				1									
Amphenicols - Chloramphenicol	16	3	0											2		1												
Fluoroquinolones - Ciprofloxacin	0.5	3	1								1	1				1												
Quinolones - Nalidixic acid	16	3	1													1	1		1									
Tetracyclines - Tetracycline	1	3	3												1		1	1										
Macrolides - Erythromycin	4	3	1										1		1			1										
Resistant to 1 antimicrobial		1	1	1																								
Resistant to 2 antimicrobials		1	1	1																								
Resistant to 4 antimicrobials		1	1	1																								

C. jejuni	Meat from pig	
	yes	
	3	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		



Table Antimicrobial susceptibility testing of *C. jejuni* in Meat from pig - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

<b>C. jejuni</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from pig	
	yes	
	3	
	lowest	highest
<b>Antimicrobials:</b>		
Fluoroquinolones - Ciprofloxacin		
Quinolones - Nalidixic acid		
Tetracyclines - Tetracycline		
Macrolides - Erythromycin		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		
Resistant to 4 antimicrobials		



Table Antimicrobial susceptibility testing of C. coli in Meat from pig - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

C. coli	Meat from pig																											
	yes																											
	6																											
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	6	0								1	1	2	2														
Aminoglycosides - Streptomycin	4	6	4											1		1			1	3								
Amphenicols - Chloramphenicol	16	6	0											1	4	1												
Fluoroquinolones - Ciprofloxacin	0.5	6	4								1	1			1	1	2											
Quinolones - Nalidixic acid	16	6	4														1	1	1	1	2							
Tetracyclines - Tetracycline	2	6	5											1				1	4									
Macrolides - Erythromycin	8	6	1										2	2	1			1										
Resistant to 1 antimicrobial		1	1	1																								
Resistant to 2 antimicrobials		2	2	2																								
Resistant to 4 antimicrobials		2	2	2																								
Resistant to >4 antimicrobials		1	1	1																								

C. coli	Meat from pig	
	yes	
	6	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		



Table Antimicrobial susceptibility testing of *C. coli* in Meat from pig - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

C. coli	Meat from pig	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol		
Fluoroquinolones - Ciprofloxacin		
Quinolones - Nalidixic acid		
Tetracyclines - Tetracycline		
Macrolides - Erythromycin		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		
Resistant to 4 antimicrobials		
Resistant to >4 antimicrobials		



Table Antimicrobial susceptibility testing of C. jejuni in Meat from other poultry species - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

C. jejuni	Meat from other poultry species																											
	yes																											
	6																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	2	6	0							1	3	1	1															
Aminoglycosides - Streptomycin	4	6	2										2		2				2									
Amphenicols - Chloramphenicol	16	6	0										1	2	3													
Fluoroquinolones - Ciprofloxacin	0.5	6	4								2				2	2												
Quinolones - Nalidixic acid	16	6	5													1		2		3								
Trimethoprim		6	6										1			1	1	3										
Macrolides - Erythromycin	4	6	0									3	1	2														
Resistant to 2 antimicrobials		2	2	2																								
Resistant to 3 antimicrobials		2	2	2																								
Resistant to 4 antimicrobials		2	2	2																								

C. jejuni	Meat from other poultry species	
	yes	
	6	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		



Table Antimicrobial susceptibility testing of *C. jejuni* in Meat from other poultry species - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

<i>C. jejuni</i>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from other poultry species	
	yes	
	6	
Antimicrobials:	lowest	highest
Fluoroquinolones - Ciprofloxacin		
Quinolones - Nalidixic acid		
Trimethoprim		
Macrolides - Erythromycin		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		



Table Antimicrobial susceptibility testing of C. coli in Meat from other poultry species - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

C. coli	Meat from other poultry species																											
	yes																											
	4																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	2	4	0							2	2																	
Aminoglycosides - Streptomycin	4	4	0										2	2														
Amphenicols - Chloramphenicol	16	4	0										2	1	1													
Fluoroquinolones - Ciprofloxacin	0.5	4	3								1				1	2												
Quinolones - Nalidixic acid	16	4	3												1				2	1								
Tetracyclines - Tetracycline	2	4	2									1	1				1	1										
Fully sensitive		1	1	1																								
Macrolides - Erythromycin	8	4	0										4															
Resistant to 2 antimicrobials		1	1	1																								
Resistant to 3 antimicrobials		2	2	2																								

C. coli	Meat from other poultry species	
	yes	
	4	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		



Table Antimicrobial susceptibility testing of C. coli in Meat from other poultry species - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

C. coli	Meat from other poultry species	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	4	
Antimicrobials:	lowest	highest
Fluoroquinolones - Ciprofloxacin		
Quinolones - Nalidixic acid		
Tetracyclines - Tetracycline		
Fully sensitive		
Macrolides - Erythromycin		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		



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		
Broth dilution		EFSA		

  

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

  

			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

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

Testing of ready-to-eat products for the presence/and/or the determination of the number of *Listeria monocytogenes* is obligatory for food business operators based on Reg.2073/2005/EC. The official monitoring program concentrates to take samples from these products on a risk based approach as well. Only the data of official control are presented in this report, because only these data are collected in the database of the authority. The legislative background has changed a lot, because before 2006 only milk and milk products were regularly tested for *Listeria monocytogenes* and only by presence absence tests. In the frame of USDA-FSIS monitoring obligatory for US exporting establishments raw cured products were tested as well with presence-absence tests and MPN based method suitable for enumeration of low numbers of the microorganism

From 2006, those RTE products that not support the growth of *Listeria*, are examined by the enumeration method ISO 11290:2 (e.g.salami, raw smoked ham). If the product is able to support the growth of the pathogen, presence-absence test is used as a first step (ISO 11290:1), or the two method run paralel (depending on the expiry date, the amount of sample is enough to perform an enumeration test if the first test is positive). The pathogen is enumerated from all the positive samples.

Based on the past decade's USDA *Listeria* monitoring data, *Listeria monocytogenes* can be frequently isolated from traditional raw and smoked meat products as salami and sausages, but the highest contamination level was 2.3 cells (MPN method)/gram. Therefore this product group certainly does not play an important role in human infections.

*Listeria monocytogenes* can be isolated from mixes salads as well, but because of low pH and preservatives charateristic for this product group generally do not support the growth of the pathogen, and only level of <10 cells per gram was measured from the positive samples.

Milk products are characteristically made of pasteurised milk in Hungary, therefore these types of foodstuff are practically free from *Listeria*.

Consumers show an increasing interest to by raw milk for consumption in the past few years. Despite of the obligatory labelling to call the consumers' attention for heat treating of raw milk, this product can be considered as a potential source of infection in the future.

#### Recent actions taken to control the zoonoses

Based on Reg. 2073/2005/EC.



## 2.3.2 Listeriosis in humans

### A. Listeriosis in humans

#### Reporting system in place for the human cases

There are around 80 communicable diseases notifiable in Hungary based on legal background. The physician (in primary health care, specialist care, inpatient medical institution or pathology) who first diagnoses a case of a notifiable communicable disease (even the suspicion of the disease!) immediately reports data of case to the first level of the epidemiological network (municipal institute) of National Public Health and Medical Officer's Service (NPHMOS). Data must be reported both at the beginning and at end of the illness (recovery/death, result of laboratory test). The NPHMOS has a nationwide electronic reporting system for registering and analysing data of communicable diseases in a combined national database, so the system provides online connection amid the three levels (municipal, regional and national level – National Centre of Epidemiology - NCE) of the organization. The NCE prepares reports regularly (weekly, monthly, yearly) to the Chief Medical Officer, the MoH and the Hungarian Central Statistical Office.

#### Case definition

Confirmed case: Clinical picture of an invasive illness (meningitis purulenta, sepsis, stillbirth etc.), and *L.monocytogenes* has been isolated from invasive sample (liquor, blood, amniotic fluid etc.)

#### Diagnostic/analytical methods used

The samples are cultivated on enriched medium. The isolation is followed by the biochemical tests, and antimicrobial susceptibility testing.

#### Notification system in place

Listeriosis has been notifiable since 1998 in Hungary. The physician reports data of case on a "case report form" by mail to the municipal institute of NPHMOS. The specialist of the institute records data immediately in the electronic system of the NPHMOS. Hungary also has a laboratory based surveillance system, and the NPHMOS has representative dataset from most of the microbiological laboratories about the investigated cases (since 2003 antibiotic resistances has also been reported from 20 county institutes and 12 laboratories from universities or hospitals).

The illness is reported first as meningitis purulenta syndrome on the basis of the symptoms. Having the results of the laboratory tests this syndrome-based diagnose is modified to etiology-based diagnose (listeriosis).

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

Listeriosis has been notifiable since 1998 in Hungary, there have been 91 cases registered since then. The number of yearly registered cases ranged between 4 – 25 (incidence 0,04 – 0,2/100 000 inhabitants/year; median: 14 cases), the case fatality rate ranged between 0 – 50% (median 22,2%). The age-distribution of cases: 12% infants, 1 – 14 year 3,4%, 15 – 19 year 0%, 20 – 49 year 20%, 50 – 59 year 20%, > 60 year 43%. Most of the cases are meningitis, less of them are sepsis.

#### Relevance as zoonotic disease

Listeriosis is underreported in Hungary. No evidence has been found for a food-borne case based on laboratory tests in Hungary.







### 2.3.3 Listeria in foodstuffs

#### A. Listeria in Food

##### Monitoring system

###### Sampling strategy

monitoring, objective sampling

###### Type of specimen taken

At the production plant

RTE

At retail

RTE

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

At the production plant

single sample

At retail

single sample

##### Definition of positive finding

At the production plant

Listeria monocytogenes is isolated

At retail

Listeria monocytogenes is isolated

##### Diagnostic/analytical methods used

At the production plant

ISO 11290-1, ISO 11290-2

At retail

ISO 11290-1, ISO 11290-2



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
Milk, cows' - raw milk - intended for direct human consumption - Farm - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 ml	185	0	185	0
Milk, cows' - pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 ml	150	0	150	0
Milk, cows' - pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 ml	20	0	20	0
Milk, goats' - raw milk - intended for direct human consumption - Farm - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 ml	1	0	1	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	43	0	43	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	92	2	90	2
Cheeses made from cows' milk - hard - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	4	0	4	0
Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	11	0	11	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	2	0	2	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	2	0	2	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) - butter - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	30	0	30	0
Dairy products (excluding cheeses) - butter - made from pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	56	0	56	0
Dairy products (excluding cheeses) - cream - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	4	0	4	0
Dairy products (excluding cheeses) - cream - made from pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	6	0	6	0
Cheeses made from cows' milk - curd - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	37	0	37	0
Cheeses made from cows' milk - curd - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	38	1	37	1
Cheeses made from cows' milk - unspecified - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > carcass swabs	Domestic	Single	25 g	7	0	7	0
Cheeses made from cows' milk - unspecified - made from pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	5	0	5	0
Cheeses made from goats' milk - unspecified - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	4	0	4	0
Cheeses made from sheep's milk - fresh - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	8	0	8	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
Cheeses made from sheep's milk - fresh - made from pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	62	2	60	2
Dairy products (excluding cheeses) - dairy desserts - chilled - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	23	0	23	0
Dairy products (excluding cheeses) - dairy desserts - chilled - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	87	0	87	0
Dairy products (excluding cheeses) - fermented dairy products - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	105	0	105	0
Dairy products (excluding cheeses) - fermented dairy products - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	104	0	104	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Catering - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	36	0	36	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	20	0	20	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	233	1	232	1
Dairy products (excluding cheeses) - milk powder and whey powder - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	15	0	15	0
Dairy products (excluding cheeses) - milk powder and whey powder - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	49	0	49	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	0	0	0
Milk, cows' - pasteurised milk - Processing plant - Surveillance	0	0	0
Milk, cows' - pasteurised milk - Retail - Surveillance	0	0	0
Milk, goats' - raw milk - intended for direct human consumption - Farm - 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 - soft and semi-soft - made from pasteurised milk - Retail - Surveillance	2	2	0
Cheeses made from cows' milk - hard - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - Surveillance	0	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - Retail - Surveillance	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) - butter - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - butter - made from pasteurised milk - Retail - Surveillance	0	0	0
Dairy products (excluding cheeses) - cream - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - cream - made from pasteurised milk - Retail - Surveillance	0	0	0
Cheeses made from cows' milk - curd - Processing plant - Surveillance	0	0	0
Cheeses made from cows' milk - curd - Retail - Surveillance	1	1	0
Cheeses made from cows' milk - unspecified - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Cheeses made from cows' milk - unspecified - made from pasteurised milk - Retail - Surveillance	0	0	0
Cheeses made from goats' milk - unspecified - made from pasteurised milk - Processing plant - Surveillance	0	0	0
Cheeses made from sheep's milk - fresh - made from pasteurised milk - Processing plant - Surveillance	0	0	0



Table *Listeria monocytogenes* in milk and dairy products

	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Cheeses made from sheep's milk - fresh - made from pasteurised milk - Retail - Surveillance	2	1	1
Dairy products (excluding cheeses) - dairy desserts - chilled - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - dairy desserts - chilled - Retail - Surveillance	0	0	0
Dairy products (excluding cheeses) - fermented dairy products - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - fermented dairy products - Retail - Surveillance	0	0	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - Catering - Surveillance	0	0	0
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 - Retail - Surveillance	1	1	0
Dairy products (excluding cheeses) - milk powder and whey powder - Processing plant - Surveillance	0	0	0
Dairy products (excluding cheeses) - milk powder and whey powder - Retail - Surveillance	0	0	0



Table *Listeria monocytogenes* in milk and dairy products



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	NFC SO	Objective sampling	Official sampling	food sample > meat	Domestic	Single	25 g	79	1	78	1
Meat from broilers ( <i>Gallus gallus</i> ) - meat products - cooked, ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	176	1	175	1
Meat from pig - meat products - cooked, ready-to-eat - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	39	1	38	1
Meat from pig - meat products - cooked, ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	102	1	101	1
Meat from bovine animals - meat products - cooked, ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	32	0	32	0
Fish - smoked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	Single	25 g	59	9	50	9
Crustaceans - unspecified - cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	20	0	20	0
Molluscan shellfish - cooked - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	60	0	60	0
Infant formula - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	201	0	201	0
Other processed food products and prepared dishes - sandwiches - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	234	3	231	3
Vegetables - pre-cut - ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	167	30	137	30
Bakery products - cakes - Catering - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	168	0	168	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
Bakery products - cakes - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	145	1	144	1
Cereals and meals - flakes - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	10	0	10	0
Cereals and meals - flakes - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	55	0	55	0
Chocolate - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > carcase swabs	Domestic	Single	25 g	28	0	28	0
Chocolate - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	119	0	119	0
Cocoa and cocoa preparations, coffee and tea - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	101	0	101	0
Foodstuffs intended for special nutritional uses - ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	25	0	25	0
Fruits - non-pre-cut - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	42	0	42	0
Meat from pig - meat products - fermented sausages - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	803	27	776	27
Meat from pig - meat products - raw ham - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	197	4	193	4
Meat from turkey - meat products - cooked, ready-to-eat - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	49	1	48	1
Meat from turkey - meat products - cooked, ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	175	0	175	0
Nuts and nut products - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	67	0	67	0
Other processed food products and prepared dishes - Retail - Surveillance <sup>1)</sup>	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	57	1	56	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
Other processed food products and prepared dishes - meat based dishes - Catering - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Domestic	Single	25 g	205	1	204	1
Other processed food products and prepared dishes - meat based dishes - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	178	3	175	3
Other processed food products and prepared dishes - muesli - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	63	0	63	0
Ready-to-eat salads - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	399	3	396	3
Seeds, sprouted - ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	74	0	74	0
Vegetables - non-pre-cut - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	25 g	24	0	24	0

	Units tested with enumeration method	> detection limit but ≤ 100 cfu/g	<i>L. monocytogenes</i> > 100 cfu/g
Meat from broilers ( <i>Gallus gallus</i> ) - meat products - cooked, ready-to-eat - Processing plant - Surveillance	1	1	0
Meat from broilers ( <i>Gallus gallus</i> ) - meat products - cooked, ready-to-eat - Retail - Surveillance	1	0	1
Meat from pig - meat products - cooked, ready-to-eat - Processing plant - Surveillance	1	1	0



Table Listeria monocytogenes in other foods

	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Meat from pig - meat products - cooked, ready-to-eat - Retail - Surveillance	1	1	0
Meat from bovine animals - meat products - cooked, ready-to-eat - Retail - Surveillance	0	0	0
Fish - smoked - Retail - Surveillance	9	8	1
Crustaceans - unspecified - cooked - Retail - Surveillance	0	0	0
Molluscan shellfish - cooked - Retail - Surveillance	0	0	0
Infant formula - Retail - Surveillance	0	0	0
Other processed food products and prepared dishes - sandwiches - Retail - Surveillance	3	3	0
Vegetables - pre-cut - ready-to-eat - Retail - Surveillance	30	28	2
Bakery products - cakes - Catering - Surveillance	0	0	0
Bakery products - cakes - Retail - Surveillance	1	1	0
Cereals and meals - flakes - Processing plant - Surveillance	0	0	0
Cereals and meals - flakes - Retail - Surveillance	0	0	0
Chocolate - Processing plant - Surveillance	0	0	0
Chocolate - Retail - Surveillance	0	0	0
Cocoa and cocoa preparations, coffee and tea - Retail - 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
Foodstuffs intended for special nutritional uses - ready-to-eat - Retail - Surveillance	0	0	0
Fruits - non-pre-cut - Retail - Surveillance	0	0	0
Meat from pig - meat products - fermented sausages - in total - Surveillance	27	27	0
Meat from pig - meat products - raw ham - in total - Surveillance	4	3	1
Meat from turkey - meat products - cooked, ready-to- eat - Processing plant - Surveillance	1	1	0
Meat from turkey - meat products - cooked, ready-to- eat - Retail - Surveillance	0	0	0
Nuts and nut products - Retail - Surveillance	0	0	0
Other processed food products and prepared dishes <sup>1)</sup> - Retail - Surveillance	1	1	0
Other processed food products and prepared dishes - meat based dishes - Catering - Surveillance	1	1	0
Other processed food products and prepared dishes - meat based dishes - Retail - Surveillance	3	2	1
Other processed food products and prepared dishes - muesli - Retail - Surveillance	0	0	0
Ready-to-eat salads - in total - Surveillance	3	3	0
Seeds, sprouted - ready-to-eat - Retail - 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
Vegetables - non-pre-cut - Retail - Surveillance	0	0	0

Comments:

1) party meals not heat

not heat treated

treated

treated



## 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
Sheep - Farm - Clinical investigations	NFC SO VDD	Suspect sampling	Not applicable	animal sample	Domestic	Animal	13	13	0	13



## 2.4 E. COLI INFECTIONS

### 2.4.1 General evaluation of the national situation

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

##### Additional information

E. coli- microbiological examination of food according to ISO 16654 (E. coli O157)  
identification by antisera



## 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
Meat from bovine animals - fresh - Processing plant - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	ISO 16654:2001	Single	25 g	74	0	0
Meat from bovine animals - fresh - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > meat	Unknown	ISO 16654:2001	Single	25 g	6	0	0
Milk, cows' - raw milk - intended for direct human consumption - Farm - Surveillance	NFC SO	Objective sampling	Official sampling	food sample > milk	Domestic	ISO 16654:2001	Single	25 ml	107	1	1
Milk, goats' - raw milk - intended for direct human consumption - Farm - Surveillance	NFC SO	Unspecified	Official sampling	food sample > milk	Domestic	ISO 16654:2001	Single	25 ml	2	0	0
Vegetables - pre-cut - ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	ISO 16654:2001	Single	25 g	111	0	0
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance	NFC SO	Unspecified	Industry sampling	food sample	Unknown	ISO/PRF TS 13136	Batch	25 g	24	0	0
Seeds, sprouted - ready-to-eat - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	ISO 16654:2001	Single	25 g	59	0	0
Meat from bovine animals - meat products - raw but intended to be eaten cooked - frozen - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	ISO 16654:2001	Single	25 g	6	0	0
Meat from bovine animals - minced meat - intended to be eaten cooked - in total - Surveillance	NFC SO	Objective sampling	Official sampling	food sample	Unknown	ISO 16654:2001	Single	25 g	15	0	0



Table VT E. coli in food

	Verotoxigenic E. coli (VTEC) - VTEC non- O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Meat from bovine animals - fresh - Processing plant - Surveillance		
Meat from bovine animals - fresh - Retail - Surveillance		
Milk, cows' - raw milk - intended for direct human consumption - Farm - Surveillance		
Milk, goats' - raw milk - intended for direct human consumption - Farm - Surveillance		
Vegetables - pre-cut - ready-to-eat - Retail - Surveillance		
Seeds, sprouted - ready-to-eat - Processing plant - Surveillance	0	0
Seeds, sprouted - ready-to-eat - Retail - Surveillance		
Meat from bovine animals - meat products - raw but intended to be eaten cooked - frozen - in total - Surveillance		
Meat from bovine animals - minced meat - intended to be eaten cooked - in total - Surveillance		



## 2.4.3 Escherichia coli, pathogenic in animals

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

#### Monitoring system

##### Sampling strategy

Monitoring, Official sampling, objective sampling

##### Frequency of the sampling

Animals at farm

Sampling distributed evenly throughout the year

Animals at slaughter (herd based approach)

Sampling distributed evenly throughout the year

##### Type of specimen taken

Animals at slaughter (herd based approach)

meat, minced meat

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

Animals at slaughter (herd based approach)

500 gram meat sample is taken (from one animal), the weight of test portion is 25 grams (cutted from the surface of meat).

The samples are examined by ISO 16654:2001 Standard. Immuno-magnetic concentration is used for the detection of the most important serotype O157. If a strain belonging to the O 157 serotype is isolated, the toxin production is detected by a latex based agglutination test.

##### Case definition

Animals at slaughter (herd based approach)

The sample is considered to be positive if E. coli O157 was isolated, and the strain produces verotoxin (VT-1, VT-2 or both)

##### Diagnostic/analytical methods used

Animals at slaughter (herd based approach)

Bacteriological method: ISO 16654:2001



## 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

In bovine populations, eradication measures for tuberculosis started in 1962. The eradication of bovine tuberculosis was considered to be completed at the end of 1980. Since then, only sporadic cases occur.

As regards of tuberculosis in man, the favourable tendency which could be observed from the 1950s in the epidemiology of tuberculosis seemed to stop and getting worse in 1990. (Incidence raised by 19% between 1990 and 1995.) In order to lower the incidence and improve the situation, a National Tuberculosis Programme was adopted in 1994 which also incorporated a national surveillance programme based on a central, computerised database.

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

Regular screening of the human population is provided. All farm workers have to be checked by the competent public health authority for their compliance with the rules set for persons dealing with animals and food intended for human consumption. The documents proving their compliance are subject to on farm checks performed by the veterinary service. Each county veterinary authority has the right to set further health requirements for persons dealing with animals kept on small size farms.



## 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

The nationwide program for eradication of bovine tuberculosis in Hungary has successfully been completed by 31 December 1980 and the tuberculosis free status of the country were declared to the OIE. Since then no evidence of the presence of infection in more than 0,1 % of our herds has been found. The Commission Implementing Decision 2014/91/EU recognized Hungary's freedom from the disease.

#### Monitoring system

##### Sampling strategy

###### Post mortem inspections

According to the meat inspection rules in force in Hungary, based on a tradition of at least a century, each animal for slaughter is to be checked individually ante and post mortem. Technical methods applied at meat inspection is suitable to detect even the slightest tuberculous lesions. The legal provisions for tuberculosis require that the organs, together with the lymphnodes belonging to them, shall be sent to the National Food Chain Safety Office, Veterinary Diagnostic Directorate (former Central Veterinary Institute) for further laboratory examination, if during post mortem inspection of a slaughtered animal the tuberculous lesions are revealed. In case of animals ordered to be slaughtered for establishing the reason for unclarified positive or inconclusive reactions during intradermal tuberculin testing, a set of lymph nodes belonging to several organs and systems, as listed in the Annex 3 of the Decree No. 65/2002. (VIII. 9.) FVM and in the Technical Guideline, shall be sent to the National Food Chain Safety Office, Veterinary Diagnostic Directorate.

###### Intradermal tuberculin testing

Together with the post mortem control program, the compulsory intradermal tuberculin testing with a yearly interval of the whole Hungarian cattle population (older than six weeks), as well as case by case testing of animals moved from one herd to another, has been maintained and executed.

##### Frequency of the sampling

See above.

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

According to the Annex 3 of the Decree No. 65/2002. (VIII.9) FVM the rules of taking samples are the followings:

All-samples taken from animals with a large body (cattle, swine) must include the organs showing signs of the disease and the adjacent lymphatic glands, in case of birds and smaller animals the sample must be an entire carcass;

All-samples used for confirming paraallergic reaction must include the tonsils, pharyngeal, mesenteric and portal lymphatic glands of the slaughtered animal;

All-the purpose of detecting the presence of mycobacteria from the feedingstuffs, litter, soil etc. 20-50 gramm samples must be taken, 20 gramm samples from faeces, 50cm<sup>3</sup> from urine and 5 litres from drinking water. The samples must be sent to the CVI with a view to carry out tests to detect tuberculosis



and confirm the presence of mycobacteria.

#### Case definition

An animal is considered a positive case, if the presence of tuberculosis is confirmed by the isolation of *M. bovis* from its lymph node(s) or parenchymatous organs on laboratory examination.

Suspension or withdrawal of the free status of a herd is based upon the analysis of the results of the intradermal tuberculin tests (if necessary, repeated and completed by simultaneous testing), post mortem examinations and laboratory tests. According to the Annex 1 of the Decree No. 65/2002. (VIII.9) the officially tuberculosis -free status of the herd have to be withdrawn if the presence of tuberculosis is confirmed by the isolation of *M. bovis* on laboratory examination.

#### Diagnostic/analytical methods used

The identification of *Mycobacterium bovis* is carried out only the National Food Chain Safety Office, Veterinary Diagnostic Directorate(VDD) (Budapest). The VDD works according to the OIE Manual of Standards for Diagnostic tests and Vaccines, Forth Edition, Chapter 2.3.3. (bovine tuberculosis).

Annex 7. of the Decree No. 65/2002. (VIII.9) FVM contains the standards for the tuberculin (bovine and avian) to be used during the intradermal tests. These rules are fully compatible with Annex B point 2.1. of Council Directive 64/432/EEC.

Annex 2., which contains the standards for the test procedures is fully compatible with Council Directive 64/432/EEC.

#### Vaccination policy

Preventive vaccination against *M. bovis* is prohibited by Decree No. 65/2002. (VIII. 9.) FVM.

#### Control program/mechanisms

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

The whole cattle population is continuously monitored for bovine tuberculosis on a yearly basis by the intradermal tuberculin tests and by post-mortem inspections.

For measures taken in case of single cases, see "Measures in case of the positive findings or single cases".

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

Guidelines have been issued first by the Ministry of Agriculture and Rural Development and later by the Central Agricultural Office (the currently valid guideline was issued in March 2010) about the carrying out the tuberculin test in cattle herds taking into consideration the false positive or interference reactions as well as the data collection, and reporting by the regional authorities.

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

When an animal is considered to be a positive reactor in the intradermal tests, it is removed from the herd and slaughtered. The post-mortem, laboratory and epidemiological examinations shall be carried out. The status of the herd will remain suspended until the all laboratory examinations have been completed. If the presence of tuberculosis is not confirmed, the suspension of the officially tuberculosis-free status may be lifted following a test of all animals over six weeks of age with negative results at least 42 days after the removal of the reactor animal.

According to the Annex 1 of the Decree No. 65/2002. (VIII.9) the officially tuberculosis -free status of the herd have to be withdrawn if the presence of tuberculosis is confirmed by the isolation of *M. bovis* on laboratory examination.

The district chief veterinarian may initiate a procedure to withdraw the tuberculosis-free status of the herd, and the animal health and food control station may withdraw the status, if



- Â the conditions for retention of the officially free status are not complied with, or
- Â classical lesions of tuberculosis are seen at post-mortem examination,
- Â an epidemiological enquiry establishes the likelihood of infection,
- Â it is deemed necessary to control of bovine tuberculosis in the herd for any other reason.

### Notification system in place

Bovine tuberculosis is compulsory notifiable by virtue of the Veterinary Act No CLXXVI. of 2005, which replaced the Veterinary Act No XCI of 1995, from 1 September 2008 by the Decree No 113/2008 (VIII. 30.) of the Ministry of Agriculture and Rural Development (MARD) on notification of animal diseases. The detailed rules regarding bovine tuberculosis are laid down by the Decree No. 65/2002. (VIII.9) FVM of the Minister of Agriculture and Rural Development, which texts replaced the relevant parts of the Zoo-Sanitary Code implemented by the Decree No 41/1997. (V. 28.) FM of the Minister of Agriculture. As regards keeping and movements of the bovine animals the Zoosanitary Code is applied further. Before the 1st of July of 1997 the Decree No. 28/1981. (XII. 30.) MEM of the Minister of Agriculture and Alimentation contained the rules for the bovine tuberculosis and keeping or movements of the bovine animals. It is very important that the former legislative rules were essentially the same as the current ones.

### Results of the investigation

During the past consecutive eight years the rate of herds infected with bovine tuberculosis has never reached 0,1 % and at least 99,9% of herds have achieved officially tuberculosis free status each year during this period.

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

Hungary is free of bovine tuberculosis. However, sporadic cases are reported.



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
Sheep	NFC SO VDD	Suspect sampling		animal sample > lymph nodes	Domestic		Animal	2	0	0	0
Goats	NFC SO VDD	Suspect sampling		animal sample > lymph nodes	Domestic		Animal	17	4	0	0
Pigs	NFC SO VDD	Suspect sampling		animal sample > lymph nodes	Domestic		Animal	34	2	0	0
Badgers - wild	NFC SO VDD	Suspect sampling		animal sample > lymph nodes	Domestic		Animal	4	0	0	0
Deer - wild - red deer - Monitoring - active	NFC SO VDD	Convenience sampling		animal sample > lymph nodes	Domestic		Animal	42	7	0	0
Foxes - wild	NFC SO VDD	Suspect sampling		animal sample > lymph nodes	Domestic		Animal	15	4	0	0
Wild boars - wild - Monitoring - active	NFC SO VDD	Convenience sampling		animal sample > lymph nodes	Domestic		Animal	461	137	0	0

	Mycobacterium spp., unspecified	M. avium complex	M. avium complex - M. avium subsp. paratuberculosis	M. caprae
Sheep	0	0	0	0
Goats	3	0	1	0
Pigs	0	2	0	0



Table Tuberculosis in other animals

	Mycobacterium spp., unspecified	M. avium complex	M. avium complex - M. avium subsp. paratuberculosis	M. caprae
Badgers - wild	0	0	0	0
Deer - wild - red deer - Monitoring - active	3	4	0	0
Foxes - wild	2	1	0	1
Wild boars - wild - Monitoring - active	57	24	2	54



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			
Baranya	459	30392	457	99.56	1	.22	once a year	24547	193	74	2
Borsod-Abaúj-Zemplén	951	48808	950	99.89	1	.11	once a year	43540	2816	82	2
Budapest	33	1076	33	100	0	0	once a year	983	26	0	0
Bács-Kiskun	2156	75535	2156	100	0	0	once a year	61471	529	31	0
Békés	1565	67358	1565	100	0	0	once a year	57909	3118	6	0
Csongrád	1397	44210	1396	99.93	0	0	once a year	34421	1248	12	0
Fejér	524	48231	524	100	0	0	once a year	41294	3570	9	0
Győr-Moson-Sopron	841	54576	838	99.64	1	.12	once a year	52621	2912	70	1
Hajdú-Bihar	2395	105015	2393	99.92	2	.08	once a year	89601	1763	19	5
Heves	331	15707	331	100	0	0	once a year	13546	936	4	0
Jász-Nagykun-Szolnok	1405	60162	1405	100	0	0	once a year	46357	925	2	0
Komárom-Esztergom	291	14772	291	100	0	0	once a year	13418	554	10	0



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

Magyarország	17573	848338	17566	99.96	6	.03	once a year	745468	83744	466	13
Nógrád	350	18505	350	100	0	0	once a year	14725	283	0	0
Pest	1264	54499	1264	100	0	0	once a year	50355	9606	26	0
Somogy	540	37511	532	98.52	1	.19	once a year	35116	27560	95	3
Szabolcs-Szatmár-Bereg	1080	44737	1080	100	0	0	once a year	39015	2084	2	0
Tolna	478	26422	478	100	0	0	once a year	27785	5113	17	0
Vas	582	29749	582	100	0	0	once a year	27409	786	0	0
Veszprém	447	44838	447	100	0	0	once a year	38995	4493	7	0
Zala	484	26235	484	100	0	0	once a year	32360	15229	0	0
Total : <sup>1)</sup>	35146	1696676	35122	99.93	12	.03	N.A.	1490936	167488	932	26

**Comments:**<sup>1)</sup> N.A.**Footnote:**

Please note that the row "Total" IS NOT VALID as the numbers are exactly duplicated, because of the new row "Magyarország" (Hungary) that contains all the data of the regions.



## 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

Hungary is practically free of Brucellosis in bovine, ovine and caprine populations. For detailed information, please refer to the specific texts.



## 2.6.2 Brucellosis in humans

### A. Brucellosis in humans

#### Reporting system in place for the human cases

##### 1. Reporting system in place for the human cases:

There are around 80 communicable diseases notifiable in Hungary based on legal background. The physician (in primary health care, specialist care, inpatient medical institution or pathology) who first diagnoses a case of a notifiable communicable disease (even the suspicion of the disease!) immediately reports data of case to the first level of the epidemiological network (municipal institute) of National Public Health and Medical Officer's Service (NPHMOS). Data must be reported both at the beginning and at end of the illness (recovery/death, result of laboratory test). The NPHMOS has a nationwide electronic system for registering and analysing data of communicable diseases in a combined national database, so the system makes online connection amid the three levels (municipal, county and national level – National Centre of Epidemiology - NCE) of the organization. The NCE prepares reports regularly (weekly, monthly, yearly) to the Chief Medical Officer, the MoH and the Hungarian Central Statistical Office.

#### Case definition

Confirmed case: a clinically compatible case and the infection is laboratory confirmed.

#### Diagnostic/analytical methods used

A serological test (Widal type tube agglutination) is used to confirm the brucellosis diagnose in Hungary. The test preparation is a TTC stained *B. melitensis* biovar. abortus HNCMB 93007 strain (internationally used diagnostic strain). Result is positive: titre 1:80; uncertain: titre 1:40; negative titre between 1:20 - 1:10. The acute illness is confirmed by the increasing titre of paired sera.

#### Notification system in place

The disease has been notifiable since 1950 in Hungary. The physician reports data of case on a "case report form" by mail to the municipal institute of NPHMOS. The specialist of the institute records data immediately in the electronic system of the NPHMOS. Hungary has also a laboratory based surveillance system, and the NPHMOS has representative dataset from most of the microbiological laboratories about the cases investigated by the laboratory

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

The disease has been notifiable since 1950 in Hungary. The annual number of reported cases ranged between 0 – 132 (incidence: 0 – 1.3/100 000 inhabitants/year, median 21 case/year – 0.2/100 000 inhabitant/year). In the 1950s and 1960s the number of registered cases was about 40 – 60/year. The most cases were registered between 1970 and 1975 (110 – 135 cases/year – incidence: 1.1 – 1.3/100 000 inhabitant/year). Between 1976 and 1986 the number of registered cases decreased to 10 cases/year. 11 death cases occurred between 1950 and 1978. The case fatality rate ranged between 0 – 6.5% (median 0%).

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

There were five cases registered in 2000 - 2001 (2000: 1, 2001: 4 cases), no case was reported between 2002 and 2004, in 2006 and 2008, and only 1-1 case was identified in 2005 and 2007 in Hungary. (The data of laboratory surveillance: 2000 – 4 800 tests, 23 positive; 2001 - 4 900 tests, 30 positive; between 2002 and 2003: about 3 900 tests/year, 6 – 9 /year positive.) No death was registered in this period. One case in 2001 was imported from abroad, in the four other cases between 2000-2001 the place and source of infection could not be identified. Cases registered in 2005 and 2007 were imported cases. No domestic



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case was reported since then.



## 2.6.3 Brucella in animals

### A. Brucella abortus in bovine animals

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

##### The entire country free

The nationwide programme for eradication of bovine brucellosis in Hungary has successfully been completed by the 31st of August 1985. and the brucellosis free status of the country were declared to the OIE. Since then no evidence of the presence of infection in more than 0,2 % of our herds has been found.

#### Monitoring system

##### Sampling strategy

Together with the random blood sampling of the Hungarian cattle population, as well as case-by-case testing of animals moved from one herd to another, a system of checking abortions and irregular parturition has been maintained.

##### Frequency of the sampling

The whole cattle population in Hungary is subject to regular checks. Investigation of abortion and related cases is the key point of the system. Random, yearly serological testing is a complementary element. 10 % of cows in herds containing 50 or more animals shall be tested yearly, after calving. If necessary, the district veterinary officer is entitled to extend the testing to the whole herd.

Small herds are serologically tested every three years, linked to the EBL screening.

##### Type of specimen taken

Blood

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

Blood, milk and semen samples are taken at farm. In case of abortion, the aborted fetus, its chorions and a blood sample from the aborted cattle shall be sent to the laboratory.

##### Case definition

An animal is considered to be infected with *B. abortus*, when

- it shows clinical signs of the disease and pathological lesions can be detected on its internal organs or on its fetus or on the chorions; or
- bacteria of *B. abortus* could be isolated from its body fluids, its chorions or from the organs of the fetus, or
- it was suspected to be infected with *B. abortus* and the serological or bacteriological investigations were positive for that animal.

##### Diagnostic/analytical methods used

For the diagnosis of *B. abortus* the following diagnostic methods are used:

- pathology
- bacteriology
- immunology (CFT, ELISA, SAT)

##### Vaccination policy

Preventive vaccination against *B. abortus* is prohibited in the whole territory of Hungary.

##### Control program/mechanisms



#### Recent actions taken to control the zoonoses

Continuous monitoring of bovine herds and investigation of aborted fetuses as well as pre-movement checks are continued.

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

Infected male animals are

to be killed as soon as possible but not later than five days or,  
to be castrated and placed under movement prohibition until it is slaughtered.

Female animals must be placed under breeding prohibition and movement control. They must be slaughtered within 15 days after the acute period or the recovery after the abortion.

#### Notification system in place

Bovine brucellosis (*B. abortus*) is compulsorily notifiable by virtue of the Act on Food Chain Safety and its official control No XLVI of 2008 that is effective since 1 September 2008 and the Decree of the Minister of Agriculture No 12/2008 (II. 14.) on detailed rules of the protection regarding certain *Brucella* species.

Notification, as well as investigation of cases of abortion is compulsory. In case of abortion or irregular parturition, the veterinarian in charge has to send a set of samples, listed in the decree mentioned above, for further laboratory examination. Until thorough clarification of the case, the animal is kept separated and, if necessary, repeatedly tested.

#### Results of the investigation

Since 1985 no infection of *B. abortus* has been found.



## B. Brucella melitensis in goats

### Status as officially free of caprine brucellosis during the reporting year

#### The entire country free

Ovine and caprine brucellosis (*B. melitensis*) has been a compulsorily notifiable animal disease in Hungary since 1982. Further to the existing rules laid down in the Zoo-Sanitary Code, the recent legal provisions give the power to the Ministry of Agriculture to introduce any additional measures, should an outbreak of a disease caused by *B. melitensis* occur in our country.

Neither a single clinical case, nor any positive serological or bacteriological test result for *B. melitensis* has ever occurred in Hungary. The Commission Decision 93/52/EEC recognized Hungary's freedom from the disease.

### Monitoring system

#### Sampling strategy

Given, that *B. melitensis* is not an agent which can be spread under Hungary's geographical and climatic conditions, furthermore no sign of the disease has ever been revealed, there was no scientifically based reason for an extended serological survey. Since 2007, all caprine animals tested for *B. melitensis* were negative.

#### Frequency of the sampling

Approximately 5% of the caprine population is sampled and tested for *B. melitensis*.

#### Type of specimen taken

Blood

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

Blood samples are taken at farm.

#### Case definition

An animal is considered to be infected with *B. melitensis*, when

- it shows clinical signs of the disease and pathological lesions can be detected on its internal organs or on its fetus or on the chorions; or
- bacteria of *B. melitensis* could be isolated from its body fluids, its chorions or from the organs of the fetus, or
- it was suspected to be infected with *B. melitensis* and the serological or bacteriological investigations were positive for that animal.

#### Diagnostic/analytical methods used

For the diagnosis of *B. melitensis* in goats, the CFT is used.

### Vaccination policy

Vaccines for *B. melitensis* have never been registered in Hungary and the using of vaccines without the registration is banned in the country. Therefore no vaccination against this disease has ever been practised in the territory of Hungary.

### Control program/mechanisms

#### The control program/strategies in place

Hungary is free of *B. melitensis*. However, monitoring of ovine and caprine populations is continuously done.

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



In case of positive findings the positive animals have to be killed without delay. The herd containing the positive animal is subject to movement control. The further measures affecting the herd shall be decided following screening of the animals and epidemiological investigation.

#### Notification system in place

Ovine and caprine brucellosis (*B. melitensis*) are compulsorily notifiable by virtue of the Veterinary Act No CLXXVI. of 2005 (which replaced the Veterinary Act No XCI of 1995) and the Zoo-Sanitary Code implemented by the Decree No 41/1997. (V. 28.) FM of the Minister of Agriculture. These legal texts replaced the former regulations, namely Law Decree No 3. of 1981. and Decree No. 28/1981. (XII. 30.) MEM of the Minister of Agriculture and Alimentation, which have contained the same provisions for the diseases mentioned above. Therefore we can declare that ovine and caprine brucellosis is compulsory since 1 January 1982 on the basis of Decree No. 28/1981. (XII. 30.) MEM of the Minister of Agriculture and Alimentation.

#### Results of the investigation

No evidence of infection with *B. melitensis* was ever found.



## C. Brucella melitensis in sheep

### Status as officially free of ovine brucellosis during the reporting year

#### The entire country free

Ovine and caprine brucellosis (*B. melitensis*) has been a compulsorily notifiable animal disease in Hungary since 1982. Further to the existing rules laid down in the Zoo-Sanitary Code, the recent legal provisions give the power to the Ministry of Agriculture to introduce any additional measures, should an outbreak of a disease caused by *B. melitensis* occur in our country.

Neither a single clinical case, nor any positive serological or bacteriological test result for *B. melitensis* has ever occurred in Hungary. The Commission Decision 93/52/EEC recognized Hungary's freedom from the disease.

### Monitoring system

#### Sampling strategy

Given, that *B. melitensis* is not an agent which can be spread under Hungary's geographical and climatic conditions, furthermore no sign of the disease has ever been revealed, there was no scientifically based reason for an extended serological survey. However, between 1997 and 2000 a limited serological screening was carried out and all results were negative. Since 2001 an extended serological survey has been started to demonstrate the *B. melitensis* free status of Hungary. During 2001, 2002 and 2003 more than 10% of the ovine animals over six months of age were tested serologically for *B. melitensis* and all results were negative. All ovine animals tested for *B. melitensis* were negative.

#### Frequency of the sampling

Approximately 5% of the ovine population were tested.

#### Type of specimen taken

Blood

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

Blood samples are taken at farm.

#### Case definition

An animal is considered to be infected with *B. melitensis*, when

- it shows clinical signs of the disease and pathological lesions can be detected on its internal organs or on its fetus or on the chorions; or
- bacteria of *B. melitensis* could be isolated from its body fluids, its chorions or from the organs of the fetus, or
- it was suspected to be infected with *B. melitensis* and the serological or bacteriological investigations were positive for that animal.

#### Diagnostic/analytical methods used

For the diagnostic serological tests of *B. melitensis* the CFT is used.

### Vaccination policy

Vaccines for *B. melitensis* have never been registered in Hungary and the using of vaccines without the registration is banned in the country. Therefore no vaccination against this disease has ever been practised in the territory of Hungary.

### Control program/mechanisms

#### The control program/strategies in place

Hungary is free of *B. melitensis*. However, monitoring of ovine and caprine populations is continuously



done.

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

In case of positive findings the positive animals have to be killed without delay. The herd containing the positive animal is subject to movement control. The further measures affecting the herd shall be decided following screening of the animals and epidemiological investigation.

### Notification system in place

Ovine and caprine brucellosis (*B. melitensis*) are compulsorily notifiable by virtue of the Veterinary Act No CLXXVI. of 2005 (which replaced the Veterinary Act No XCI of 1995) and the Zoo-Sanitary Code implemented by the Decree No 41/1997. (V. 28.) FM of the Minister of Agriculture. These legal texts replaced the former regulations, namely Law Decree No 3. of 1981. and Decree No. 28/1981. (XII. 30.) MEM of the Minister of Agriculture and Alimentation, which have contained the same provisions for the diseases mentioned above. Therefore we can declare that ovine and caprine brucellosis is compulsory since 1 January 1982 on the basis of Decree No. 28/1981. (XII. 30.) MEM of the Minister of Agriculture and Alimentation.

### Results of the investigation

No evidence of infection with *B. melitensis* were found.



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 microbio logically	Number of animals positive microbio logically	Number of suspended herds
Baranya	58	15706	58	100	0	0	51	1223	0	0	0	0	0	0
Borsod-Abaúj-Zemplén	276	60429	276	100	0	0	149	2308	0	0	0	0	0	0
Bács-Kiskun	1194	154803	1194	100	0	0	270	8315	0	0	0	0	0	0
Békés	866	42447	866	100	0	0	125	1954	0	0	0	0	0	0
Csongrád	667	31774	667	100	0	0	134	1979	0	0	0	0	0	0
Fejér	252	36982	252	100	0	0	73	1849	0	0	0	0	0	0
Győr-Moson-Sopron	91	6916	91	100	0	0	14	328	0	0	0	0	0	0
Hajdú-Bihar	1319	122550	1319	100	0	0	379	9825	0	0	0	0	0	0
Heves	279	14834	279	100	0	0	78	864	0	0	0	0	0	0
Jász-Nagykun-Szolnok	689	43450	689	100	0	0	90	2099	0	0	0	0	0	0
Komárom-Esztergom	85	8744	85	100	0	0	17	422	0	0	0	0	0	0
Magyarország	7786	844361	7786	100	0	0	2420	47305	0	0	0	0	0	0
Nógrád	313	15016	313	100	0	0	44	838	0	0	0	0	0	0



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

Pest	223	40797	223	100	0	0	134	2697	0	0	0	0	0	0
Somogy	348	21800	348	100	0	0	18	912	0	0	0	0	0	0
Szabolcs-Szatmár-Bereg	659	139927	659	100	0	0	659	7240	0	0	0	0	0	0
Tolna	105	27897	105	100	0	0	61	1648	0	0	0	0	0	0
Vas	83	3337	83	100	0	0	5	133	0	0	0	0	0	0
Veszprém	166	46289	166	100	0	0	102	2181	0	0	0	0	0	0
Zala	113	10663	113	100	0	0	17	490	0	0	0	0	0	0
Total : <sup>1)</sup>	15572	1688722	15572	100	0	0	4840	94610	0	0	0	0	0	0

Comments:

<sup>1)</sup> N.A.

Footnote:

Please note that the row "Total" IS NOT VALID as the numbers are exactly duplicated, because of the new row "Magyarország" (Hungary) that contains all the data of the regions.



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.

Region	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 microbiologically	Number of animals positive microbiologically
																		Sero logically	BST		
Baranya	459	30392	459	100	0	0	321	10660	0	1	374	0	17	0	0	0	0	0	0	0	0
Borsod-Abaúj-Zemplén	951	48808	951	100	0	0	694	23909	0	2	645	0	50	0	0	0	0	0	0	0	0
Budapest	33	1076	33	100	0	0	28	495	0	0	0	0	3	0	0	0	0	0	0	0	0
Bács-Kiskun	2156	75535	2156	100	0	0	1657	26801	0	18	1128	0	70	0	0	0	0	0	0	0	0
Békés	1565	67358	1565	100	0	0	1565	25452	0	0	0	0	241	0	0	0	0	0	0	0	0
Csongrád	1397	44210	1397	100	0	0	801	17633	0	46	658	0	72	0	0	0	0	0	0	0	0
Fejér	524	48231	524	100	0	0	524	22625	0	9	2312	0	42	0	0	0	0	0	0	0	0
Győr-Moson-Sopron	841	54576	841	100	0	0	472	21571	0	10	1432	0	128	0	0	0	0	0	0	0	0
Hajdú-Bihar	2395	105015	2395	100	0	0	1804	49308	0	0	0	0	142	0	0	0	0	0	0	0	0
Heves	331	15707	331	100	0	0	331	8551	0	0	0	0	26	0	0	0	0	0	0	0	0
Jász-Nagykun-Szolnok	1405	60162	1404	99.93	0	0	898	25459	0	1	212	0	62	0	0	0	0	0	0	0	0
Komárom-Esztergom	291	14772	291	100	0	0	251	12016	0	2	632	0	31	0	0	0	0	0	0	0	0



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

Magyarország	17573	848338	17566	99.96	0	0	13806	373913	0	111	11989	0	1079	0	0	0	0	0	0	0
Nógrád	350	18505	350	100	0	0	328	8802	0	0	0	0	12	0	0	0	0	0	0	0
Pest	1264	54499	1264	100	0	0	1031	29159	0	7	3756	0	14	0	0	0	0	0	0	0
Somogy	540	37511	534	98.89	0	0	520	13338	0	0	0	0	27	0	0	0	0	0	0	0
Szabolcs-Szatmár-Bereg	1080	44737	1080	100	0	0	1080	18876	0	0	0	0	18	0	0	0	0	0	0	0
Tolna	478	26422	478	100	0	0	231	8705	0	15	840	0	15	0	0	0	0	0	0	0
Vas	582	29749	582	100	0	0	481	15159	0	0	0	0	25	0	0	0	0	0	0	0
Veszprém	447	44838	447	100	0	0	447	22616	0	0	0	0	69	0	0	0	0	0	0	0
Zala	484	26235	484	100	0	0	342	12778	0	0	0	0	15	0	0	0	0	0	0	0
Total : <sup>1)</sup>	35146	1696676	35132	99.96	0	0	27612	747826	0	222	23978	0	2158	0	0	0	0	0	0	0

Comments:

<sup>1)</sup> N.A.

Footnote:

Please note that the row "Total" IS NOT VALID as the numbers are exactly duplicated, because of the new row "Magyarország" (Hungary) that contains summarized of the regions.



## 2.7 YERSINIOSIS

### 2.7.1 General evaluation of the national situation

#### A. Yersinia enterocolitica general evaluation

##### Additional information

diagnostic methods: bacteriological examination and  
PCR



## 2.7.2 Yersiniosis in humans

### A. Yersiniosis in humans

#### Reporting system in place for the human cases

There are around 80 communicable diseases notifiable in Hungary based on legal background. The physician (in primary health care, specialist care, inpatient medical institution or pathology) who first diagnoses a case of a notifiable communicable disease (even the suspicion of the disease!) immediately reports data of case to the first level of the epidemiological network (municipal institute) of National Public Health and Medical Officer's Service (NPHMOS). Data must be reported both at the beginning and at end of the illness (recovery/death, result of laboratory test). The NPHMOS has a nationwide electronic system for registering and analysing data of communicable diseases in a combined national database, so the system makes online connection between the three levels (municipal, regional and national level – National Centre of Epidemiology - NCE) of the organization. The NCE prepares reports regularly (weekly, monthly, yearly) to the Chief Medical Officer, the MoH and the Hungarian Central Statistical Office.

#### Case definition

Confirmed case: a clinically compatible case when the *Yersinia* infection is laboratory confirmed.

#### Diagnostic/analytical methods used

*Yersinia* isolates are obtained by culturing the faeces samples of the patients on selective-differentiating media, which is followed by biochemical tests and serotyping. Earlier the sera of the patient was tested by Widal-typed method, beside this test the ELISA method has been also in use since 2003.

#### Notification system in place

Human cases have been notifiable since 1998. The physician reports data of case on a "case report form" by mail to the municipal institute of NPHMOS. The specialist of the institute records data immediately in the electronic system of the NPHMOS. Hungary has also a laboratory based surveillance system, and the NPHMOS has representative dataset from most of the microbiological laboratories about the laboratory investigated cases (since 2003 antibiotic resistances has also been reported from 20 county institutes and 12 laboratories from universities or hospitals).

The illness is reported firstly as enteritis infectiosa syndrome on the basis of the symptoms. Having the results of the laboratory tests this syndrome-based diagnose is modified to etiology-based diagnose. There is a part of the cases which are reported only subsequently when the result of the laboratory test is available.

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

The human cases have been notifiable since 1998. The number of cases varied between 68 – 176/year (incidence: 0,7 – 1,7/100 000 inhabitant/year, median 125 cases/year - 1,3/100 000 inhabitant/year). There was no death registered. A few number of family outbreaks were investigated, community or institutional outbreaks did not occur. Laboratory or epidemiological evidences are not available to assess the source of infection.

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

Yersiniosis do not influence significantly the epidemiological situation of the human acut gastroenteritis caused by zoonotic agents. Between 2000 -2004 the dominant serotype is *Y.enterocolitica* O3. It is confirmed also by the results of culture and serologic methods.







## 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) - Clinical investigations <sup>1)</sup>	NFC SO VDD	Unspecified	Not applicable	animal sample > organ/tissue		Animal	1	0	0	0	0
Mouflons - wild - Natural habitat - Unspecified	NFC SO VDD	Unspecified	Not applicable	animal sample > organ/tissue	Domestic	Animal	12	0	0	0	0
Pigs - breeding animals - unspecified - Slaughterhouse - Unspecified	NFC SO VDD	Unspecified		animal sample > organ/tissue		Animal	20	1	1	0	0
Wild ducks - Natural habitat - Clinical investigations (Bucephala clangula)	NFC SO VDD	Unspecified	Not applicable	animal sample > organ/tissue	Domestic	Animal	1	1	0	1	0

	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified
Cattle (bovine animals) - Clinical investigations <sup>1)</sup>	0	0	0
Mouflons - wild - Natural habitat - Unspecified	0	0	0
Pigs - breeding animals - unspecified - Slaughterhouse - Unspecified	0	0	1
Wild ducks - Natural habitat - Clinical investigations (Bucephala clangula)	0	0	0



Table Yersinia in animals

Comments:

<sup>1)</sup> foetus, uterus, lymphonodes

Footnote:

The duck's and the mouflons' samples sent in to the laboratory were whole dead bodies.  
Whole bodies were sent in in the case of pigs too.



## 2.8 TRICHINELLOSIS

### 2.8.1 General evaluation of the national situation

#### A. Trichinellosis general evaluation

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

In Hungary, mandatory testing for *Trichinella* spp. is in place since 1960. Slaughtered susceptible animals intended to be placed on the market are subject to mandatory testing for *Trichinella* spp.

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

Trichinellosis was a significant zoonotic disease in Hungary in the 1950s and 1960s. Due to the introduction of control strategies, the average annual incidence of trichinellosis decreased to 0-0.7 cases per 100,000 for the early 1990s. In the past 15 years, the annual incidence dropped to 0-0.07 cases per 100,000, and no mortality in men caused by the parasite was observed in the same period. The decrease of incidence observed in men is similar to that of prevalence seen in swine at slaughterhouses.

Nevertheless, some increasing trends of incidence might be observed in both men and swine in the past years. *Trichinella spiralis* still persists in the southern and eastern border region of the country. Sporadic *Trichinella* infections (in average few cases per year) were also detected in wild boars and in less than 1.8% of red foxes. In wild boars, both *T. spiralis* and *Trichinella britovi* were detected. In foxes, *Trichinella britovi* is the dominant species; nevertheless, *Trichinella spiralis* and *Trichinella pseudospiralis* were also reported from this species.

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

Mandatory testing during meat inspection in all susceptible cases (swine, horse, nutria, wild boar).



## 2.8.2 Trichinellosis in humans

### A. Trichinellosis in humans

#### Reporting system in place for the human cases

There are about 80 communicable diseases notifiable in Hungary based on legal background. The physician (in primary health care, specialist care, inpatient medical institution or pathology) who first diagnoses a case of a notifiable communicable disease (even the suspicion of the disease!) immediately reports data of case to the first level of the epidemiological network (municipal institute) of National Public Health and Medical Officer's Service (NPHMOS). Data must be reported both at the beginning and at end of the illness (recovery/death, result of laboratory test). The NPHMOS has a nationwide electronic system for registering and analysing data of communicable diseases in a combined national database, so the system provides online connection between the three levels (municipal, regional and national level – National Centre of Epidemiology - NCE) of the organization. The NCE prepares reports regularly (weekly, monthly, yearly) to the Chief Medical Officer, the MoH and the Hungarian Central Statistical Office.

#### Case definition

Confirmed case: a clinically compatible case when the *Trichinella* infection is laboratory confirmed.

Probable case: a clinically compatible case that is not confirmed by laboratory investigation, but it has an epidemiological link to a confirmed trichinellosis outbreak.

#### Diagnostic/analytical methods used

Microprecipitic test on live larvae as diagnostic method has been used since 1983 in the Helminthozoonotic Reference Laboratory of the National Centre of Epidemiology. Parallel with this test an ELISA test (NOVATEC TRICHINELLA SPIRALIS IgG-ELISA, NovaTec Immundiagnostica, Germany) was introduced in 2002. The positive results of the previously mentioned tests have been confirmed by WB (TRICHINELLA WESTERN BLOT IgG, Ldbio Diagnostics, France) since 2004.

#### Notification system in place

Human cases have been notifiable since 1960. The physician reports data of case on a "case report form" by mail to the municipal institute of NPHMOS. The specialist of the institute records data immediately in the electronic system of the NPHMOS.

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

Human cases have been notifiable since 1960. The number of cases varied between 0 – 121 (incidence 0 – 1,2/100 000 inhabitants/year – the highest one was registered in 1964). Between 1960 and 2004 the 85% of cases had epidemiological link to an outbreak. Only one death case has been registered during the Hungarian history of trichinellosis.

Between 1960 and 1975 the swine were the source of infection in 18 outbreaks (83% of all outbreaks) and wild boar in 17% of outbreaks. The significance of swine as the source of infection decreased between 1976 and 1995: 3 outbreaks (23%) were caused by swine, and 10 outbreaks (77%) were associated with consumption of wild boar meat. (Indigenous swine were the source of two outbreaks in 1978 and 1990, and swine imported from Romania and processed at home were the source of one outbreak in 1995).

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

In the last ten years the number of reported cases ranged between 0 – 7/year (incidence 0 – 0,07/100 000 inhabitants/year), there was no death in this period. All cases linked to family outbreaks and most of sporadic cases were imported from the neighbouring counties. The indigenous cases were linked to the



consumption of indigenous wild boar meat. All human cases were caused by *T.spiralis*.



## 2.8.3 Trichinella in animals

### A. Trichinella in pigs

#### Monitoring system

##### Sampling strategy

Trichinella sampling and testing is mandatory for all pigs intended to be placed on the market.

##### Frequency of the sampling

Every slaughtered animal is sampled

##### Type of specimen taken

Diaphragm muscle

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

Methods specified in Regulation 2075/2005/EC

##### Case definition

Animal with one or more Trichinella larva in the official examination.

##### Diagnostic/analytical methods used

Artificial digestion method of collective samples.

#### Vaccination policy

None.

#### Control program/mechanisms

The control program/strategies in place

See above.

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

Positive cases are considered not to be eligible for human consumption.

#### Results of the investigation

All slaughtered swine are investigated. There was no positive finding for Trichinella.



## B. Trichinella in horses

### Monitoring system

#### Sampling strategy

Trichinella testing is mandatory, all animal is sampled.

#### Frequency of the sampling

Every slaughtered animal is sampled

#### Type of specimen taken

Diaphragm muscle

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

2075/2005/EC regulation

#### Case definition

Animal with one or more Trichinella larva in the official examination

#### Diagnostic/analytical methods used

Artificial digestion method of collective samples

### Vaccination policy

None.

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

Positive cases are considered not to be eligible for human consumption.

### Results of the investigation

All the slaughtered horses (as all other susceptible animals) are investigated. There was no positive finding for trichinella.

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

Trichinella infection has never been detected in horses in Hungary.



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	Veterinary Diagnostic Directorate	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	4025314	0	0	0	0
Solipeds, domestic - horses - Slaughterhouse - Surveillance	VDD	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	1116	0	0	0	0
Wild boars - wild - Surveillance	VDD	Census	Official sampling	animal sample > organ/tissue	Domestic	Animal	57618	11	1	1	9
Foxes - wild	VDD	Objective sampling	Official sampling	animal sample > organ/tissue	Domestic	Animal	575	17	4	6	7
Jackals - wild	VDD	Objective sampling	Official sampling	animal sample > organ/tissue	Domestic	Animal	18	1	1	0	0
Rats - wild - Monitoring	VDD	Unspecified	Official sampling	animal sample > organ/tissue	Domestic	Animal	1	0	0	0	0
Rodents - wild - Monitoring	VDD	Unspecified	Official sampling	animal sample > organ/tissue	Domestic	Animal	1	0	0	0	0



## 2.9 ECHINOCOCCOSIS

### 2.9.1 General evaluation of the national situation

#### A. Echinococcus spp. general evaluation

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

###### *Echinococcus granulosus*

Cystic echinococcosis caused by *E. granulosus* was a significant zoonosis in Hungary in the 1960s and 1970s. Due to the introduction of integrated control strategies, the average annual incidence of human cystic echinococcosis decreased to 0.08-0.2 case per 100,000 population for the early 1990s. The decrease of incidence observed in man is almost parallel with that of overall prevalence seen in swine, sheep and cattle at slaughterhouses.

*Echinococcus multilocularis* was not detected in man or animals in Hungary until 2002.

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

###### *Echinococcus granulosus*

In the past decade, the annual incidence was 0.05-0.1 case per 100,000 human population. The prevalence was under 0.2% in sheep, cattle and swine at slaughterhouses. Genotype identification of slaughterhouse isolates was initiated in 2010.

###### *Echinococcus multilocularis*

*E. multilocularis* was first detected in red foxes (*Vulpes vulpes*) in Hungary in the northern border area in 2002. Between 2002 and 2004, the parasite was described in 7 northern counties with low overall prevalence (8.7%) in foxes. In the study carried out in 2009, *E. multilocularis* was detected in foxes of 16 out of the 19 Hungarian counties and in the suburban areas of the capital, Budapest. The prevalence of infection was significantly higher in the north-western half (16.2%) than in the south-eastern half (4.2%) of the country. The multi-locus microsatellite analysis of the isolates indicate that Hungary should be considered as a peripheral area of a single European focus, where the dispersal movement of foxes resulted in the spreading of *E. multilocularis* within a time period short enough to avoid a substantial genetic drift.



## 2.9.2 Echinococcosis in humans

### A. Echinococcus spp. in humans

#### Reporting system in place for the human cases

There are about 80 communicable diseases notifiable in Hungary based on legal background. The physician (in primary health care, specialist care, inpatient medical institution or pathology) who first diagnoses a case of a notifiable communicable disease (even the suspicion of the disease!) immediately reports data of case to the first level of the epidemiological network (municipal institute) of National Public Health and Medical Officer's Service (NPHMOS). Data must be reported both at the beginning and at end of the illness (recovery/death, result of laboratory test). The NPHMOS has a nationwide electronic system for registering and analysing data of communicable diseases in a combined national database, so the system provides online connection amid the three levels (municipal, regional and national level – National Centre of Epidemiology - NCE) of the organization. The NCE prepares reports regularly (weekly, monthly, yearly) to the Chief Medical Officer, the MoH and the Hungarian Central Statistical Office.

#### Case definition

Confirmed case: a clinically compatible case when the Echinococcus infection is laboratory confirmed

#### Diagnostic/analytical methods used

The punctatum originated from cyst or sample from extracted cyst is investigated by microscopic methods. IHA (CELLOGNOST ECHINOCOCCOSIS for IHA, Dade Behring, Germany) and ELISA (HYDATIDOSIS ELISA IgG, Vircell, Spain) screening methods have been used parallel since 2002 in the Helminthozoonoses Reference Laboratory in 'Johan Béla' National Centre for Epidemiology. The positive results are confirmed by Western blot method (WB) (ECHINOCOCCUS WESTERN BLOT IgG, Ldbio Diagnostics, France).

#### Notification system in place

The disease has been notifiable since 1950 in Hungary. The physician reports data of case on a "case report form" by mail to the municipal institute of NPHMOS. The specialist of the institute records data immediately in the electronic system of the NPHMOS.

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

Complement-fixed test has been used since 1934 in Hungary to identify the presence of anti-Echinococcus antibody titre. The human cases have been notifiable since 1960. The „home made” indirect hemagglutination (IHA) was introduced in 1985, and the „home made” ELISA method in 1987. The number of registered cases ranged between 0 – 18 /year (more than 10 cases registered in the 1980s only), the incidence varied between 0 – 0.2 cases/100 000 inhabitants/year. There were 0 – 4 death cases reported yearly (the median of case fatality rate: 20%). Since 1991 there has not been any death case with this diagnosis.

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

The number of annually reported cases varied between 5 and 13 in the last five years, there was no death registered. All the reported cases were caused by *E. granulosus* confirmed in the reference laboratory by Western immunoblot method. In Hungary, autochthonous human case has not been identified as *E. multilocularis* infection.



## 2.9.3 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
Cattle (bovine animals) - Slaughterhouse - Surveillance	VDD	Unspecified	Official sampling	animal sample > organ/tissue	Domestic	Animal		524	0	0	0
Sheep - Slaughterhouse - Surveillance	VDD	Unspecified	Official sampling	animal sample > organ/tissue	Domestic	Animal		384	2	0	0
Goats - Slaughterhouse - Surveillance	VDD	Unspecified	Official sampling	animal sample > organ/tissue	Domestic	Animal		71	0	0	0
Pigs - Slaughterhouse - Surveillance	VDD	Unspecified	Official sampling	animal sample > organ/tissue	Domestic	Animal		1144	1	0	0
Solipeds, domestic - horses - Slaughterhouse - Surveillance	VDD	Unspecified	Official sampling	animal sample > organ/tissue	Domestic	Animal		24	0	0	0
Foxes - wild	VDD	Objective sampling	Not applicable	animal sample > organ/tissue	Domestic	Animal		365	17	17	0
Jackals - wild	VDD	Objective sampling	Not applicable	animal sample > organ/tissue	Domestic	Animal		16	1	1	0
	Echinococcus spp., unspecified										
Cattle (bovine animals) - Slaughterhouse - Surveillance	0										



Table Echinococcus in animals

	Echinococcus spp., unspecified
Sheep - Slaughterhouse - Surveillance	2
Goats - Slaughterhouse - Surveillance	0
Pigs - Slaughterhouse - Surveillance	1
Solipeds, domestic - horses - Slaughterhouse - Surveillance	0
Foxes - wild	0
Jackals - wild	0

Footnote:

VDD = Veterinary Diagnostic Directorate



## 2.10 TOXOPLASMOSIS

### 2.10.1 General evaluation of the national situation

### 2.10.2 Toxoplasmosis in humans

#### A. Toxoplasmosis in humans

##### Reporting system in place for the human cases

There are around 80 communicable diseases notifiable in Hungary based on legal background. The physician (in primary health care, specialist care, inpatient medical institution or pathology) who first diagnoses a case of a notifiable communicable disease (even the suspicion of the disease!) immediately reports data of case to the first level of the epidemiological network (municipal institute) of National Public Health and Medical Officer's Service (NPHMOS). Data must be reported both at the beginning and at end of the illness (recovery/death, result of laboratory test). The NPHMOS has a nationwide electronic system for registering and analysing data of communicable diseases in a combined national database, so the system makes online connection amid the three levels (municipal, regional and national level – National Centre of Epidemiology - NCE) of the organization. The NCE prepares reports regularly (weekly, monthly, yearly) to the Chief Medical Officer, the MoH and the Hungarian Central Statistical Office.

##### Case definition

Confirmed case: a clinically compatible case when the Toxoplasma infection is laboratory confirmed.

##### Diagnostic/analytical methods used

The anti-Toxoplasma ELISA IgG and IgM methods (TOXONOSTIKA IgG, TOXONOSTIKA IgM, Organon Teknika, Hollandia) are used in the everyday diagnostic work since 1986 in Hungary. Today the specific anti-Toxoplasma IgG (PLATELIA® Toxo IgG, Bio-Rad, France), IgM (PLATELIA® Toxo IgM, Bio-Rad, France), IgA ELISA-t (PLATELIA® Toxo IgA, Bio-Rad, France), IgG avidity identification (VIDAS, BioMérieux S/A, France) is used to test for the anti-Toxoplasma serologic profile.

The PCR method (classical: PRODECT TOXO B1, Bioanalisi Centro Sud s.n.c., Italy; and the light cyclor method: LIGHTCYCLER FASTSTART DNA MASTERPLUS HYBRIDIZATION PROBES, Roche (Hungary) Ltd.), further the IgG/IgM Western blot test comparing the immunprofile of mother and child (TOXOPLASMA WESTERN BLOT IgG/IgM, Ldbio Diagnostics, France) are applied. For quality assurance purposes the Toxoplasma Reference Laboratory participate twice in a year in proficiency test, and the Reference Laboratory also organise proficiency tests for laboratory of NPHMOS.

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

Anti-Toxoplasma antibody assay (Sabin-Feldman dye test) has been in use since 1958 in Hungary. The human cases have been notifiable since 1967. The „home made” complement-fixed assay and indirect hemagglutination methods (IHA) were introduced in 1969.

The annual number of registered cases ranged between 0 – 333 (median: 136 case/year), so the incidence varied 0 – 3.1/100 000 inhabitants/year (median 1.3/100 000/year). Between 1970 and 1985 the highest number of death cases reported was 1 – 5 deaths/year (max. case fatality rate 10%). Only two death cases occurred between 1985 and 2004.

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



The number of annually registered cases ranged between 292 - 107 /year (incidence 2,9 – 1,1/100 000 inhabitant/year – median 1,8/100 000 inhabitant/year), the trend of the incidence is decreasing. There was no death registered in this period. It was a seroprevalence survey performed by Helminthozoonotic Reference Laboratory of National Centre for Epidemiology in 2001. 6 985 persons without signs or symptoms were tested by serologic method for the presence of Toxoplasma antibodies. The proportion of positive persons ranged between 22,8% - 41,3% by county. The proportion of positive persons was 75% among pupils aged more than 60 years.



## 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

At the beginning of the twentieth century, rabies predominantly occurred in Hungary in its urban form and was transmitted to humans mainly by dogs. Therefore, in the 1930's strict animal health regulations were introduced, the main elements of these remained unchanged till recent days. These measures included nationwide mandatory regular vaccination of dogs over three months of age.

During World War II, epidemiological actions were hindered, which resulted in a re-emergence of urban rabies in 1946-47.

The re-introduction of regulatory measures as well as mandatory preventive vaccination, urban rabies seems to be sporadic in Hungary. The register of the annual vaccination of dogs show that around 1.5 Million of dogs are vaccinated every year.

In recent days, together with the disappearing of rabies from dogs, rabies in cats is considered to be of high importance. Preventive vaccination of cats against rabies is recommended but not mandatory and special epidemiological aspects are to be considered. (The movement of animals is hard to control and there is a relative large number of semi-wild living animals of this species.)

Sylvatic rabies reached the North-Eastern part of Hungary in the year 1954. Until 1966 cases remained sporadic (a total of 97 foxes, 16 badgers and wild cats confirmed positive for rabies). In the same timeframe, 35 dogs and 96 domestic cats were confirmed positive for the disease.

In 1967, sylvatic rabies crossed the Danube and by 1971 the whole country was infected. At this time, intensive attempts were executed in order to lower the number of foxes, with minimum results. These actions were suspended in 1987.

Between 1988 and 1996 around 1000 rabies cases in foxes were diagnosed per year. Oral vaccination of foxes was introduced in Hungary in 1992. From that year, the rabies cases in foxes decreased year by year, as the vaccination zone was extended from the western part of the country to the whole territory of Hungary. From 1988, rabies cases in foxes decreased by 90%.

The efficacy of the oral immunization of foxes can be demonstrated by the considerable decrease of rabies cases in the country. During the recent years the number of the detected positive cases remained under ten cases. In the calendar years 2005 only 9, in 2006 only 3, in 2007 only 4, in 2008 only 7 and in 2009 only 2 positive cases could be detected for the whole territory of the country. In 2010 fox rabies cases happened in Hungary: from this 6 cases in county Csongrád (close to the border of the country) and 1 dog in the same county, 1 case in county Hajdú-Bihar, 2 cases in county Szabolcs-Szatmár-Bereg. In 2011 two(2) rabies cases in bats were proved. In 2012 one (1) rabies case was confirmed in bat.

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

After a period of lack of rabies cases, in the autumn of 2013 24 cases were diagnosed, mainly in foxes. Therefore the oral vaccination of foxes is continued in a defined part of the country.

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

In order to eradicate rabies from Hungary and to protect public health, regulatory measures on domestic animals are in place. Regular preventive vaccination of dogs is mandatory two times between 3 months of age and under 1 year of age with monovalent vaccine. Later repeated annually. Stray dogs are removed from public areas and are vaccinated against the disease. Oral vaccination of foxes is done in a part of Hungary's territory.







## 2.11.2 Rabies in humans

### A. Rabies in humans

#### Reporting system in place for the human cases

There are around 80 communicable diseases notifiable in Hungary based on legal background. The physician (in primary health care, specialist care, inpatient medical institution or pathology) who first diagnoses a case of a notifiable communicable disease (even the suspicion of the disease!) immediately reports data of case to the first level of the epidemiological network (municipal institute) of National Public Health and Medical Officer's Service (NPHMOS). The suspicion of the human lyssa is obligatory to be reported immediately also by telephone. Data must be reported both at the beginning and at end of the illness (recovery/death, result of laboratory test). The NPHMOS has a nationwide electronic system for registering and analysing data of communicable diseases in a combined national database, so the system provides online connection between the three levels (municipal, regional and national level – National Centre of Epidemiology - NCE) of the organization. The NCE prepares reports regularly (weekly, monthly, yearly) to the Chief Medical Officer, the MoH and the Hungarian Central Statistical Office.

#### Case definition

Confirmed case: Clinical picture compatible with human lyssa and the antigen/genetic material/specific antibodies are identified or viruses have been isolated from appropriate sample.

Suspected case: Clinical picture compatible with human lyssa and the patient has anamnestic data about exposure by a rabies suspected animal

#### Diagnostic/analytical methods used

The identification of the virus in vivo from cornea imprint of the patient by immunofluorescence method, or to determine the specific antibody titre of the blood or liquor by immunofluorescence method during the second week of the illness. Post mortem: detection of the Negri-body in the brain tissue, or the antigen by immunofluorescence method, or identification of the viral genetic material by PCR, or isolation of the virus in mouse.

#### Notification system in place

Human cases have been notifiable since 1950 in Hungary, injury suspected to lyssa-infection has been notifiable since 1964. The physician reports data of case on a "case report form" by mail to the municipal institute of NPHMOS. The suspicion of the human lyssa is obligatory to be reported immediately also by telephone. The specialist of the institute records data immediately in the electronic system of the NPHMOS.

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

Human cases have been notifiable since 1950 in Hungary, injury suspect to human lyssa-infection has been notifiable since 1964. 8 human lyssa cases have been reported since 1950 in Hungary. Seven cases were indigenous; only one case was presumably imported from Africa. Cat was the source of infection in four of the cases, fox in two cases, and one case was caused by a dog. The origin of the imported case remained unknown. The vaccine based on brain-extract was used for post exposure prophylaxis in Hungary until 1989. Since then the cell cultured vaccine has been used. The change in the vaccine used and not in the epidemiological situation of lyssa is reflected in the statistics of vaccinated persons (1985 – 1988.: 2000 – 3000 person vaccinated/year, 1994 – 1998. 8000 – 10 500/year, 1999 - 2003.: 9 500 – 11 000/year).

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



No human lyssa case has been registered since 1994 in Hungary.



### 2.11.3 Lyssavirus (rabies) in animals

#### A. Rabies in dogs

##### Vaccination policy

Obligatory vaccination of dogs, once a year.

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

There were no positive cases since 2010 (in dogs) .

##### Notification system in place

Notifiable disease.



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
Cattle (bovine animals)	NFC SO VDD	Unspecified		animal sample		Animal		26	2	2	0
Sheep	NFC SO VDD	Unspecified		animal sample		Animal		21	0	0	0
Goats	NFC SO VDD	Unspecified		animal sample		Animal		5	0	0	0
Foxes - wild - Monitoring	NFC SO VDD	Objective sampling		animal sample		Animal		1799	2	2	0
Bats - wild - Unknown - Clinical investigations	NFC SO VDD	Suspect sampling		animal sample		Animal		3	0	0	0
Bats - zoo animal - Zoo - Unspecified	NFC SO VDD	Unspecified		animal sample		Animal		10	0	0	0
Cats	NFC SO VDD	Unspecified		animal sample		Animal		350	0	0	0
Deer - wild - red deer - Unspecified	NFC SO VDD	Suspect sampling		animal sample		Animal		17	0	0	0
Dogs	NFC SO VDD	Unspecified		animal sample		Animal		240	0	0	0
Foxes - wild - Monitoring - passive	NFC SO VDD	Suspect sampling		animal sample		Animal		1382	20	20	0
Jackals - wild	NFC SO VDD	Suspect sampling		animal sample		Animal		27	0	0	0

	EBLV-2	Lyssavirus (unspecified virus)
Cattle (bovine animals)	0	0
Sheep	0	0
Goats	0	0



Table Rabies in animals

	EBLV-2	Lyssavirus (unspecified virus)
Foxes - wild - Monitoring	0	0
Bats - wild - Unknown - Clinical investigations	0	0
Bats - zoo animal - Zoo - Unspecified	0	0
Cats	0	0
Deer - wild - red deer - Unspecified	0	0
Dogs	0	0
Foxes - wild - Monitoring - passive	0	0
Jackals - wild	0	0



## 2.12 STAPHYLOCOCCUS INFECTION

### 2.12.1 General evaluation of the national situation

### 2.12.2 Staphylococcus in animals

Table Staphylococcus in Animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Staphylococcus	S. aureus, meticillin resistant (MRSA)	S. aureus, meticillin resistant (MRSA) - spa-type t011
Gallus gallus (fowl) - unspecified	NFC SO VDD	Unspecified	Not applicable	animal sample		Animal		79	68	0	0
Pigs - unspecified	NFC SO VDD	Unspecified	Not applicable	animal sample		Animal		7	3	0	0
Sheep	NFC SO VDD	Unspecified	Not applicable	animal sample		Animal		3	2	0	0
Turkeys - unspecified	NFC SO VDD	Unspecified	Not applicable	animal sample		Animal		148	101	0	0

  

	S. aureus, meticillin resistant (MRSA) - spa-type t108	S. aureus, meticillin resistant (MRSA) - spa-type t034	S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	S. aureus
Gallus gallus (fowl) - unspecified	0	0	0	68
Pigs - unspecified	0	0	0	3
Sheep	0	0	0	2
Turkeys - unspecified	0	0	0	101



Table Staphylococcus in Animals

Footnote:  
None of S. aureus was MRSA.



## 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

In May 2013 a human Q fever epidemic occurred in Baranya county. The investigation carried out in cooperation of the human and animal health authorities identified as possible source of the disease a sheep farm. During the investigation 1379 tests were carried out from samples taken in sheep, goat and cattle farms in the area around the farm. 72 bovine, 1 caprine and 34 ovine samples were positive.

##### Additional information

Diagnostic methods : Complement fixation test (CFT) and  
immunohistochemical test



## 2.13.2 Coxiella (Q-fever) in animals

Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii	No of clinically affected herds
Cattle (bovine animals) - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > blood	Domestic	PCR	Animal	55	0	0	0
Cattle (bovine animals) - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > blood	Domestic	Immuno Histo Chemistry (IHC)	Animal	5	0	0	0
Cattle (bovine animals) - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > blood	Domestic	Isolation (Cell, Egg, Mouse)	Animal	13	0	0	0
Cattle (bovine animals) - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > milk	Domestic	PCR	Animal	86	4	4	0
Cattle (bovine animals) - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > blood	Domestic	Complement fixation test (CFT)	Animal	542	53	53	0
Cattle (bovine animals) - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > blood	Domestic	ELISA	Animal	103	35	35	0
Cattle (bovine animals) - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > faeces	Domestic	PCR	Animal	55	0	0	0
Sheep and goats - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > blood	Domestic	Complement fixation test (CFT)	Animal	298	19	19	0
Sheep and goats - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > blood	Domestic	PCR	Animal	59	0	0	0
Sheep and goats - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample	Domestic	Immuno Histo Chemistry (IHC)	Animal	3	0	0	0



Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Analytical Method	Sampling unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii	No of clinically affected herds
Sheep and goats - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > blood	Domestic	ELISA	Animal	128	31	31	0
Sheep and goats - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	environmental sample > dust	Domestic	PCR	Holding	161	112	112	0
Sheep and goats - Farm - Unspecified	NFC SO VDD	Suspect sampling	Official sampling	animal sample > milk	Domestic	PCR	Animal	33	4	4	0

Footnote:

Both animal and environmental samples were taken.

In the column "Total units positive for Q-fever" all the units positive are shown, although a part of them originate from the same sample (to be tested with different analytical methods). 107 animals were positive, 72 bovine, 1 caprine and 34 ovine.



## 2.14 WEST NILE VIRUS INFECTIONS

### 2.14.1 General evaluation of the national situation

### 2.14.2 West Nile Virus in animals

#### A. West Nile Virus in Animals

##### Vaccination policy

In case of equine animals vaccination for West Nile Virus is on a voluntary basis.

##### Notification system in place

In case of animals West Nile Virus is not a notifiable disease.

##### Additional information

In 2004 goshawks in Hungary (*Accipiter gentilis*) showed symptoms of lethal encephalitis. West Nile virus nucleic acid and antigens were detected in the brain of the animals. The complete genome analysis indicated that the strain belonged to the lineage 2 of WNV. The same lineage was detected in 2005 in four goshawks and one sparrowhawk. Furthermore in 2007 the virus was detected in geese and in red-footed falcons as well. The first human case was confirmed in 2008.



Table West Nile Virus in Animals

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Vaccination status	Analytical Method	Sampling unit	Region	Units tested	Total units positive for West Nile Virus
Corvids, unspecified - wild - Natural habitat	NFC SO VDD	Suspect sampling	Not applicable	animal sample > blood	Domestic			Animal		1	1
Eagle - wild - Natural habitat	NFC SO VDD	Suspect sampling	Not applicable	animal sample > blood	Domestic		Immuno Histo Chemistry (IHC)	Animal		1	0
Falcons - wild - Natural habitat	NFC SO VDD	Suspect sampling	Not applicable	animal sample > blood	Domestic			Animal		4	1
Geese - unspecified - Farm	NFC SO VDD	Suspect sampling	Not applicable	animal sample > brain	Domestic		PCR	Animal		1	0
Owls - zoo animals - Zoo	NFC SO VDD	Suspect sampling	Not applicable	animal sample > brain	Domestic			Animal		1	1
Passeriformes, unspecified - wild - Natural habitat	NFC SO VDD	Suspect sampling	Not applicable	animal sample > blood	Domestic		Immuno Histo Chemistry (IHC)	Animal		2	0
Penguin - zoo animals - Zoo	NFC SO VDD	Suspect sampling	Not applicable	animal sample	Domestic		Immuno Histo Chemistry (IHC)	Animal		1	0
Solipeds, domestic - donkeys - Farm	NFC SO VDD	Suspect sampling	Not applicable	animal sample > blood	Domestic		ELISA	Animal		1	0
Solipeds, domestic - horses - Farm	NFC SO VDD	Suspect sampling	Not applicable	animal sample > blood	Domestic			Animal		25	1



### 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

Table Antimicrobial susceptibility testing of E. coli in Meat from bovine animals

Escherichia coli, non-pathogenic  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	E.coli, non-pathogenic, unspecified	
	yes	
	23	
Antimicrobials:	N	n
Aminoglycosides - Gentamicin	23	0
Aminoglycosides - Streptomycin	23	6
Amphenicols - Chloramphenicol	23	4
Cephalosporins - 3rd generation cephalosporins	23	0
Fluoroquinolones - Ciprofloxacin	23	0
Penicillins - Ampicillin	23	10
Quinolones - Nalidixic acid	23	0
Sulfonamides	23	6
Tetracyclines - Tetracycline	23	8
Trimethoprim	23	2
Fully sensitive	23	11
Resistant to 1 antimicrobial	23	3
Resistant to 2 antimicrobials	23	3



Table Antimicrobial susceptibility testing of E. coli in Meat from bovine animals

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
	yes	
	23	
	N	n
Antimicrobials:		
Resistant to 3 antimicrobials	23	1
Resistant to 4 antimicrobials	23	2
Resistant to >4 antimicrobials	23	3



Table Antimicrobial susceptibility testing of *E. coli* in Meat from pig

Escherichia coli, non-pathogenic  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	E.coli, non-pathogenic, unspecified	
	yes	
	12	
Antimicrobials:	N	n
Aminoglycosides - Gentamicin	12	0
Aminoglycosides - Streptomycin	12	3
Amphenicols - Chloramphenicol	12	2
Cephalosporins - 3rd generation cephalosporins	12	0
Fluoroquinolones - Ciprofloxacin	12	3
Penicillins - Ampicillin	12	6
Quinolones - Nalidixic acid	12	1
Sulfonamides	12	3
Tetracyclines - Tetracycline	12	6
Trimethoprim	12	5
Fully sensitive	12	4
Resistant to 1 antimicrobial	12	1
Resistant to 2 antimicrobials	12	1
Resistant to 3 antimicrobials	12	2
Resistant to 4 antimicrobials	12	1
Resistant to >4 antimicrobials	12	3



Table Antimicrobial susceptibility testing of *E. coli* in Meat from broilers (*Gallus gallus*)

Escherichia coli, non-pathogenic  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	E.coli, non-pathogenic, unspecified	
	yes	
	46	
Antimicrobials:	N	n
Aminoglycosides - Gentamicin	46	4
Aminoglycosides - Streptomycin	46	11
Amphenicols - Chloramphenicol	46	5
Cephalosporins - 3rd generation cephalosporins	46	4
Fluoroquinolones - Ciprofloxacin	46	37
Penicillins - Ampicillin	46	34
Quinolones - Nalidixic acid	46	35
Sulfonamides	46	20
Tetracyclines - Tetracycline	46	27
Trimethoprim	46	11
Fully sensitive	46	2
Resistant to 1 antimicrobial	46	2
Resistant to 2 antimicrobials	46	7
Resistant to 3 antimicrobials	46	5
Resistant to 4 antimicrobials	46	12
Resistant to >4 antimicrobials	46	18

Footnote:

One ESBL strain was detected.



Table Antimicrobial susceptibility testing of *E. coli* in Meat from other poultry species

Escherichia coli, non-pathogenic  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	E.coli, non-pathogenic, unspecified	
	yes	
	9	
Antimicrobials:	N	n
Aminoglycosides - Gentamicin	9	0
Aminoglycosides - Streptomycin	9	2
Amphenicols - Chloramphenicol	9	1
Cephalosporins - 3rd generation cephalosporins	9	1
Fluoroquinolones - Ciprofloxacin	9	6
Penicillins - Ampicillin	9	6
Quinolones - Nalidixic acid	9	4
Sulfonamides	9	4
Tetracyclines - Tetracycline	9	5
Trimethoprim	9	1
Resistant to 1 antimicrobial	9	2
Resistant to 2 antimicrobials	9	1
Resistant to 3 antimicrobials	9	1
Resistant to 4 antimicrobials	9	2
Resistant to >4 antimicrobials	9	3



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

E.coli, non-pathogenic, unspecified  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from broilers (Gallus gallus)																											
	yes																											
	46																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	2	46	4							7	7	17	9	2	4													
Aminoglycosides - Streptomycin	16	46	11											1	13	16	5	2	1	2	6							
Amphenicols - Chloramphenicol	16	46	5											8	25	8			2	3								
Cephalosporins - Cefotaxime	0.25	46	4							40	2	1	1	2														
Fluoroquinolones - Ciprofloxacin	0.064	46	37						8	1	2	11	3	3	1	3	14											
Penicillins - Ampicillin	8	46	34											1	4	5	2	1			33							
Quinolones - Nalidixic acid	16	46	35											3	3	2	1	2	1	2	8	24						
Sulfonamides	256	46	20												1	5	2	8	8	2			3	15	2			
Tetracyclines - Tetracycline	8	46	27											11	7	1				8	17	2						
Trimethoprim	2	46	11								3	13	17	2				11										

E.coli, non-pathogenic, unspecified  Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from broilers (Gallus gallus)	
	yes	
	46	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

E.coli, non-pathogenic, unspecified  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from broilers (Gallus gallus)	
	yes	
	46	
	lowest	highest
Antimicrobials:		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Meat from turkey - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

E.coli, non-pathogenic, unspecified	Meat from turkey																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	9																											
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	9	0									4	5															
Aminoglycosides - Streptomycin	16	9	2												1	4	2		1		1							
Amphenicols - Chloramphenicol	16	9	1												2	5	1				1							
Cephalosporins - Cefotaxime	0.25	9	1								8		1															
Fluoroquinolones - Ciprofloxacin	0.064	9	6						2	1	1	1	3		1													
Penicillins - Ampicillin	8	9	6											1	1		1				6							
Quinolones - Nalidixic acid	16	9	4											1	1	1	1	1		1	1	2						
Sulfonamides	256	9	4													2			3				3	1				
Tetracyclines - Tetracycline	8	9	5											4						4	1							
Trimethoprim	2	9	1									4	4					1										

E.coli, non-pathogenic, unspecified  Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from turkey	
	yes	
	9	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Meat from turkey - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

E.coli, non-pathogenic, unspecified  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from turkey	
	yes	
	9	
	lowest	highest
Antimicrobials:		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Meat from bovine animals - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

E.coli, non-pathogenic, unspecified	Meat from bovine animals																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	23																											
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	23	0								2	3	11	7														
Aminoglycosides - Streptomycin	16	23	6												1	5	8	3	2	1	2	1						
Amphenicols - Chloramphenicol	16	23	4												5	12	2			3	1							
Cephalosporins - Cefotaxime	0.25	23	0								22	1																
Fluoroquinolones - Ciprofloxacin	0.064	23	0						23																			
Penicillins - Ampicillin	8	23	10													5	8	2			8							
Quinolones - Nalidixic acid	16	23	0											1	15	7												
Sulfonamides	256	23	5												1	5	3	2	6			1	1	4				
Tetracyclines - Tetracycline	8	23	8											7	7	1				3	4	1						
Trimethoprim	2	23	2									8	11	1	1			2										

E.coli, non-pathogenic, unspecified	Meat from bovine animals	
	Isolates out of a monitoring program (yes/no)	
	yes	
	Number of isolates available in the laboratory	
Antimicrobials:	23	
	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Meat from bovine animals - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

E.coli, non-pathogenic, unspecified  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from bovine animals	
	yes	
	23	
Antimicrobials:	lowest	highest
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Meat from pig - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

E.coli, non-pathogenic, unspecified	Meat from pig																											
	yes																											
	12																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	2	12	0							5	2	5																
Aminoglycosides - Streptomycin	16	12	3												5	4		1	1		1							
Amphenicols - Chloramphenicol	16	12	2											4	5	1			2									
Cephalosporins - Cefotaxime	0.25	12	0							11	1																	
Fluoroquinolones - Ciprofloxacin	0.064	12	3						8	1	2		1															
Penicillins - Ampicillin	8	12	6										1	2	3					6								
Quinolones - Nalidixic acid	16	12	1										4	3	3	1					1							
Sulfonamides	256	12	3												1	4	3	1				1	2					
Tetracyclines - Tetracycline	8	12	6										4	2					5	1								
Trimethoprim	2	12	5							1	2	3	1				5											

E.coli, non-pathogenic, unspecified  Isolates out of a monitoring program (yes/no) Number of isolates available in the laboratory	Meat from pig	
	yes	
	12	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Meat from pig - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

E.coli, non-pathogenic, unspecified  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from pig	
	yes	
	12	
	lowest	highest
Antimicrobials:		
Cephalosporins - Cefotaxime		
Fluoroquinolones - Ciprofloxacin		
Penicillins - Ampicillin		
Quinolones - Nalidixic acid		
Sulfonamides		
Tetracyclines - Tetracycline		
Trimethoprim		



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Cattle (bovine animals) - calves (under 1 year) - quantitative data [Dilution method]

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

E.coli, non-pathogenic, unspecified	Cattle (bovine animals) - calves (under 1 year)																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	51																											
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	51	1									2	36	12					1									
Aminoglycosides - Streptomycin	16	51	5													9	36	1	2	2	1							
Amphenicols - Chloramphenicol	16	51	1												1	13	31	5		1								
Cephalosporins - Cefotaxime	0.25	51	0							47	4																	
Fluoroquinolones - Ciprofloxacin	0.064	51	2			5	42		2			1					1											
Penicillins - Ampicillin	8	51	1											3	15	29	3		1									
Quinolones - Nalidixic acid	16	51	2													48	1			2								
Tetracyclines - Tetracycline	8	51	5											11	34		1		1	4								
Trimethoprim	2	51	1										47	3					1									
Sulfonamides - Sulfamethoxazole	64	51	11														4	16	9	11	7				4			

E.coli, non-pathogenic, unspecified

Isolates out of a monitoring program (yes/no)

Number of isolates available in the laboratory

Antimicrobials:

Cattle (bovine animals) - calves (under 1 year)

51

lowest highest

Aminoglycosides - Gentamicin

0.25 32

Aminoglycosides - Streptomycin

2 128

Amphenicols - Chloramphenicol

2 64



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Cattle (bovine animals) - calves (under 1 year) - quantitative data [Dilution method]

E.coli, non-pathogenic, unspecified	Cattle (bovine animals) - calves (under 1 year)	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
Antimicrobials:	51	
	lowest	highest
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

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

E.coli, non-pathogenic, unspecified	Gallus gallus (fowl) - broilers																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	152																											
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	152	3									3	107	37	2			1	2									
Aminoglycosides - Streptomycin	16	152	36													34	77	5	9	4	23							
Amphenicols - Chloramphenicol	16	152	15												3	47	79	8	4	11								
Cephalosporins - Cefotaxime	0.25	152	10							118	23	1		1	3	6												
Fluoroquinolones - Ciprofloxacin	0.064	152	104			3	36		9		5	27	13	15	12	5	27											
Penicillins - Ampicillin	8	152	67											4	36	42	3		67									
Quinolones - Nalidixic acid	16	152	96													49	3	4		96								
Tetracyclines - Tetracycline	8	152	57											26	69			1	1	55								
Trimethoprim	2	152	35										113	3	1				35									
Sulfonamides - Sulfamethoxazole	64	152	51														15	36	27	23				51				

E.coli, non-pathogenic, unspecified	Gallus gallus (fowl) - broilers	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	152	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers - quantitative data [Dilution method]

<b>E.coli, non-pathogenic, unspecified</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Gallus gallus (fowl) - broilers	
	152	
	lowest	highest
<b>Antimicrobials:</b>		
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Pigs - fattening pigs - quantitative data [Dilution method]

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

E.coli, non-pathogenic, unspecified	Pigs - fattening pigs																											
	Isolates out of a monitoring program (yes/no)																											
	Number of isolates available in the laboratory																											
	152																											
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	152	3									6	97	43	3				3									
Aminoglycosides - Streptomycin	16	152	80												3	24	40	5	9	24	47							
Amphenicols - Chloramphenicol	16	152	27												2	37	81	5	3	24								
Cephalosporins - Cefotaxime	0.25	152	4							137	10	1			2	2												
Fluoroquinolones - Ciprofloxacin	0.064	152	14			21	102		15		3	4	2	1		1	3											
Penicillins - Ampicillin	8	152	63											2	34	49	4		63									
Quinolones - Nalidixic acid	16	152	9													140	2	1		9								
Tetracyclines - Tetracycline	8	152	98											12	41		1		4	94								
Trimethoprim	2	152	32										115	5		1			31									
Sulfonamides - Sulfamethoxazole	64	152	62														26	30	28	6	2			60				

E.coli, non-pathogenic, unspecified	Pigs - fattening pigs	
	Isolates out of a monitoring program (yes/no)	
	Number of isolates available in the laboratory	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin	0.25	32
Aminoglycosides - Streptomycin	2	128
Amphenicols - Chloramphenicol	2	64



Table Antimicrobial susceptibility testing of E.coli, non-pathogenic, unspecified in Pigs - fattening pigs - quantitative data [Dilution method]

E.coli, non-pathogenic, unspecified  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Pigs - fattening pigs	
	152	
	lowest	highest
Antimicrobials:		
Cephalosporins - Cefotaxime	0.06	4
Fluoroquinolones - Ciprofloxacin	0.008	8
Penicillins - Ampicillin	0.5	32
Quinolones - Nalidixic acid	4	64
Tetracyclines - Tetracycline	1	64
Trimethoprim	0.5	32
Sulfonamides - Sulfamethoxazole	8	1024



Test Method Used	Standard methods used for testing

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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		
Broth dilution		EFSA		

  

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



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

Table Antimicrobial susceptibility testing of *E. faecalis* in Meat from bovine animals - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

E. faecalis	Meat from bovine animals																											
	yes																											
	21																											
	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	32	21	0											1	1	5	8	6										
Aminoglycosides - Kanamycin		0	0															0										
Aminoglycosides - Streptomycin	512	21	2															3	8	4		4	1	1				
Amphenicols - Chloramphenicol	32	21	0											4	17													
Penicillins - Ampicillin	4	21	0									1	16	4														
Tetracyclines - Tetracycline	4	21	12									7	1		1	2		1	4	5								
Fully sensitive		9	9	9																								
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	21	0										10	9	2													
Macrolides - Erythromycin	4	21	0								1	18	2															
Oxazolidines - Linezolid	4	21	0										6	15														
Resistant to 1 antimicrobial		10	10	10																								
Resistant to 2 antimicrobials		2	2	2																								



Table Antimicrobial susceptibility testing of *E. faecalis* in Meat from bovine animals - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

<b>E. faecalis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from bovine animals	
	yes	
	21	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Kanamycin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Penicillins - Ampicillin		
Tetracyclines - Tetracycline		
Fully sensitive		
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin		
Macrolides - Erythromycin		
Oxazolidines - Linezolid		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		



Table Antimicrobial susceptibility testing of E. faecalis in Meat from broilers (Gallus gallus) - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

E. faecalis	Meat from broilers (Gallus gallus)																											
	yes																											
	35																											
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	32	35	3													2	12	15	3	1	2							
Aminoglycosides - Streptomycin	512	35	9																1	6	10	3	6	3	6			
Amphenicols - Chloramphenicol	32	35	0												7	22	5		1									
Penicillins - Ampicillin	4	35	0										7	14	14													
Tetracyclines - Tetracycline	4	35	28									6	1					4	4	7	13							
Fully sensitive		6	6	6																								
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	35	2											19	14		2											
Macrolides - Erythromycin	4	35	14								3	1	14	3				1	3	1	7	2						
Oxazolidines - Linezolid	4	35	0											13	22			0	0	0	0	0						
Resistant to 1 antimicrobial		13	13	13																								
Resistant to 2 antimicrobials		6	6	6																								
Resistant to 3 antimicrobials		9	9	9																								
Resistant to 4 antimicrobials		1	1	1																								



Table Antimicrobial susceptibility testing of *E. faecalis* in Meat from broilers (*Gallus gallus*) - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

<b>E. faecalis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from broilers ( <i>Gallus gallus</i> )	
	yes	
	35	
Antimicrobials:	lowest	highest
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		
Penicillins - Ampicillin		
Tetracyclines - Tetracycline		
Fully sensitive		
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin		
Macrolides - Erythromycin		
Oxazolidines - Linezolid		
Resistant to 1 antimicrobial		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		



Table Antimicrobial susceptibility testing of E. faecalis in Meat from turkey - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

E. faecalis	Meat from turkey																											
	yes																											
	6																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	32	6	0													1	5											
Aminoglycosides - Streptomycin	512	6	2																	1	1	2			2			
Amphenicols - Chloramphenicol	32	6	1												1	2	1		1	1								
Penicillins - Ampicillin	4	6	0										2	4														
Tetracyclines - Tetracycline	4	6	6																	1	5							
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	6	0											3	1	2												
Macrolides - Erythromycin	4	6	6															1	1	2	2							
Oxazolidines - Linezolid	4	6	0											1	5													
Resistant to 2 antimicrobials		4	4	4																								
Resistant to 3 antimicrobials		1	1	1																								
Resistant to 4 antimicrobials		1	1	1																								

E. faecalis	Meat from turkey	
	yes	
	6	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		



Table Antimicrobial susceptibility testing of *E. faecalis* in Meat from turkey - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

<b>E. faecalis</b>  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from turkey	
	yes	
	6	
Antimicrobials:	lowest	highest
Amphenicols - Chloramphenicol		
Penicillins - Ampicillin		
Tetracyclines - Tetracycline		
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin		
Macrolides - Erythromycin		
Oxazolidines - Linezolid		
Resistant to 2 antimicrobials		
Resistant to 3 antimicrobials		
Resistant to 4 antimicrobials		



Table Antimicrobial susceptibility testing of E. faecalis in Meat from pig - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

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

E. faecalis	Meat from pig																											
	yes																											
	6																											
	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		
Antimicrobials:																												
Aminoglycosides - Gentamicin	32	6	0										1		2	1	1	1										
Aminoglycosides - Streptomycin	512	6	0													1			2	1	1	1						
Amphenicols - Chloramphenicol	32	6	0											5	1													
Penicillins - Ampicillin	4	6	0								1	2	1	2														
Tetracyclines - Tetracycline	4	6	3									3						2		1								
Fully sensitive		3	3	3																								
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	6	0										5	1														
Macrolides - Erythromycin	4	6	0									5		1														
Oxazolidines - Linezolid	4	6	0										2	4														
Resistant to 1 antimicrobial		3	3	3																								

E. faecalis	Meat from pig	
	yes	
	6	
	lowest	highest
Antimicrobials:		
Aminoglycosides - Gentamicin		
Aminoglycosides - Streptomycin		
Amphenicols - Chloramphenicol		



Table Antimicrobial susceptibility testing of E. faecalis in Meat from pig - Objective sampling - Official sampling - food sample - meat - quantitative data [Dilution method]

E. faecalis  Isolates out of a monitoring program (yes/no)  Number of isolates available in the laboratory	Meat from pig	
	yes	
	6	
Antimicrobials:	lowest	highest
Penicillins - Ampicillin		
Tetracyclines - Tetracycline		
Fully sensitive		
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin		
Macrolides - Erythromycin		
Oxazolidines - Linezolid		
Resistant to 1 antimicrobial		



Table Cut-off values for antibiotic resistance of *E. faecalis* in Animals

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 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

### 4.1.2 Cronobacter in foodstuffs

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 - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	10 g	114	0	0	0



## 4.2 HISTAMINE

### 4.2.1 General evaluation of the national situation

### 4.2.2 Histamine in foodstuffs

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 - Fishery products from fish species associated with a high amount of histidine - not enzyme matured - Retail - Surveillance	NFC SO	Objective sampling	Official sampling	food sample		Single	5 g	43	0	43	0
Fish - Fishery products from fish species associated with a high amount of histidine - not enzyme matured - Catering	NFC SO	Suspect sampling	Official sampling	food sample		Single	5 g	1	0	1	0
										>200 - <= 400 mg/kg	> 400 mg/kg
Fish - Fishery products from fish species associated with a high amount of histidine - not enzyme matured - Retail - Surveillance									0	0	
Fish - Fishery products from fish species associated with a high amount of histidine - not enzyme matured - Catering									0	0	



Table Histamine in food



## 4.3 STAPHYLOCOCCAL ENTEROTOXINS

### 4.3.1 General evaluation of the national situation

### 4.3.2 Staphylococcal enterotoxins in foodstuffs

#### A. Staphylococcal enterotoxins in foodstuffs

##### Monitoring system

###### Sampling strategy

There is no direct sampling strategy, samples containing more than 100.000 coagulase positive staphylococci/gram are tested for the presence of enterotoxin.

Only those product groups are routinely tested for coagulase positive staphylococci, for which there is a criterion in 2073/2005/EC.

###### Type of specimen taken

milk products, in case of supposed human cases other food as meat products, prepared dishes are sampled

##### Definition of positive finding

If ELFA test shows a positive result, the product is considered to be positive.

##### Diagnostic/analytical methods used

Validated detection method of the EU-RL based on VIDAS enterotoxin test is used.

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

products are withdrawn from the market.



Table Staphylococcal enterotoxins in food

	Source of information	Sampling strategy	Sampler	Sample type	Sample origin	Sampling unit	Sample weight	Units tested	Total units positive for Staphylococcal enterotoxins
Meat from bovine animals and pig - minced meat - Processing plant - Clinical investigations <sup>1)</sup>	NFC SO	Suspect sampling	Official sampling	food sample	Domestic	Batch	75 g	2	0
Meat from pig - meat products - Retail - Clinical investigations	NFC SO	Suspect sampling	Official sampling	food sample		Single	25 g	5	0
Other processed food products and prepared dishes - Catering - Clinical investigations	NFC SO	Suspect sampling	Official sampling	food sample	Domestic	Single	25 g	11	0

## Comments:

<sup>1)</sup> 3 \* 25 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

Data on foodborne outbreaks have been collected in Hungary by legal background at the Public Health Authority since 1931. There are two surveillance systems in Hungary since 1st January 2007. One of them is for collection of communicable diseases included the human data of foodborne outbreaks (based on the obligatory reports of a physician and microbiological laboratories). The reporting system of human cases belongs to the institutes of the National Public Health and Medical Officers' Service (National Center for Epidemiologie = NCE and National Institute for Food and Nutrition Science = NIFNS). The other surveillance system is operated by the Central Agricultural Office, (since 15 March 2012 it's name is National Food Chain Safety Office = NFCSO), which is working under the supervision of Ministry of Agriculture. This system based on the reports of the food business operators, the drinking water suppliers and the data of the communicable disease reporting system. The role of the NFCSO is in this topic to investigate which food was the source of the outbreaks, collection and analysis of obtained data – in all events if the outbreak was general or the supposed product is produced by the food industry and/or catering, and not located to a household. The household outbreaks are investigated by the Public Health Authority. The investigation of an outbreak is usually initiated with the information about the human cases provided by the public health service. The two authorities cooperate in the whole process of investigation.

### Description of the types of outbreaks covered by the reporting:

Outbreak: At least two cases with epidemiological link (exposed by the same food).

Household outbreak: At least two related cases in the same household.

General outbreak: At least two related cases in a community (school, kindergarten, hospital, events etc.).

### National evaluation of the reported outbreaks in the country:

#### Trends in numbers of outbreaks and numbers of human cases involved

Altogether there were 119 general and household outbreaks verified as foodborne in 2013 (2012:114) in Hungary. 1145 cases (2012: 1414) were linked to the outbreaks, among them 136 (11,9%) hospitalised cases (2012: 206 (14,6%). Nobody died. Although the number of the outbreaks did not changed significantly and the number of cases and the rate of hospitalisation decreased.

The surveillance based on results of laboratories and the reports of physicians. The epidemiological investigation was carried out by Public Health Services. If it has been suspected the outbreak was foodborne, the investigation at the food chain was conducted by National Food Chain Safety Office.

The number of foodborne outbreaks registered by National Food Chain Safety Office was less than in 2012, but the number of cases increased compared to the previous year. In 2013 there were 26 general food-borne events, there were 1023 human cases.

#### The proportion of causative agents:

26,9 % (7) of the outbreaks were caused by *Salmonella enteritidis*, 15,4 % (4) Norovirus, 3,8 % (1) *Clostridium perfringens*, 3,8 % (1) *Staphylococcus aureus*, 19,2 % (5) high microbial count and 30,8 % (8) outbreaks had unknown etiology. The proportion of *Salmonella* etiology have fallen compared to 2012 (2013: 26,9 %, 2012: 42,9%). 1/3 of the outbreaks were caused by facultative agents.

There was no major change in the type of food vehicles. The most foodborne outbreaks (65,4 %) were caused by mixed foods. A number of cases were caused by broiler meats and products thereof, decreased. Only one outbreaks caused by egg products in restaurants.



The most food borne events occurred in public canteens and the number of events decreased compared to 2012 (2013: 57,7 %, 2012: 58,1 %). 42,3 % of the outbreaks occurred in catering services (restaurant, bar, cafe, etc.), the number of cases slumped compared to the previous year. We did not register outbreaks which were caused by the food industry or by small producers' products.



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	8	28	12	0	0	8
Salmonella - S. Enteritidis	73	329	95	0	5	78
Salmonella - Other serovars	12	29	6	0	0	12
Campylobacter	0	0	0	0	0	0
Listeria - Listeria monocytogenes	0	0	0	0	0	0
Listeria - Other Listeria	0	0	0	0	0	0
Yersinia	0	0	0	0	0	0
Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0	0	0	0	0	0
Bacillus - B. cereus	0	0	0	0	0	0
Bacillus - Other Bacillus	0	0	0	0	0	0
Staphylococcal enterotoxins	0	0	0	0	1	1
Clostridium - Cl. botulinum	0	0	0	0	0	0
Clostridium - Cl. perfringens	0	0	0	0	1	1



	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	0	0	0	0	0
Other Bacterial agents - Brucella	0	0	0	0	0	0
Other Bacterial agents - Shigella	0	0	0	0	0	0
Other Bacterial agents - Other Bacterial agents	5	329	1	0	0	5
Parasites - Trichinella	0	0	0	0	0	0
Parasites - Giardia	0	0	0	0	0	0
Parasites - Cryptosporidium	0	0	0	0	0	0
Parasites - Anisakis	0	0	0	0	0	0
Parasites - Other Parasites	0	0	0	0	0	0
Viruses - Norovirus	3	159	17	0	1	4
Viruses - Hepatitis viruses	0	0	0	0	0	0
Viruses - Other Viruses	0	0	0	0	0	0
Other agents - Histamine	0	0	0	0	0	0
Other agents - Marine biotoxins	0	0	0	0	0	0
Other agents - Other Agents	0	0	0	0	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		
9	271	5	0	1	10



Table Foodborne Outbreaks: detailed data for Clostridium

Please use CTRL for multiple selection fields

**C. perfringens**

Value

FBO Code	ÉTbl_7
Number of outbreaks	1
Number of human cases	66
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Bovine meat and products thereof
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Others
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Cross-contamination
Mixed Outbreaks (Other Agent)	
Additional information	



Table Foodborne Outbreaks: detailed data for Salmonella

Please use CTRL for multiple selection fields

## S. Enteritidis - PT 2

Value

FBO Code	OEK_2
Number of outbreaks	1
Number of human cases	21
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Eggs and egg products
More food vehicle information	Tiramishu
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	School or kindergarten
Place of origin of problem	Household
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	



## S. Enteritidis - PT 2

Value

FBO Code	ÉTbi_24
Number of outbreaks	1
Number of human cases	116
Number of hospitalisations	12
Number of deaths	0
Food vehicle	Other foods
More food vehicle information	
Nature of evidence	Detection of causative agent in food chain or its environment - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	School or kindergarten
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	



## S. Enteritidis - PT 21

Value

FBO Code	OEK_1
Number of outbreaks	1
Number of human cases	23
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Eggs and egg products
More food vehicle information	Vegetable salad with mayones
Nature of evidence	Analytical epidemiological evidence
Outbreak type	Household
Setting	Household
Place of origin of problem	Household
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	



## S. Enteritidis - PT 2

Value

FBO Code	OEK_3
Number of outbreaks	1
Number of human cases	6
Number of hospitalisations	2
Number of deaths	0
Food vehicle	Eggs and egg products
More food vehicle information	Pancake filled with cottage cheese cream contained raw eggs
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Household
Place of origin of problem	Household
Origin of food vehicle	Unknown
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	



## S. Enteritidis - PT 1

Value

FBO Code	ÉTbl_23
Number of outbreaks	1
Number of human cases	2
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Eggs and egg products
More food vehicle information	
Nature of evidence	Detection of causative agent in food chain or its environment - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Canteen or workplace catering
Place of origin of problem	Canteen or workplace catering
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	



Table Foodborne Outbreaks: detailed data for Staphylococcal enterotoxins

Please use CTRL for multiple selection fields

## Enterotoxin, unspecified

Value

FBO Code	ÉTbl_17
Number of outbreaks	1
Number of human cases	17
Number of hospitalisations	13
Number of deaths	0
Food vehicle	Other foods
More food vehicle information	
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Place of origin of problem	Unknown
Origin of food vehicle	Domestic
Contributory factors	Inadequate heat treatment
Mixed Outbreaks (Other Agent)	
Additional information	



Table Foodborne Outbreaks: detailed data for Unknown agent

Please use CTRL for multiple selection fields

## Unknown

Value

FBO Code	ÉTbl_12
Number of outbreaks	1
Number of human cases	34
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Temporary mass catering (fairs or festivals)
Place of origin of problem	Restaurant or Cafe or Pub or Bar or Hotel or Catering service
Origin of food vehicle	Domestic
Contributory factors	Cross-contamination
Mixed Outbreaks (Other Agent)	
Additional information	



Table Foodborne Outbreaks: detailed data for Viruses

Please use CTRL for multiple selection fields

## Calicivirus - norovirus (Norwalk-like virus)

Value

FBO Code	ÉTbl_21
Number of outbreaks	1
Number of human cases	124
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Other foods
More food vehicle information	
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	School or kindergarten
Place of origin of problem	Canteen or workplace catering
Origin of food vehicle	Domestic
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	