European Food Safety Authority

ZOONOSES MONITORING

HUNGARY

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

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

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

IN 2009

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: Hungary

Reporting Year:

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 2009 .

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 is noted that from the Central Agricultural Office who collected data from the registrations of the Directorate of Food Chain Safety and Animal Health of the Agricultural Offices of the 19 counties of Hungary.

Dates the figures relate to and the content of the figures

Most of the population data refer to the actual population as of the 1st of December 2009.

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

According to the data of the Hungarian Central Statistical Office, the decreasing tendency in most of the animal populations continued.

Additional information

The number of cows in first calf which were intended to refill the cow population has not been changed since December 2008.
The size of the pig population decreased, what is true for almost every aspects (ie. age, sex and the utilization of the pigs) except the number of young sows.
On 1 December 2009 61000 horses were counted in Hungary, 3000 horses more than in previous year.

Table Susceptible animal populations

* Only if different than current reporting year

		Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
Animal species	Category of animals	Data	Year*	Data	Year*	Data	Year*	Data	Year*
Cattle (bovine animals)	- in total	18618		111104		792505		18616	
Ducks	- in total	394				3713000			
Gallus gallus (fowl)	breeding flocks, unspecified - in total					2695010			
	broilers	830				26757681			
	laying hens	830				2675681			
	- in total					32128372			
Geese	breeding flocks, unspecified - in total	30				122510			
	meat production flocks	556				2478240			
Goats	- in total					16043		532	
Pigs	- in total			3368067		2792886		52043	
Sheep	- in total			9478		1019210		7045	
Solipeds, domestic	horses - in total					61000			
Turkeys	meat production flocks [1)]								

Table Susceptible animal populations

		Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
Animal species	Category of animals	Data	Year*	Data	Year*	Data	Year*	Data	Year*
Turkeys	- in total	394				3018000			

Comments:

[1)] 362

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

In 2009, a 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

In 2009 control of Salmonella was compulsory in breeding, layer and broiler flocks of Gallus gallus,. Breeding flocks are vaccinated Layer flocks are vaccinated on a compulsory basis.and voluntary in turkey flocks.

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 privet 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.

Table Salmonella in humans - Species/serotype distribution

Distribution Zoonotic Agent	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.	Unknown status
Salmonella	5874	0	5869	0	5	0	0
S. Enteritidis	3552		3548		4		
S. Typhimurium	998		998		0		
Not typeable	37		37				
Other serotypes	162		162		0		
S. 4,5,12:i:-	69		68		1		
S. Bovismorbificans	60		60		0		
S. Brandenburg	25		25		0		
S. Bredeney	12		12		0		
S. Derby	44		44		0		
S. Goldcoast	56		56		0		
S. Hadar	11		11		0		
S. Infantis	417		417		0		
S. London	9		9		0		
S. Manhattan	14		14		0		
S. Saintpaul	57		57		0		
S. Thompson	16		16		0		
S. Virchow	14		14		0		
Salmonella spp.	321		321		0		

2.1.3 Salmonella in foodstuffs

A. 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 Agricilture 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 samles 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 Agricilture 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

B. 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 te different stages of food chain (slaughterhouses, processing plants, retail). Based on the structure of the EU zoonosis report, the data collection system will be resturctured 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 garms 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

Bacteriological method: ISO 6579:2002

At retail

Bacteriological method: ISO 6579:2002

C. 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 samles 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 determenid 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

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 wich has been responsible for 70-80 % of the human infections for many years.

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Bredeney	S. Derby	S. Infantis
Meat from broilers (Gallus gallus) - fresh - at slaughterhouse	CAO FFSD	Single	25 gramms	653	397	5	1	17	9	0	365
Meat from broilers (Gallus gallus) - fresh - at processing plant	CAO FFSD	Single	25 gramms	302	94	0	2	0	0	0	92
Meat from broilers (Gallus gallus) - fresh - at retail	CAO FFSD	Single	25 gramms	97	35	0	0	0	0	0	35
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at processing plant	CAO FFSD	Single	10 gramms	109	18	0	0	0	0	0	18
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at retail	CAO FFSD	Single	10 gramms	76	29	1	0	0	0	1	27
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant	CAO FFSD	Single	25 gramms	293	0	0	0	0	0	0	0
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at retail	CAO FFSD	Single	25 gramms	170	1	0	0	0	0	0	1
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at processing plant	CAO FFSD	Single	10 gramms	12	2	0	0	0	0	0	2
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at retail	CAO FFSD	Single	10 gramms	4	0	0	0	0	0	0	0
Meat from duck - at slaughterhouse	CAO FFSD	Single	25 gramms	96	10	0	4	4	0	0	2
Meat from duck - at retail	CAO FFSD	Single	25 gramms	70	10	0	5	5	0	0	0
Meat from geese - at slaughterhouse	CAO FFSD	Single	25 gramms	108	2	0	1	1	0	0	0
Meat from geese - at retail	CAO FFSD	Single	25 gramms	46	1	0	1	0	0	0	0

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Bredeney	S. Derby	S. Infantis
Meat from turkey - fresh - at slaughterhouse	CAO FFSD	Single	25 gramms	463	96	0	0	38	44	0	14
Meat from turkey - fresh - at processing plant	CAO FFSD	Single	25 gramms	255	49	1	0	29	17	0	2
Meat from turkey - fresh - at retail	CAO FFSD	Single	10 or 25 gramms	83	4	0	0	3	0	0	1
Meat from turkey - meat preparation - intended to be eaten cooked - at processing plant	CAO FFSD	Single	10 gramms	30	0	0	0	0	0	0	0
Meat from turkey - meat preparation - intended to be eaten cooked - at retail	CAO FFSD	Single	10 gramms	9	1	1	0	0	0	0	0
Meat from turkey - meat products - cooked, ready-to -eat - at processing plant	CAO FFSD	Single	25 gramms	239	0	0	0	0	0	0	0
Meat from turkey - meat products - cooked, ready-to -eat - at retail	CAO FFSD	Single	25 gramms	104	0	0	0	0	0	0	0
Meat from turkey - meat products - raw but intended to be eaten cooked - at processing plant [1)]	CAO FFSD	Single	25 gramms	45	2	0	0	0	0	0	2
Meat from turkey - meat products - raw but intended to be eaten cooked - at retail [2)]	CAO FFSD	Single	25 gramms	52	5	0	0	1	1	0	3
Meat from turkey - minced meat - intended to be eaten cooked - at processing plant	CAO FFSD	Single	10 gramms	58	5	1	0	2	0	0	2
Meat from turkey - minced meat - intended to be eaten cooked - at retail	CAO FFSD	Single	10 gramms	74	12	0	0	4	2	0	6
Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - frozen - at processing plant - Monitoring - official sampling [3)]	CAO FFSD	Single	25 gramms	80	0	0	0	0	0	0	0
Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - frozen - at retail - Monitoring - official sampling [4)]	CAO FFSD	Single	25 gramms	91	0	0	0	0	0	0	0

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Bredeney	S. Derby	S. Infantis
Meat from duck - meat products - cooked, ready-to-eat - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	14	0	0	0	0	0	0	0
Meat from geese - meat products - cooked, ready-to -eat - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	12	0	0	0	0	0	0	0
Meat from turkey - meat products - raw and intended to be eaten raw - in total - Monitoring - official sampling [5)]	CAO FFSD	Single	25 gramms	6	0	0	0	0	0	0	0
Meat from wild game - birds - fresh - in total - Monitoring - official sampling	CAO FFSD	Single	10 or 25 gramms	46	0	0	0	0	0	0	0

Comments:

[1)] heat treated but not completely cooked
[2)] heat treated but not completely cooked
[3)] heat treated but not completely cooked
[4)] heat treated but not completely cooked
[5)] sausages

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Bredeney	S. Derby	S. Goldcoast
Meat from bovine animals - fresh - at processing plant	CAO FFSD	Single	25 gramms	280	5	0	1	4	0	0	0
Meat from bovine animals - fresh - at retail	CAO FFSD	Single	25 gramms	71	0	0	0	0	0	0	0
Meat from bovine animals - meat preparation - intended to be eaten cooked - at retail	CAO FFSD	Single	25 gramms	1	0	0	0	0	0	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - at processing plant	CAO FFSD	Single	25 gramms	63	0	0	0	0	0	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - at retail	CAO FFSD	Single	25 gramms	38	0	0	0	0	0	0	0
Meat from bovine animals - meat products - raw but intended to be eaten cooked - at processing plant	CAO FFSD	Single	25 gramms	33	0	0	0	0	0	0	0
Meat from bovine animals - meat products - raw but intended to be eaten cooked - at retail	CAO FFSD	Single	25 gramms	40	0	0	0	0	0	0	0
Meat from bovine animals - minced meat - intended to be eaten cooked - at processing plant	CAO FFSD	Single	25 gramms	31	0	0	0	0	0	0	0
Meat from bovine animals - minced meat - intended to be eaten cooked - at retail	CAO FFSD	Single	25 gramms	59	1	0	0	0	0	0	1
Meat from pig - fresh - at processing plant	CAO FFSD	Single	25 gramms	363	6	0	2	3	0	1	0
Meat from pig - fresh - at retail	CAO FFSD	Single	25 gramms	89	0	0	0	0	0	0	0
Meat from pig - meat preparation - intended to be eaten cooked - at processing plant	CAO FFSD	Single	25 gramms	154	10	1	3	5	0	0	0
Meat from pig - meat preparation - intended to be eaten cooked - at retail	CAO FFSD	Single	25 gramms	51	0	0	0	0	0	0	0

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Bredeney	S. Derby	S. Goldcoast
Meat from pig - meat products - cooked, ready-to-eat - at processing plant	CAO FFSD	Single	25 gramms	253	2	0	0	2	0	0	0
Meat from pig - meat products - cooked, ready-to-eat - at retail	CAO FFSD	Single	25 gramms	188	1	0	0	1	0	0	0
Meat from pig - meat products - raw but intended to be eaten cooked - at processing plant	CAO FFSD	Single	25 gramms	4	0	0	0	0	0	0	0
Meat from pig - meat products - raw but intended to be eaten cooked - at retail	CAO FFSD	Single	25 gramms	5	0	0	0	0	0	0	0
Meat from pig - minced meat - intended to be eaten cooked - at processing plant	CAO FFSD	Single	10 gramms	96	4	0	0	0	1	2	0
Meat from pig - minced meat - intended to be eaten cooked - at retail	CAO FFSD	Single	10 gramms	95	3	0	1	0	0	1	0
Meat from sheep - fresh - at slaughterhouse	CAO FFSD	Single	surface sample (400 cm2)	1	0	0	0	0	0	0	0
Other products of animal origin - gelatin and collagen	CAO FFSD	Single	25 gramms	73	0	0	0	0	0	0	0
Meat from bovine animals - carcass - at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling	CAO FFSD	Single	surface sample (400 cm2)	186	2	0	0	2	0	0	0
Meat from horse - meat products - fermented sausages - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	10	0	0	0	0	0	0	0
Meat from pig - carcass - at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling	CAO FFSD	Single	surface sample	860	2	0	2	0	0	0	0
Meat from pig - meat products - fermented sausages - at processing plant - Monitoring - official sampling [1)]	CAO FFSD	Single	25 garmms	528	12	0	3	7	0	1	0

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Bredeney	S. Derby	S. Goldcoast
Meat from pig - meat products - fermented sausages - at retail - Monitoring - official sampling [2)]	CAO FFSD	Single	25 gramms	245	6	0	2	3	0	1	0
Meat from pig - meat products - pate - in total - Monitoring - official sampling [3)]	CAO FFSD	Single	25 gramms	85	0	0	0	0	0	0	0
Meat from pig - meat products - raw ham - at processing plant - Monitoring - official sampling	CAO FFSD	Single	25 gramms	167	2	0	0	0	0	0	0
Meat from pig - meat products - raw ham - at retail - Monitoring - official sampling	CAO FFSD	Single	25 gramms	103	1	0	0	1	0	0	0
Meat from wild game - land mammals - fresh - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	125	0	0	0	0	0	0	0

	S. Infantis
Meat from bovine animals - fresh - at processing plant	0
Meat from bovine animals - fresh - at retail	0
Meat from bovine animals - meat preparation - intended to be eaten cooked - at retail	0
Meat from bovine animals - meat products - cooked, ready-to-eat - at processing plant	0
Meat from bovine animals - meat products - cooked, ready-to-eat - at retail	0

Table Salmonella in red meat and products thereof

	S. Infantis
Meat from bovine animals - meat products - raw but intended to be eaten cooked - at processing plant	0
Meat from bovine animals - meat products - raw but intended to be eaten cooked - at retail	0
Meat from bovine animals - minced meat - intended to be eaten cooked - at processing plant	0
Meat from bovine animals - minced meat - intended to be eaten cooked - at retail	0
Meat from pig - fresh - at processing plant	0
Meat from pig - fresh - at retail	0
Meat from pig - meat preparation - intended to be eaten cooked - at processing plant	1
Meat from pig - meat preparation - intended to be eaten cooked - at retail	0
Meat from pig - meat products - cooked, ready-to-eat - at processing plant	0
Meat from pig - meat products - cooked, ready-to-eat - at retail	0
Meat from pig - meat products - raw but intended to be eaten cooked - at processing plant	0
Meat from pig - meat products - raw but intended to be eaten cooked - at retail	0
Meat from pig - minced meat - intended to be eaten cooked - at processing plant	1

Table Salmonella in red meat and products thereof

	S. Infantis
Meat from pig - minced meat - intended to be eaten cooked - at retail	1
Meat from sheep - fresh - at slaughterhouse	0
Other products of animal origin - gelatin and collagen	0
Meat from bovine animals - carcass - at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling	0
Meat from horse - meat products - fermented sausages - in total - Monitoring - official sampling	0
Meat from pig - carcass - at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling	0
Meat from pig - meat products - fermented sausages - at processing plant - Monitoring - official sampling [1)]	1
Meat from pig - meat products - fermented sausages - at retail - Monitoring - official sampling [2)]	0
Meat from pig - meat products - pate - in total - Monitoring - official sampling [3)]	0
Meat from pig - meat products - raw ham - at processing plant - Monitoring - official sampling	2
Meat from pig - meat products - raw ham - at retail - Monitoring - official sampling	0
Meat from wild game - land mammals - fresh - in total - Monitoring - official sampling	0

Table Salmonella in red meat and products thereof

Comments:

[1)] sausages and salami with traditional and rapid ripening method
[2)] sausages and salami with traditional and rapid ripening method
[3)] products containing offal

Footnote:

CAO FFSD: Central Agricultural Office, Food and Feed Safety Directorate

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Crustaceans - at retail	CAO FFSD	Single	25 gramms	54	0	0	0	0
Crustaceans - unspecified - cooked - at retail	CAO FFSD	Single	25 gramms	28	0	0	0	0
Eggs - table eggs - at retail	CAO FFSD	Batch	shells of 10 eggs + 25 ml egg yolk from 5 eggs	672	0	0	0	0
Fishery products, unspecified - at retail [1)]	CAO FFSD	Single	25 gramms	111	0	0	0	0
Fruits and vegetables - precut	CAO FFSD	Single	25 gramms	18	0	0	0	0
Fruits and vegetables - precut - ready-to-eat	CAO FFSD	Single	25 gramms	189	0	0	0	0
Infant formula - dried - intended for infants below 6 months	CAO FFSD	Batch	30x25 gramms	25	0	0	0	0
Molluscan shellfish - cooked - at retail	CAO FFSD	Single	25 gramms	49	0	0	0	0
Molluscan shellfish - raw - at retail	CAO FFSD	Single	25 gramms	8	0	0	0	0
Seeds, sprouted - ready-to-eat	CAO FFSD	Single	25 gramms	56	0	0	0	0
Bakery products - cakes - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	63	0	0	0	0
Cereals and meals - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	67	0	0	0	0
Chocolate - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	190	0	0	0	0
Cocoa and cocoa preparations, coffee and tea - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	209	0	0	0	0

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Coconut - coconut products - at retail - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	71	1	0	0	1
Confectionery products and pastes - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	254	0	0	0	0
Egg products - dried - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	84	0	0	0	0
Egg products - liquid - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	68	1	1	0	0
Fish - raw - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	113	0	0	0	0
Fishery products, unspecified - non-ready-to-eat - frozen - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	23	0	0	0	0
Fishery products, unspecified - smoked - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	29	0	0	0	0
Foodstuffs intended for special nutritional uses - dietary foods for special medical purposes - at retail - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	33	0	0	0	0
Fruits and vegetables - products - at retail - Monitoring - official sampling - objective sampling [2)]	CAO FFSD	Single	25 gramms	11	0	0	0	0
Infant formula - dried - in total - Monitoring - official sampling	CAO FFSD	Batch	5-30x25 gramms	142	0	0	0	0
Infant formula - ready-to-eat - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	47	0	0	0	0

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Nuts and nut products - dried - at retail - Monitoring - official sampling - objective sampling [3)]	CAO FFSD	Single	25 gramms	78	0	0	0	0
Other food - at catering - Monitoring - official sampling - objective sampling [4)]	CAO FFSD	Single	25 gramms	855	0	0	0	0
Other processed food products and prepared dishes - pasta - in total - Monitoring	CAO FFSD	Single	25 gramms	186	2	2	0	0
Other processed food products and prepared dishes - sandwiches - with meat - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	253	0	0	0	0
Other products of animal origin - gelatin and collagen - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	73	0	0	0	0
Ready-to-eat salads - at processing plant - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	144	0	0	0	0
Ready-to-eat salads - at retail - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	275	0	0	0	0
Seeds, dried - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	183	0	0	0	0
Soups - dehydrated - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	105	0	0	0	0
Soups - ready-to-eat - at catering - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	224	0	0	0	0
Spices and herbs - in total - Monitoring - official sampling - objective sampling	CAO FFSD	Single	25 gramms	243	1	0	0	1

Table Salmonella in other food

Comments:

[1)] cooked or preserved, ready-to-eat
[2)] deep frozen products from fruits
[3)] and other oily seeds
[4)] Prepared dishes (RTE) in catering

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Infantis
Cheeses made from cows' milk - at processing plant	CAO FFSD	Single	25 gramms	11	0	0	0	0	0
Cheeses made from cows' milk - at retail	CAO FFSD	Single	25 gramms	11	0	0	0	0	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at processing plant	CAO FFSD	Single	25 gramms	24	0	0	0	0	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at retail	CAO FFSD	Single	25 gramms	26	0	0	0	0	0
Cheeses made from goats' milk - at processing plant	CAO FFSD	Single	25 gramms	1	0	0	0	0	0
Cheeses made from goats' milk - at retail	CAO FFSD	Single	25 gramms	1	0	0	0	0	0
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - at processing plant	CAO FFSD	Single	25 gramms	3	0	0	0	0	0
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - at retail	CAO FFSD	Single	25 gramms	2	0	0	0	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - at processing plant	CAO FFSD	Single	25 garmms	3	0	0	0	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - at retail	CAO FFSD	Single	25 garmms	1	0	0	0	0	0
Dairy products (excluding cheeses) - cream - made from raw or low heat-treated milk - at processing plant	CAO FFSD	Single	25 garmms	2	0	0	0	0	0
Dairy products (excluding cheeses) - ice-cream - at processing plant	CAO FFSD	Single	25 gramms	169	0	0	0	0	0

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Infantis
Dairy products (excluding cheeses) - ice-cream - at retail	CAO FFSD	Single	25 gramms	140	1	0	0	0	1
Dairy products (excluding cheeses) - milk powder and whey powder - at processing plant	CAO FFSD	Single	25 gramms	29	0	0	0	0	0
Dairy products (excluding cheeses) - milk powder and whey powder - at retail	CAO FFSD	Single	25 gramms	49	0	0	0	0	0
Milk, cows' - pasteurised milk - at processing plant	CAO FFSD	Single	25 ml	20	0	0	0	0	0
Milk, cows' - pasteurised milk - at retail	CAO FFSD	Single	25 ml	85	0	0	0	0	0
Milk, cows' - raw	CAO FFSD	Single	25 ml	196	0	0	0	0	0
Milk, cows' - raw - intended for direct human consumption	CAO FFSD	Single	25 ml	50	0	0	0	0	0
Milk, goats' - raw - intended for direct human consumption	CAO FFSD	Single	25 ml	2	0	0	0	0	0
Cheeses made from cows' milk - curd - at processing plant - Monitoring - official sampling	CAO FFSD	Single	25 gramms	89	0	0	0	0	0
Cheeses made from cows' milk - curd - at retail - Monitoring - official sampling	CAO FFSD	Single	25 gramms	47	0	0	0	0	0
Cheeses made from sheep's milk - unspecified - made from pasteurised milk - at processing plant - Monitoring - official sampling	CAO FFSD	Single	25 gramms	16	0	0	0	0	0
Cheeses made from sheep's milk - unspecified - made from pasteurised milk - at retail - Monitoring - official sampling	CAO FFSD	Single	25 gramms	44	0	0	0	0	0
Dairy products (excluding cheeses) - butter - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	9	0	0	0	0	0

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Infantis
Dairy products (excluding cheeses) - cream - in total - Monitoring - official sampling	CAO FFSD	Single	25 gramms	5	0	0	0	0	0
Dairy products (excluding cheeses) - dairy desserts - at processing plant - Monitoring - official sampling	CAO FFSD	Single	25 gramms	57	0	0	0	0	0
Dairy products (excluding cheeses) - dairy desserts - at retail - Monitoring - official sampling	CAO FFSD	Single	25 gramms	46	0	0	0	0	0
Dairy products (excluding cheeses) - fermented dairy products - at processing plant - Monitoring - official sampling	CAO FFSD	Single	25 gramms	12	0	0	0	0	0
Dairy products (excluding cheeses) - fermented dairy products - at retail - Monitoring - official sampling	CAO FFSD	Single	25 gramms	27	0	0	0	0	0

Footnote:

CAO FFSD: Central Agricultural Office, Food and Feed Safety Directorate

2.1.4 Salmonella in animals

Table Salmonella in breeding flocks of Gallus gallus

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Hadar	S. Infantis	S. Typhimurium	S. Virchow	Salmonella spp., unspecified
Gallus gallus (fowl) - grandparent breeding flocks for broiler production line			---								
Gallus gallus (fowl) - parent breeding flocks, unspecified - day-old chicks [1)]	277	county reports	Flock	277	3	0	0	2	0	0	1
Gallus gallus (fowl) - parent breeding flocks, unspecified - during rearing period	277	county reports	Flock	277	4	0	0	4	0	0	0
Gallus gallus (fowl) - parent breeding flocks, unspecified - adult	641	county reports	Flock	641	41	0	0	15	0	0	26
Gallus gallus (fowl) - grandparent breeding flocks, unspecified	61	county reports	Flock	61	4	4	0	0	0	0	0
Gallus gallus (fowl) - elite breeding flocks, unspecified	12	county reports	Flock	12	0	0	0	0	0	0	0

Comments:

[1)] The number of existing flocks is the same than parent breeding flocks, unspecified - during rearing period.

Table Salmonella in other poultry

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl) - laying hens - day-old chicks [1)]	175	county reports	Flock	175	14	5	3	6
Gallus gallus (fowl) - laying hens - during rearing period	164	county reports	Flock	164	7	1	0	6
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling	887	county reports	Flock	887	79	31	3	45
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry			---					
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling			---					
Gallus gallus (fowl) - broilers - day-old chicks	4491	county reports	Flock	4491	257	24	32	201
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling	4491	county reports	Flock	4491	1456	13	7	1436
Turkeys - meat production flocks	362	CAO-VDD	Single	3885	271	16	3	252
Ducks - meat production flocks	385	CAO-VDD	Single	517	382	24	77	281
Geese - meat production flocks	553	CAO-VDD	Single	486	254	20	134	100

Comments:

[1)] Number of existing flocks is the same than Gallus gallus (fowl) - laying hens - during rearing period

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Cattle (bovine animals) - adult cattle over 2 years	CAO-VDD	Animal	30	13		1	12
Cattle (bovine animals) - calves (under 1 year)	CAO-VDD	Animal	148	18		5	13
Pigs	CAO-VDD	Animal	832	157	1	37	119
Solipeds, domestic	CAO-VDD	Animal	3	1			1
Cats - pet animals - at hospital or care home - Clinical investigations	CAO-VDD	Animal	12	1			1
Dogs - pet animals - at hospital or care home - Clinical investigations	CAO-VDD	Animal	20	1			1
Guinea pigs - pet animals - in total - Clinical investigations	CAO-VDD	Animal	1	1			1
Wild boars - in total - Clinical investigations	CAO-VDD	Animal	18	15			15
Wolves - zoo animal - at zoo - Clinical investigations	CAO-VDD	Animal	1	1			1

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Pigeons	CAO-VDD	Animal	7	7		7	
Birds - pet animals - in total - Clinical investigations	CAO-VDD	Animal	3	1			1
Birds - wild - Game birds - in total - Clinical investigations	CAO-VDD	Animal	1	1			1

2.1.5 Salmonella in feedingstuffs

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Compound feedingstuffs for cattle - final product	Official monitoring program	Single	1 kg	41	2	0	0	2
Compound feedingstuffs for pigs - final product	Official monitoring program	Single	1 kg	210	3	0	0	3
Compound feedingstuffs for poultry (non specified) - final product	Official monitoring program	Single	1 kg	11	0			
Compound feedingstuffs for poultry - laying hens - final product	Official monitoring program	Single	1 kg	47	0			
Compound feedingstuffs for poultry - broilers - final product	Official monitoring program	Single	1 kg	221	2	0	0	2
Pet food - dog snacks (pig ears, chewing bones)	Official monitoring program	Single	1 kg	61	1	0	0	1

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of cereal grain origin - barley derived	Official monitoring program	Single	1 kg	3	0			
Feed material of cereal grain origin - maize	Official monitoring program	Single	1 kg	12	0			
Feed material of cereal grain origin - maize - derived	Official monitoring program	Single	1 kg	10	0			
Feed material of cereal grain origin - wheat derived	Official monitoring program	Single	1 kg	12	0			
Feed material of oil seed or fruit origin - linseed derived	Official monitoring program	Single	1 kg	10	1	0	0	1
Feed material of oil seed or fruit origin - soya (bean) derived	Official monitoring program	Single	1 kg	8	0			
Feed material of oil seed or fruit origin - sunflower seed derived	Official monitoring program	Single	1 kg	4	0			

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of land animal origin - meat meal	Official monitoring program	Single	1 kg	17	0			
Feed material of marine animal origin - fish meal	Official monitoring program	Single	1 kg	4	0			

2.1.6 Salmonella serovars and phagetype distribution

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

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Turkeys - at farm - Monitoring - industry sampling	
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory	21	8	45	26	2663	12		96	365	10
Number of isolates serotyped	21	8	45	26	2663	12	0	85	365	10
Number of isolates per serovar										
Not typeable	0	0	0	0	23	0		0	1	0
Other serotypes	0	0	0	0	81	0		0	6	0
S. Agona	0	0	0	0	5	0		0	2	0
S. Anatum	1	0	0	0	5	0		2	5	0
S. Banana	0	0	0	0	8	1		0	0	0
S. Blockley	0	0	0	0	9	0		0	0	0

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Turkeys - at farm - Monitoring - industry sampling	
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory	21	8	45	26	2663	12		96	365	10
Number of isolates serotyped	21	8	45	26	2663	12	0	85	365	10
Number of isolates per serovar										
S. Bovismorbificans	2	0	1	0	34	0		0	2	3
S. Brandenburg	0	0	1	0	0	0		0	0	0
S. Bredeney	0	0	0	0	16	0		0	187	1
S. Choleraesuis	0	0	0	15	0	0		0	0	0
S. Derby	1	0	11	0	1	0		0	0	0
S. Dublin	0	3	0	0	0	0		0	0	0
S. Enteritidis	1	0	0	1	166	0		7	7	3
S. Gallinarum	0	0	0	0	0	1		0	0	0
S. Hadar	0	0	0	0	34	0		0	26	0
S. Indiana	0	0	0	0	7	0		0	0	0
S. Infantis	2	0	7	1	1950	0		9	50	0
S. Kentucky	0	0	0	0	2	0		0	2	0

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Turkeys - at farm - Monitoring - industry sampling	
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory	21	8	45	26	2663	12		96	365	10
Number of isolates serotyped	21	8	45	26	2663	12	0	85	365	10
Number of isolates per serovar										
S. Kottbus	0	0	0	0	9	0		1	2	0
S. Livingstone	0	0	0	0	31	2		6	1	1
S. London	0	0	3	0	0	0		0	0	0
S. Manhattan	0	0	0	0	18	0		0	0	0
S. Mbandaka	0	0	0	0	5	0		0	0	0
S. Montevideo	0	0	0	0	19	0		0	0	0
S. Muenchen	0	0	1	0	0	0		0	0	0
S. Newport	0	0	0	0	8	0		0	19	1
S. Ohio	0	0	0	0	31	0		0	0	0
S. Saintpaul	0	0	0	0	12	0		0	43	1
S. Senftenberg	2	0	1	0	90	0		0	1	0
S. Typhimurium	11	2	13	7	62	8		59	1	0

Table Salmonella serovars in animals

Serovar	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Turkeys - at farm - Monitoring - industry sampling	
Sources of isolates	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical	Monitoring	Clinical
Number of isolates in the laboratory	21	8	45	26	2663	12		96	365	10
Number of isolates serotyped	21	8	45	26	2663	12	0	85	365	10
Number of isolates per serovar										
S. Virchow	0	0	0	0	3	0		0	9	0
S. group B, monophasic strain	1	3	7	2	21	0		0	1	0
S. group C1, monophasic strain	0	0	0	0	13	0		1	0	0

Table Salmonella serovars in food

Serovar	Meat from bovine animals	Meat from pig	Meat from broilers (Gallus gallus)	Meat from other poultry species	Other products of animal origin	Meat from turkey - Unspecified - Monitoring
Sources of isolates	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring
Number of isolates in the laboratory	11	87	629	32	17	195
Number of isolates serotyped	9	82	624	31	17	183
Number of isolates per serovar						
S. Agona	0	1	0	0	0	1
S. Anatum	0	2	0	2	0	0
S. Blockley	0	2	0	1	0	8
S. Bovismorbificans	1	0	5	0	0	9
S. Bredeney	0	4	9	0	0	64
S. Derby	0	7	1	0	0	0
S. Enteritidis	0	10	7	2	11	3
S. Goldcoast	1	0	0	0	0	0
S. Hadar	0	0	5	0	0	2
S. Infantis	2	21	585	7	2	37
S. Kottbus	0	0	3	1	0	0

Table Salmonella serovars in food

Serovar	Meat from bovine animals	Meat from pig	Meat from broilers (Gallus gallus)	Meat from other poultry species	Other products of animal origin	Meat from turkey - Unspecified - Monitoring
Sources of isolates	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring	Monitoring
Number of isolates in the laboratory	11	87	629	32	17	195
Number of isolates serotyped	9	82	624	31	17	183
Number of isolates per serovar						
S. Livingstone	0	3	2	6	0	1
S. London	0	6	0	0	0	0
S. Newport	0	0	0	0	0	22
S. Rissen	2	3	0	0	0	0
S. Saintpaul	0	1	1	0	0	26
S. Senftenberg	0	0	0	0	1	5
S. Typhimurium	2	19	3	12	3	0
S. Virchow	0	0	0	0	0	5
S. group C1, monophasic strain	0	1	0	0	0	0
S. group D, monophasic strain	1	2	3	0	0	0

Table Salmonella Enteritidis phagetypes in humans

Phagetype	Humans	
	Monitoring	Clinical
	879	362
	879	362
Not typeable	58	15
Other	42	14
PT 1	20	15
PT 13a		7
PT 14b	37	14
PT 1b	9	4
PT 2	129	48
PT 21	151	59
PT 3		4
PT 33	28	9
PT 4	88	42
PT 4b	9	1

Table Salmonella Enteritidis phagetypes in humans

Phagetype	Humans	
	Monitoring	Clinical
	879	362
	879	362
PT 51	150	38
PT 6	41	24
PT 6a	19	5
PT 8	88	59
PT RDNC	10	4

Table Salmonella Typhimurium phagetypes in humans

Phagetype	Humans	
	Monitoring	Clinical
	405	131
	405	131
DT 1	9	1
DT 104H	11	3
DT 104b	76	41
DT 104l	51	13
DT 124		7
DT 14	6	1
DT 193	131	29
DT 193a	4	5
DT 195	16	5
DT 208	4	2
DT 35	4	1
DT 46a	7	3

Table Salmonella Typhimurium phagetypes in humans

Phagetype	Humans	
	Monitoring	Clinical
	405	131
	405	131
DT 9	8	3
DT 92		3
DT 99	5	
Not typeable	8	1
Other	20	6
RDNC	16	3
U 302	9	4
U 310	16	
U 311	4	

2.1.7 Antimicrobial resistance in Salmonella isolates

A. 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 resistence 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 resistence 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.

B. 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

Table Antimicrobial susceptibility testing of Salmonella in Gallus gallus (fowl) - broilers

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.	
Isolates out of a monitoring program (yes/no)			yes			
Number of isolates available in the laboratory			6			
Antimicrobials:	N	n	N	n	N	n
Amphenicols - Chloramphenicol			6	0		
Amphenicols - Florfenicol			6	0		
Cephalosporins - 3rd generation cephalosporins			6	0		
Fluoroquinolones - Enrofloxacin			6	0		
Quinolones - Nalidixic acid			6	0		
Sulfonamides - Sulfonamide			4	3		
Aminoglycosides - Streptomycin			6	0		
Penicillins - Ampicillin			6	0		
Tetracyclines - Tetracycline			6	0		

Table Antimicrobial susceptibility testing of Salmonella in meat from other poultry species

Salmonella	Salmonella spp.		S. Enteritidis		S. Infantis		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes		yes		yes	
Number of isolates available in the laboratory	98		23		24		17	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	98	6	23	0	24	1	17	3
Amphenicols - Florfenicol	0	0	0	0	0	0	0	0
Cephalosporins - 3rd generation cephalosporins	98	0	23	0	24	0	17	0
Fluoroquinolones - Ciprofloxacin	98	49	23	0	24	20	17	0
Fluoroquinolones - Enrofloxacin	98	49	23	0	24	20	17	0
Quinolones - Nalidixic acid	98	54	23	0	24	20	17	1
Trimethoprim	98	13	23	11	24	3	17	0
Sulfonamides - Sulfonamide	98	34	23	11	24	17	17	4
Aminoglycosides - Streptomycin	98	30	23	0	24	15	17	3
Aminoglycosides - Gentamicin	98	5	23	0	24	0	17	0
Aminoglycosides - Neomycin	98	5	23	0	24	0	17	1
Aminoglycosides - Kanamycin	98	5	23	0	23	0	17	1
Trimethoprim + sulfonamides	98	13	23	11	24	3	17	0
Penicillins - Ampicillin	98	60	23	11	24	0	17	3
Tetracyclines - Tetracycline	98	72	23	11	24	18	17	3
Fully sensitive	98	20	23	12	24	2	17	11
Resistant to 1 antimicrobial	98	2	23	0	24	2	17	2
Resistant to 2 antimicrobials	98	8	23	0	24	0	17	0
Resistant to 3 antimicrobials	98	13	23	0	24	3	17	1
Resistant to 4 antimicrobials	98	4	23	0	24	0	17	0

Table Antimicrobial susceptibility testing of Salmonella in meat from other poultry species

Salmonella	Salmonella spp.		S. Enteritidis		S. Infantis		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes		yes		yes	
Number of isolates available in the laboratory	98		23		24		17	
Antimicrobials:	N	n	N	n	N	n	N	n
Resistant to >4 antimicrobials	98	51	23	11	24	17	17	3

Table Antimicrobial susceptibility testing of Salmonella in meat from broilers (Gallus gallus)

Salmonella	Salmonella spp.		S. Enteritidis		S. Infantis		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes		yes		yes	
Number of isolates available in the laboratory	26		7		138		3	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	26	1	7	0	138	5	3	0
Amphenicols - Florfenicol	0	0	0	0	0	0	0	0
Cephalosporins - 3rd generation cephalosporins	26	0	7	0	138	0	3	0
Fluoroquinolones - Ciprofloxacin	26	9	7	2	138	136	3	0
Fluoroquinolones - Enrofloxacin	26	7	7	2	138	126	3	0
Quinolones - Nalidixic acid	26	9	7	2	138	137	3	0
Trimethoprim	26	5	7	0	138	3	3	0
Sulfonamides - Sulfonamide	26	9	7	1	138	123	3	2
Aminoglycosides - Streptomycin	26	8	7	0	138	121	3	1
Aminoglycosides - Gentamicin	26	0	7	0	138	1	3	0
Aminoglycosides - Neomycin	26	1	7	0	138	1	3	0
Aminoglycosides - Kanamycin	26	1	7	0	138	1	3	0
Trimethoprim + sulfonamides	26	5	7	0	138	3	3	0
Penicillins - Ampicillin	26	3	7	0	138	1	3	2
Tetracyclines - Tetracycline	26	8	7	0	138	127	3	2
Fully sensitive	26	13	7	4	138	0	3	1
Resistant to 1 antimicrobial	26	2	7	1	138	1	3	0
Resistant to 2 antimicrobials	26	0	7	0	138	1	3	0
Resistant to 3 antimicrobials	26	1	7	2	138	0	3	0
Resistant to 4 antimicrobials	26	2	7	0	138	9	3	1

Table Antimicrobial susceptibility testing of Salmonella in meat from broilers (Gallus gallus)

Salmonella	Salmonella spp.		S. Enteritidis		S. Infantis		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes		yes		yes	
Number of isolates available in the laboratory	26		7		138		3	
Antimicrobials:	N	n	N	n	N	n	N	n
Resistant to >4 antimicrobials	26	8	7	0	138	127	3	1

Table Antimicrobial susceptibility testing of Salmonella in meat from pig

Salmonella	Salmonella spp.		S. Enteritidis		S. Infantis		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes		yes		yes	
Number of isolates available in the laboratory	50		9		10		42	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	50	1	9	0	10	0	42	14
Amphenicols - Florfenicol	0	0	0	0	0	0	0	0
Cephalosporins - 3rd generation cephalosporins	50	0	9	0	10	0	42	0
Fluoroquinolones - Ciprofloxacin	50	5	9	0	10	7	42	3
Fluoroquinolones - Enrofloxacin	50	4	9	0	10	6	42	3
Quinolones - Nalidixic acid	50	6	9	0	10	7	42	3
Trimethoprim	50	10	9	0	10	0	42	7
Sulfonamides - Sulfonamide	50	27	9	1	10	7	42	38
Aminoglycosides - Streptomycin	50	11	9	0	10	0	42	29
Aminoglycosides - Gentamicin	50	0	9	0	10	0	42	0
Aminoglycosides - Neomycin	50	5	9	0	10	0	42	1
Aminoglycosides - Kanamycin	50	6	9	0	10	0	42	1
Trimethoprim + sulfonamides	50	10	9	0	10	0	42	7
Penicillins - Ampicillin	50	7	9	0	10	0	42	29
Tetracyclines - Tetracycline	50	15	9	0	10	7	42	32
Fully sensitive	50	4	9	8	10	3	42	4
Resistant to 1 antimicrobial	50	27	9	1	10	0	42	3
Resistant to 2 antimicrobials	50	1	9	0	10	0	42	1
Resistant to 3 antimicrobials	50	9	9	0	10	0	42	2
Resistant to 4 antimicrobials	50	4	9	0	10	1	42	6

Table Antimicrobial susceptibility testing of Salmonella in meat from pig

Salmonella	Salmonella spp.		S. Enteritidis		S. Infantis		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes		yes		yes	
Number of isolates available in the laboratory	50		9		10		42	
Antimicrobials:	N	n	N	n	N	n	N	n
Resistant to >4 antimicrobials	50	5	9	0	10	6	42	26

Table Antimicrobial susceptibility testing of Salmonella in meat from bovine animals

Salmonella	Salmonella spp.		S. Enteritidis		S. Infantis		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes				yes	
Number of isolates available in the laboratory	2		0		0		3	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	2	0	0	0	0	0	3	0
Amphenicols - Florfenicol	0	0	0	0	0	0	0	0
Cephalosporins - 3rd generation cephalosporins	2	0	0	0	0	0	3	0
Fluoroquinolones - Ciprofloxacin	2	0	0	0	0	0	3	0
Fluoroquinolones - Enrofloxacin	2	0	0	0	0	0	3	0
Quinolones - Nalidixic acid	2	0	0	0	0	0	3	1
Trimethoprim	2	0	0	0	0	0	3	0
Sulfonamides - Sulfonamide	2	1	0	0	0	0	3	3
Aminoglycosides - Streptomycin	2	0	0	0	0	0	3	3
Aminoglycosides - Gentamicin	2	0	0	0	0	0	3	1
Aminoglycosides - Neomycin	2	0	0	0	0	0	3	0
Aminoglycosides - Kanamycin	2	0	0	0	0	0	3	0
Trimethoprim + sulfonamides	2	1	0	0	0	0	3	1
Penicillins - Ampicillin	2	0	0	0	0	0	3	2
Tetracyclines - Tetracycline	2	1	0	0	0	0	3	2
Fully sensitive	2	1	0	0	0	0	3	0
Resistant to 1 antimicrobial	2	0	0	0	0	0	3	0
Resistant to 2 antimicrobials	2	0	0	0	0	0	3	0
Resistant to 3 antimicrobials	2	0	0	0	0	0	3	1
Resistant to 4 antimicrobials	2	1	0	0	0	0	3	1

Table Antimicrobial susceptibility testing of Salmonella in meat from bovine animals

Salmonella	Salmonella spp.		S. Enteritidis		S. Infantis		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes				yes	
Number of isolates available in the laboratory	2		0		0		3	
Antimicrobials:	N	n	N	n	N	n	N	n
Resistant to >4 antimicrobials	2	0	0	0	0	0	3	1

Table Antimicrobial susceptibility testing of Salmonella in humans

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.	
Isolates out of a monitoring program (yes/no)	no		no		no	
Number of isolates available in the laboratory	103		550		474	
Antimicrobials:	N	n	N	n	N	n
Amphenicols - Chloramphenicol	96	0	550	128	474	13
Cephalosporins - 3rd generation cephalosporins	103	0	550	2	474	1
Fluoroquinolones - Ciprofloxacin	103	0	550	0	474	2
Quinolones - Nalidixic acid	103	4	550	24	474	266
Trimethoprim	96	1	550	96	474	29
Sulfonamides - Sulfonamide	96	1	469	300	474	209
Aminoglycosides - Streptomycin	96	3	550	313	474	247
Aminoglycosides - Gentamicin	96	0	550	1	474	4
Aminoglycosides - Kanamycin	96	0	550	9	474	5
Trimethoprim + sulfonamides	102	0	550	82	474	28
Penicillins - Ampicillin	103	0	550	371	474	41
Tetracyclines - Tetracycline	103	1	550	394	474	236
Fully sensitive			550	108	474	147
Resistant to 1 antimicrobial	103	10	550	72	474	64
Resistant to 2 antimicrobials	103	0	550	20	474	24
Resistant to 3 antimicrobials	103	0	550	21	474	46
Resistant to 4 antimicrobials	103	0	550	160	474	156
Resistant to >4 antimicrobials	103	0	550	169	474	37
Number of multiresistant S. Typhimurium - with penta resistance			550	73		
Number of multiresistant S. Typhimurium - resistant to other antimicrobials			550	369		

Table Antimicrobial susceptibility testing of S. Enteritidis in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Enteritidis	Pigs - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	1																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	1	0																					1		
Amphenicols - Florfenicol	14	1	0																							
Tetracyclines - Tetracycline	11	1	0																			1				
Fluoroquinolones - Ciprofloxacin	21	1	0																	1						
Fluoroquinolones - Enrofloxacin	22	1	0																							
Quinolones - Nalidixic acid	13	1	0																					1		
Sulfonamides - Sulfonamide	12	1	0																			1				
Aminoglycosides - Streptomycin	11	1	0													1										
Penicillins - Ampicillin	13	1	0																			1				
Cephalosporins - Cefotaxim	23	1	0																							

S. Enteritidis	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol		1					
Tetracyclines - Tetracycline							
Fluoroquinolones - Ciprofloxacin							

Table Antimicrobial susceptibility testing of S. Enteritidis in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Enteritidis	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Fluoroquinolones - Enrofloxacin						1	
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim			1				

Table Antimicrobial susceptibility testing of S. Choleraesuis in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Choleraesuis	Pigs - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	6																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	6	3	3																		1			1	1
Amphenicols - Florfenicol	14	6	3	3																		1	1	1		
Tetracyclines - Tetracycline	11	6	3	3														1	1	1						
Fluoroquinolones - Enrofloxacin	16	6	0																		2		1		1	
Quinolones - Nalidixic acid	15	6	3	3															1				1	1		
Sulfonamides - Sulfonamide	12	6	3	3																1	1					
Aminoglycosides - Streptomycin	11	6	3	3							1		2													
Aminoglycosides - Gentamicin	12	6	0											1		2	2				1					
Penicillins - Ampicillin	13	6	3	3													1				1	1				
Cephalosporins - Cefotaxim	23	6	0																					1		2

S. Choleraesuis	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	6						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin		1	1				

Table Antimicrobial susceptibility testing of S. Choleraesuis in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Choleraesuis	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	6						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide		1					
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	1				1	1	

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

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Bovismorbificans	Gallus gallus (fowl) - laying hens - at farm - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	7																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	7	0																					1		1
Amphenicols - Florfenicol	14	7	0																		1			2		1
Tetracyclines - Tetracycline	13	7	0															1	1	2	1	1				
Fluoroquinolones - Enrofloxacin	22	6	0																							1
Quinolones - Nalidixic acid	13	6	0																			1	2	1	1	
Sulfonamides - Sulfonamide	12	7	4	3						1								2			1					
Aminoglycosides - Streptomycin	11	7	0											4	1	1										
Aminoglycosides - Gentamicin	19	7	0														1	3		1	1					
Penicillins - Ampicillin	13	7	0																1	3	1		1			
Cephalosporins - Cefotaxim	23	7	0																							1

S. Bovismorbificans	Gallus gallus (fowl) - laying hens - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	7						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol		2		1		1	1
Amphenicols - Florfenicol				2			1
Tetracyclines - Tetracycline							1
Fluoroquinolones - Enrofloxacin	1	2				1	1

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

S. Bovismorbificans	Gallus gallus (fowl) - laying hens - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	7						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							1
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin		1					
Aminoglycosides - Gentamicin							1
Penicillins - Ampicillin							1
Cephalosporins - Cefotaxim	1	2				2	1

Table Antimicrobial susceptibility testing of S. Bovismorbificans in Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Bovismorbificans	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	2																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Florfenicol	14	2	0																					1		
Tetracyclines - Tetracycline	13	2	0															1				1				
Fluoroquinolones - Enrofloxacin	22	2	0																					1		
Quinolones - Nalidixic acid	13	2	1	1																				1		
Sulfonamides - Sulfonamide	12	2	1	1																		1				
Aminoglycosides - Streptomycin	11	2	0										1		1											
Aminoglycosides - Gentamicin	19	2	0											1								1				
Penicillins - Ampicillin	13	2	0																1					1		
Cephalosporins - Cefotaxim	23	2	0																			1				

S. Bovismorbificans	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	2						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Florfenicol	1						
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin			1				
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							

Table Antimicrobial susceptibility testing of S. Bovismorbificans in Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Bovismorbificans	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	2						
Antimicrobials:	29	30	31	32	33	34	>=35
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim				1			

Table Antimicrobial susceptibility testing of S. Infantis in Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Infantis	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring																									
Isolates out of a monitoring program (yes/no)	yes																									
Number of isolates available in the laboratory	275																									
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	274	2	2												20	14	41	18	55	19	44	15	22	3	12
Amphenicols - Florfenicol	14	273	1									1		1	2	1	72	49	22	36	14	36	8	20	2	6
Tetracyclines - Tetracycline	11	275	233	174	1	22	14	17	5				1		3	10	4	8	8	7	1					
Fluoroquinolones - Enrofloxacin	22	275	10											10		19	17	34	9	2	82	28	19	14	6	16
Quinolones - Nalidixic acid	13	275	252	251				1												3	1	5	1	9	3	1
Sulfonamides - Sulfonamide	22	274	240	238						2			1		3	7	2	4	1	3	1	1		7		4
Aminoglycosides - Streptomycin	11	274	43	2		1		4	36	47	46	1	96	16	11	8	1	2		2				1		
Aminoglycosides - Gentamicin	19	275	0										1	7	5	46	18	57	48	35	21	26	5	5		1
Penicillins - Ampicillin	13	275	17	17											14	27	24	51	30	37	27	22	11	9		4
Cephalosporins - Cefotaxim	23	275	0																		13	16	9	28	29	61

S. Infantis	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	275						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol		7	1	1			
Amphenicols - Florfenicol		2					1
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	3	5	1	7			3

Table Antimicrobial susceptibility testing of S. Infantis in Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Infantis	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	275						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin		2					
Cephalosporins - Cefotaxim	9	47	9	31	4	9	10

Table Antimicrobial susceptibility testing of S. Kottbus in Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Kottbus	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	1																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	1	0																			1				
Amphenicols - Florfenicol	14	1	0																			1				
Tetracyclines - Tetracycline	13	1	0																					1		
Fluoroquinolones - Enrofloxacin	22	1	0																			1				
Quinolones - Nalidixic acid	13	1	1	1																						
Sulfonamides - Sulfonamide	12	1	0																						1	
Aminoglycosides - Streptomycin	11	1	0										1													
Aminoglycosides - Gentamicin	19	1	0														1									
Penicillins - Ampicillin	13	1	1	1																						
Cephalosporins - Cefotaxim	23	1	0																							

S. Kottbus	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin							

Table Antimicrobial susceptibility testing of S. Kottbus in Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Kottbus	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim		1					

Table Antimicrobial susceptibility testing of S. Bovismorbificans in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Bovismorbificans	Pigs - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	1																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	1	0																			1				
Amphenicols - Florfenicol	14	1	0																			1				
Tetracyclines - Tetracycline	13	1	0																			1				
Fluoroquinolones - Enrofloxacin	22	1	0																							
Quinolones - Nalidixic acid	13	1	0																			1				
Sulfonamides - Sulfonamide	12	1	0																	1						
Aminoglycosides - Streptomycin	11	1	0											1												
Aminoglycosides - Gentamicin	12	1	0													1										
Penicillins - Ampicillin	13	1	0																	1						
Cephalosporins - Cefotaxim	23	1	0																							

S. Bovismorbificans	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin				1			

Table Antimicrobial susceptibility testing of S. Bovismorbificans in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Bovismorbificans	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim						1	

Table Antimicrobial susceptibility testing of S. Derby in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Derby	Pigs - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	11																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	11	0																2		1	5	2	1		
Amphenicols - Florfenicol	14	11	0															2		1	2	4	1			1
Tetracyclines - Tetracycline	13	11	5	5													1	2		2	1					
Fluoroquinolones - Enrofloxacin	22	11	0																							4
Quinolones - Nalidixic acid	13	11	0																		2	4	2	1	2	
Sulfonamides - Sulfonamide	12	11	6	6														1		1		1		1		1
Aminoglycosides - Streptomycin	11	11	1			1							5	3	2											
Aminoglycosides - Gentamicin	12	11	0													4	2	1	2	1	1					
Penicillins - Ampicillin	13	11	0																	4	3	1	3			
Cephalosporins - Cefotaxim	23	11	0																				1			2

S. Derby	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	11						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	1	2	1	2	1		

Table Antimicrobial susceptibility testing of S. Derby in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Derby	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	11						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	4	3	1				

Table Antimicrobial susceptibility testing of S. Infantis in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Infantis	Pigs - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	6																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	6	0													2				1		1		1		1
Amphenicols - Florfenicol	14	6	0														2			2	1					1
Tetracyclines - Tetracycline	11	6	5	2		1		1	1									1								
Fluoroquinolones - Enrofloxacin	22	6	0													2					3					
Quinolones - Nalidixic acid	13	6	5	5																		1				
Sulfonamides - Sulfonamide	12	6	5	5																1						
Aminoglycosides - Streptomycin	11	6	5						5					1												
Aminoglycosides - Gentamicin	19	6	0											2				3		1						
Penicillins - Ampicillin	13	6	0												2				2		1	1				
Cephalosporins - Cefotaxim	23	5	0																		1		2	1		

S. Infantis	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	6						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	1						

Table Antimicrobial susceptibility testing of S. Infantis in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Infantis	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	6						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim		1					

Table Antimicrobial susceptibility testing of S. Infantis in Pigs - breeding animals - at farm - environmental sample - boot swabs - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Infantis	Pigs - breeding animals - at farm - environmental sample - boot swabs - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	1																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	1	0																							
Amphenicols - Florfenicol	14	1	0																							
Tetracyclines - Tetracycline	13	1	0																	1						
Fluoroquinolones - Enrofloxacin	22	1	0																							
Quinolones - Nalidixic acid	13	1	0																	1						
Sulfonamides - Sulfonamide	12	1	1	1																						
Aminoglycosides - Streptomycin	11	1	0											1												
Aminoglycosides - Gentamicin	19	1	0															1								
Penicillins - Ampicillin	13	1	0																			1				
Cephalosporins - Cefotaxim	23	1	0																							

S. Infantis	Pigs - breeding animals - at farm - environmental sample - boot swabs - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol		1					
Amphenicols - Florfenicol		1					
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin					1		

Table Antimicrobial susceptibility testing of S. Infantis in Pigs - breeding animals - at farm - environmental sample - boot swabs - Monitoring - quantitative data [Diffusion method]

S. Infantis	Pigs - breeding animals - at farm - environmental sample - boot swabs - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim		1					

Table Antimicrobial susceptibility testing of S. Senftenberg in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Senftenberg	Pigs - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	1																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	1	0										1													
Amphenicols - Florfenicol	16	1	1						1																	
Tetracyclines - Tetracycline	11	1	0										1													
Fluoroquinolones - Enrofloxacin	22	1	0																							1
Quinolones - Nalidixic acid	13	1	0														1									
Sulfonamides - Sulfonamide	12	1	0																			1				
Aminoglycosides - Streptomycin	11	1	0											1												
Aminoglycosides - Gentamicin	19	1	0														1									
Penicillins - Ampicillin	13	1	1								1															
Cephalosporins - Cefotaxim	23	1	0																				1			

S. Senftenberg	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin							

Table Antimicrobial susceptibility testing of S. Senftenberg in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Senftenberg	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim							

Table Antimicrobial susceptibility testing of S. Bovismorbificans in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Bovismorbificans	Cattle (bovine animals) - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	2																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	2	0																	1		1				
Amphenicols - Florfenicol	14	2	0																			1		1		
Tetracyclines - Tetracycline	13	2	0											1				1								
Fluoroquinolones - Enrofloxacin	22	2	0																				1			1
Quinolones - Nalidixic acid	13	2	0																			1	1			
Sulfonamides - Sulfonamide	12	2	0											1	1											
Aminoglycosides - Streptomycin	11	2	0											1	1											
Aminoglycosides - Gentamicin	19	2	0														1	1								
Penicillins - Ampicillin	13	2	0																1		1					
Cephalosporins - Cefotaxim	23	2	0																							

S. Bovismorbificans	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	2						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin							

Table Antimicrobial susceptibility testing of S. Bovismorbificans in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Bovismorbificans	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	2						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	1	1					

Table Antimicrobial susceptibility testing of S. Anatum in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Anatum	Cattle (bovine animals) - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	1																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	1	0																				1			
Amphenicols - Florfenicol	14	1	0																			1				
Tetracyclines - Tetracycline	13	1	0													1										
Fluoroquinolones - Enrofloxacin	22	1	0																				1			
Quinolones - Nalidixic acid	13	1	0																		1					
Sulfonamides - Sulfonamide	12	1	0																		1					
Aminoglycosides - Streptomycin	11	1	0											1												
Aminoglycosides - Gentamicin	12	1	0														1									
Penicillins - Ampicillin	13	1	0																1							
Cephalosporins - Cefotaxim	23	1	0																							

S. Anatum	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin							

Table Antimicrobial susceptibility testing of S. Anatum in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Anatum	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim		1					

Table Antimicrobial susceptibility testing of S. Derby in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Derby	Cattle (bovine animals) - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	1																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	1	0																				1			
Amphenicols - Florfenicol	14	1	0																			1				
Tetracyclines - Tetracycline	13	1	0																1							
Fluoroquinolones - Enrofloxacin	22	1	0																							
Quinolones - Nalidixic acid	13	1	0																				1			
Sulfonamides - Sulfonamide	12	1	1							1																
Aminoglycosides - Streptomycin	11	1	0												1											
Aminoglycosides - Gentamicin	19	1	0															1								
Penicillins - Ampicillin	13	1	0																		1					
Cephalosporins - Cefotaxim	23	1	0																							1

S. Derby	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin						1	

Table Antimicrobial susceptibility testing of S. Derby in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Derby	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim							

Table Antimicrobial susceptibility testing of S. Typhimurium in Pigeons - wild - at farm - animal sample - Clinical investigations - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Typhimurium	Pigeons - wild - at farm - animal sample - Clinical investigations																									
Isolates out of a monitoring program (yes/no)	yes																									
Number of isolates available in the laboratory	3																									
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	3	0																					1		
Amphenicols - Florfenicol	16	3	0																					1		
Tetracyclines - Tetracycline	13	3	0																		1	1				1
Fluoroquinolones - Enrofloxacin	22	3	0																						1	
Quinolones - Nalidixic acid	13	3	0																				1		1	
Sulfonamides - Sulfonamide	12	3	0												1									2		
Aminoglycosides - Streptomycin	13	3	1						1				1	1												
Aminoglycosides - Gentamicin	12	3	0																		2			1		
Penicillins - Ampicillin	13	2	0																1							
Cephalosporins - Cefotaxim	23	3	0																							1

S. Typhimurium	Pigeons - wild - at farm - animal sample - Clinical investigations						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	3						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol		1					1
Amphenicols - Florfenicol	1	1					
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin						1	1

Table Antimicrobial susceptibility testing of S. Typhimurium in Pigeons - wild - at farm - animal sample - Clinical investigations - quantitative data [Diffusion method]

S. Typhimurium	Pigeons - wild - at farm - animal sample - Clinical investigations						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	3						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid		1					
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin		1					
Cephalosporins - Cefotaxim				1			1

Table Antimicrobial susceptibility testing of S. Typhimurium in Ducks - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Typhimurium	Ducks - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	28																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	28	2	2															1			3	1	7	2	7
Amphenicols - Florfenicol	14	28	0																	4	1	2		8		6
Tetracyclines - Tetracycline	13	28	0													3	2	3	4	6	8	1	1			
Fluoroquinolones - Enrofloxacin	22	28	0																				2			2
Quinolones - Nalidixic acid	13	26	0															1	3	3	6	4	4	2	2	
Sulfonamides - Sulfonamide	12	28	6	3						3			1		2	2	1	5		2	1	4	1			2
Aminoglycosides - Streptomycin	11	28	0										9	5	6	6	2									
Aminoglycosides - Gentamicin	19	27	0											1	1	2	1	5	5	4	5		2	1		
Penicillins - Ampicillin	13	26	0													1		2		3	6	3	1	3	2	2
Cephalosporins - Cefotaxim	23	28	0																			1			2	2

S. Typhimurium	Ducks - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	28						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol		4		1			
Amphenicols - Florfenicol	2	5					
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	2	5	4	4	2	3	4

Table Antimicrobial susceptibility testing of S. Typhimurium in Ducks - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Typhimurium	Ducks - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	28						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid		1					
Sulfonamides - Sulfonamide						1	
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin		3					
Cephalosporins - Cefotaxim		5	1	5	2	4	6

Table Antimicrobial susceptibility testing of S. Typhimurium in Geese - unspecified - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Typhimurium	Geese - unspecified - at farm - animal sample - Monitoring																									
Isolates out of a monitoring program (yes/no)	yes																									
Number of isolates available in the laboratory	29																									
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	12	29	2	2																	1		4	3	1	3
Amphenicols - Florfenicol	14	28	0																	1		4	4	2	1	5
Tetracyclines - Tetracycline	13	29	1	1												2	1	4	4	4	6	5	2			
Fluoroquinolones - Enrofloxacin	22	29	0																					1		
Quinolones - Nalidixic acid	13	29	0																1	1	5	2	9	2	6	3
Sulfonamides - Sulfonamide	12	29	5	3		2									1	1	2		2	3	2	7	1	2		1
Aminoglycosides - Streptomycin	11	29	2	2									5	6	6	5	5									
Aminoglycosides - Gentamicin	22	29	0														2	4	5	5	6	5	2			
Penicillins - Ampicillin	13	29	2	2											1			1	1	1	2	3	6	5	2	4
Cephalosporins - Cefotaxim	23	29	0																							1

S. Typhimurium	Geese - unspecified - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	29						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	2	4		5		4	
Amphenicols - Florfenicol	1	5	3	1		1	
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	2	5	2	4	2	5	8

Table Antimicrobial susceptibility testing of S. Typhimurium in Geese - unspecified - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

S. Typhimurium	Geese - unspecified - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	29						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide	1						1
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin		1					
Cephalosporins - Cefotaxim	3	4	1	5	1	1	13

Table Antimicrobial susceptibility testing of S. Enteritidis in Guinea pigs - pet animals - at hospital or care home - Clinical investigations - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

S. Enteritidis	Guinea pigs - pet animals - at hospital or care home - Clinical investigations																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	1																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Florfenicol	14	1	0																			1				
Tetracyclines - Tetracycline	13	1	0															1								
Fluoroquinolones - Enrofloxacin	22	1	0																							1
Quinolones - Nalidixic acid	13	1	0																				1			
Sulfonamides - Sulfonamide	12	1	0														1									
Aminoglycosides - Streptomycin	13	1	0																			1				
Aminoglycosides - Gentamicin	12	1	0																1							
Penicillins - Ampicillin	13	1	0															1								
Cephalosporins - Cefotaxim	23	1	0																			1				

S. Enteritidis	Guinea pigs - pet animals - at hospital or care home - Clinical investigations						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin							
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							

Table Antimicrobial susceptibility testing of S. Enteritidis in Guinea pigs - pet animals - at hospital or care home - Clinical investigations - quantitative data [Diffusion method]

S. Enteritidis	Guinea pigs - pet animals - at hospital or care home - Clinical investigations						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	1						
Antimicrobials:	29	30	31	32	33	34	>=35
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim							

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

Test Method Used
Disc diffusion

Standard methods used for testing
NCCLS/CLSI

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol			12
	Florfenicol			14
Tetracyclines	Tetracycline			11
Fluoroquinolones	Ciprofloxacin			15
	Enrofloxacin			16
Quinolones	Nalidixic acid			13
Sulfonamides	Sulfonamide			12
Aminoglycosides	Streptomycin			11
	Gentamicin			12
	Neomycin			12
	Kanamycin			13
Cephalosporins	3rd generation cephalosporins			14
	Cefotaxim			14
Penicillins	Ampicillin			13

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

Test Method Used	Standard methods used for testing
Disc diffusion	EFSA Q 2006 045.

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol		16	15
Tetracyclines	Tetracycline		8	15
Fluoroquinolones	Ciprofloxacin		0.12	28
	Enrofloxacin		0.5	22
Quinolones	Nalidixic acid		16	18
Trimethoprim	Trimethoprim		2	9
Sulfonamides	Sulfonamide		256	6
	Sulfonamides		256	10
Aminoglycosides	Streptomycin		32	12
	Gentamicin		2	15
	Neomycin		16	17
	Kanamycin		16	17
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		2	10
Cephalosporins	3rd generation cephalosporins		0.1	25

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

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Cephalosporins	Cefotaxim		0.5	27
Penicillins	Ampicillin		4	20

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 <=
Amphenicols	Chloramphenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.06	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulfonamides	Sulfonamides		256	
Aminoglycosides	Streptomycin		32	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.5	
Penicillins	Ampicillin		4	

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 invetigations 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, desinfection, 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 oxigen 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 sesonal disribution of 30 % in winter to more than 60% in the summer months.

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus) - fresh - at processing plant [1)]	CAO FFSD	Single	25g	291	78	29	49	0	0	0
Meat from broilers (Gallus gallus) - fresh - at retail [2)]	CAO FFSD	Single	25g	64	11	5	6	0	0	0
Meat from duck - at slaughterhouse [3)]	CAO FFSD	Single	25g	95	6	0	6	0	0	0
Meat from duck - at retail [4)]	CAO FFSD	Single	25g	51	2	0	2	0	0	0
Meat from geese - at slaughterhouse [5)]	CAO FFSD	Single	25g	128	1	0	1	0	0	0
Meat from geese - at retail [6)]	CAO FFSD	Single	25g	23	1	0	1	0	0	0
Meat from turkey - fresh - at processing plant [7)]	CAO FFSD	Single	25g	171	2	1	1	0	0	0
Meat from turkey - fresh - at retail [8)]	CAO FFSD	Single	25g	131	7	4	3	0	0	0

Comments:

[1)] no
[2)] no
[3)] no
[4)] no
[5)] no
[6)] no
[7)] no
[8)] no

Table Campylobacter in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from bovine animals - fresh - at processing plant [1)]	CAO FFSD	Single	25g	274	1	0	1	0	0	0
Meat from bovine animals - fresh - at retail [2)]	CAO FFSD	Single	25g	57	1	0	1	0	0	0
Meat from pig - fresh - at processing plant [3)]	CAO FFSD	Single	25g	283	4	2	2	0	0	0
Meat from pig - fresh - at retail [4)]	CAO FFSD	Single	25g	52	1	0	1	0	0	0
Milk, cows' - raw milk for manufacture - intended for manufacture of raw or low heat-treated products [5)]	CAO FFSD	Single	25ml	197	1	0	1	0	0	0
Milk, goats' - raw milk for manufacture - intended for manufacture of raw or low heat-treated products [6)]	CAO FFSD	Single	50ml	1	0	0	0	0	0	0
Dairy products (excluding cheeses) - fermented dairy products - at processing plant - domestic production - Monitoring - official sampling - objective sampling [7)]	CAO FFSD	Single	50ml	1	0	0	0	0	0	0
Milk, sheep's - raw milk for manufacture - intended for manufacture of raw or low heat-treated products - at processing plant - domestic production - Monitoring - official sampling - objective sampling [8)]	CAO FFSD	Single	50 ml	1	0	0	0	0	0	0

Comments:

[1)] no
[2)] no
[3)] no
[4)] no
[5)] no

Table Campylobacter in other food

[6] no
[7] whey
[8] no

2.2.4 Campylobacter in animals

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Cattle (bovine animals) - dairy cows	CAO-VDD	Animal	39	39	17	22			
Gallus gallus (fowl) - broilers - at farm	CAO-VDD	Animal	713	556	288	259			9
Pigs	CAO-VDD	Animal	930	569	468	20			81
Gallus gallus (fowl) - at slaughterhouse - Monitoring - official sampling - objective sampling	CAO-FFSD	Slaughter batch	38	14	6	8			
Monkeys - zoo animal - at zoo - Clinical investigations	CAO-VDD	Animal	1	1				1	

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. jejuni in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Dilution method]

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

C. jejuni	Cattle (bovine animals) - at farm - animal sample - Monitoring																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	5																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Tetracyclines - Tetracycline	2	5	1	2	2										1									0.003	16
Quinolones - Nalidixic acid	16	5	0							1	1	2	1											0.5	4
Aminoglycosides - Streptomycin	2	1	0								1													1	1
Aminoglycosides - Gentamicin	2	1	0						1															0.25	0.25
Penicillins - Ampicillin	8	4	0					1	1			1	1											0.12	4
Macrolides - Erythromycin	4	5	0					1	2	2														0.12	0.5

Table Antimicrobial susceptibility testing of C. coli in Gallus gallus (fowl) - at farm - animal sample - Monitoring - quantitative data [Dilution method]

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

C. coli	Gallus gallus (fowl) - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	72																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Florfenicol																								0.12	256
Tetracyclines - Tetracycline	2	70	40					2	18	6	2	2		1	18	15	4		2						
Fluoroquinolones - Ciprofloxacin	1	60	58						1		1	1	29	26	2									0.25	16
Quinolones - Nalidixic acid	32	72	61										2	5	3	1	35	21	5					4	256
Aminoglycosides - Streptomycin	4	58	5							4	8	31	10		1	4								0.5	32
Aminoglycosides - Gentamicin	2	65	1						5	38	21			1										0.25	8
Penicillins - Ampicillin		7	1							1	2	2	1		1									0.5	16
Macrolides - Erythromycin	16	71	2					1	20	36	2	9	1			2								0.12	32

Table Antimicrobial susceptibility testing of C. jejuni in Gallus gallus (fowl) - at farm - animal sample - Monitoring - quantitative data [Dilution method]

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

C. jejuni	Gallus gallus (fowl) - at farm - animal sample - Monitoring																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	80																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Tetracyclines - Tetracycline	2	80	42						29	6	2	1	2	2	9	4	1	24						0.25	128
Fluoroquinolones - Ciprofloxacin	1	46	42						3		1	1	23	16	1	1								0.25	32
Quinolones - Nalidixic acid	16	62	48						1			3	6	3	1	1	27	14	6					0.25	256
Aminoglycosides - Streptomycin	2	43	4							11	21	7	2		1	1								0.5	32
Aminoglycosides - Gentamicin	1	46	0						19	24	3													0.25	1
Penicillins - Ampicillin		9	0								1	3	2	3										1	8
Macrolides - Erythromycin	4	53	0						20	29	2	2												0.25	2

Table Antimicrobial susceptibility testing of C. coli in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Dilution method]

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

C. coli	Cattle (bovine animals) - at farm - animal sample - Monitoring																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	3																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Tetracyclines - Tetracycline	2	3	2							1					1		1							0.5	64
Fluoroquinolones - Ciprofloxacin	1	2	1						1				1											0.25	4
Quinolones - Nalidixic acid	32	3	2										1				1		1					4	256
Aminoglycosides - Streptomycin	4	1	0									1												2	2
Aminoglycosides - Gentamicin	2	2	0						1	1														0.25	0.5
Penicillins - Ampicillin	8	1	1												1									16	16
Macrolides - Erythromycin	16	3	0						1	1		1												0.25	2

Table Antimicrobial susceptibility testing of C. coli in Pigs - at farm - animal sample - Monitoring - quantitative data [Dilution method]

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

C. coli	Pigs - at farm - animal sample - Monitoring																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	118																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Tetracyclines - Tetracycline	2	118	107						8		2	1	1	2	52	38	8		6					0.25	256
Fluoroquinolones - Ciprofloxacin	1	82	59		5				13	3	2	1	34	23	1									0.015	16
Quinolones - Nalidixic acid	32	118	69									6	12	20	7	4	43	18	8					2	256
Aminoglycosides - Streptomycin	4	88	67							1	2	6	12	6	39	22								0.5	32
Aminoglycosides - Gentamicin	2	98	2						3	42	47	4	1	1										0.25	8
Penicillins - Ampicillin		15	1					2	2	3	1	2	3	1			1							0.12	64
Macrolides - Erythromycin	16	116	14						22	41	24	10	5			9		2	2	1				0.25	512

Table Antimicrobial susceptibility testing of C. jejuni in Pigs - at farm - animal sample - Monitoring - quantitative data [Dilution method]

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

C. jejuni	Pigs - at farm - animal sample - Monitoring																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	5																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Tetracyclines - Tetracycline	2	5	2			1				1		1		1					1					0.03	256
Quinolones - Nalidixic acid	16	5	3										1	1				2	1					4	256
Aminoglycosides - Streptomycin	2	3	1							1		1	1											0.5	4
Aminoglycosides - Gentamicin		3	0							2	1													0.5	1
Penicillins - Ampicillin		2	0								1	1												1	2
Macrolides - Erythromycin	4	5	0						1	3	1													0.25	1

Table Cut-off values used for antimicrobial susceptibility testing of Campylobacter in Animals

Test Method Used
Broth dilution

Standard methods used for testing
EUCAST

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline		2	
Fluoroquinolones	Ciprofloxacin		1	
Quinolones	Nalidixic acid		16	
Aminoglycosides	Gentamicin		1	
	Streptomycin		2	
Macrolides	Erythromycin		4	
Penicillins	Ampicillin		8	

Footnote:

The breakpoints given are for C. jejuni only.

Table Cut-off values used for antimicrobial susceptibility testing of Campylobacter in Food

Test Method Used	Standard methods used for testing
Disc diffusion	

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

Table Cut-off values used for antimicrobial susceptibility testing of Campylobacter in Feed

Test Method Used	Standard methods used for testing

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

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-abscence 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-abscence 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

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Crustaceans - unspecified - cooked - at retail	monitoring	Single	25 gramms or 10 gramms	17	0	15	0	2	0	0
Fish - smoked - at retail	monitoring	Single	25 gramms or 10 gramms	58	0	46	0	12	0	0
Foodstuffs intended for special nutritional uses	monitoring	Single	25 gramms	43	0	43	0	0	0	0
Infant formula	monitoring	Single	25 gramms or 10 gramms	48	0	48	0	0	0	0
Meat from bovine animals - fresh	monitoring	Single	25 gramms or 10 gramms	2	0	2	0	0	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - at processing plant	monitoring	Single	25 gramms or 10 gramms	10	0	10	0	0	0	0
Meat from bovine animals - meat products - cooked, ready-to-eat - at retail	monitoring	Single	25 gramms or 10 gramms	17	0	17	0	0	0	0
Meat from broilers (Gallus gallus) - fresh	monitoring	Single	25 gramms or 10 gramms	23	2	19	2	4	0	0
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant	monitoring	Single	25 gramms or 10 gramms	146	12	117	8	29	1	3
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at retail	monitoring	Single	25 gramms or 10 gramms	171	3	162	2	9	1	0
Meat from pig - fresh	monitoring	Single	25 gramms or 10 gramms	78	9	73	8	5	1	0
Meat from pig - meat products - cooked, ready-to-eat - at processing plant	monitoring	Single	25 gramms or 10 gramms	149	0	127	0	22	0	0
Meat from pig - meat products - cooked, ready-to-eat - at retail	monitoring	Single	25 gramms or 10 gramms	154	6	123	4	31	1	1

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Molluscan shellfish - cooked - at retail	monitoring	Single	25 grammsor 10 gramms	49	0	43	0	6	0	0
Bakery products - cakes - containing heat-treated cream - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	30	0	28	0	2	0	0
Beverages, non-alcoholic - soft drinks - at retail - Monitoring - official sampling	monitoring	Single	25 gramms	5	0	5	0	0	0	0
Cereals and meals - at processing plant - Monitoring - official sampling	monitoring	Single	25 gramms	29	0	29	0	0	0	0
Cereals and meals - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	154	0	120	0	34	0	0
Chocolate - at retail - Monitoring - official sampling	monitoring	Single	25 gramms	2	0	2	0	0	0	0
Cocoa and cocoa preparations, coffee and tea - in total - Monitoring - official sampling	monitoring	Single	25 gramms	117	0	117	0	0	0	0
Confectionery products and pastes - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	248	6	209	5	39	1	0
Crustaceans - unspecified - raw - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	27	2	15	2	12	0	0
Fish - raw - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	15	0	10	0	5	0	0
Fishery products, unspecified - cooked - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	80	1	60	1	20	0	0
Fishery products, unspecified - ready-to-eat - at retail - Monitoring - official sampling [1)]	monitoring	Single	25 gramms or 10 gramms	71	1	59	1	12	0	0
Infant formula - dried - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	154	0	134	0	20	0	0

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Infant formula - dried - intended for infants below 6 months - at retail - Monitoring - official sampling	monitoring	Batch	10x25 gramms	10	0	10	0	0	0	0
Meat from bovine animals - meat products - raw but intended to be eaten cooked - frozen - at retail - Monitoring - official sampling	monitoring	Single	25 gramms	4	0	4	0	0	0	0
Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - frozen - in total - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	90	14	76	8	14	6	0
Meat from pig - meat products - raw and intended to be eaten raw - at processing plant - Monitoring - official sampling [2)]	monitoring	Single	25 gramms or 10 gramms	295	28	238	23	57	5	0
Meat from pig - meat products - raw and intended to be eaten raw - at retail - Monitoring - official sampling [3)]	monitoring	Single	25 gramms or 10 gramms	207	10	162	8	45	2	0
Meat from pig - meat products - raw but intended to be eaten cooked - frozen - in total - Monitoring - official sampling	monitoring	Single	25 gramms	2	0	2	0	0	0	0
Meat from pig - meat products - raw ham - in total - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	149	3	122	2	27	1	0
Meat from turkey - fresh - in total - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	17	4	13	3	4	1	0
Meat from turkey - meat products - cooked, ready-to-eat - at processing plant - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	87	2	76	1	11	1	0
Meat from turkey - meat products - cooked, ready-to-eat - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	201	8	196	6	5	0	2

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Meat from turkey - meat products - raw and intended to be eaten raw - in total - Monitoring - official sampling [4)]	monitoring	Single	25 gramms or 10 gramms	9	0	8	0	1	0	0
Meat from turkey - meat products - raw but intended to be eaten cooked - frozen - in total - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	19	1	17	1	2	0	0
Molluscan shellfish - raw - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	3	0	2	0	1	0	0
Nuts and nut products - dried - in total - Monitoring - official sampling [5)]	monitoring	Single	25 gramms or 10 gramms	56	0	41	0	15	0	0
Other processed food products and prepared dishes - sandwiches - with meat - in total - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	248	6	204	4	44	1	1
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - at catering - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	825	3	750	3	75	0	0
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	154	3	134	2	20	1	0
Other products of animal origin - gelatin and collagen - in total - Monitoring - official sampling	monitoring	Single	25 gramms	29	0	29	0	0	0	0
Ready-to-eat salads - at retail - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	503	24	416	18	87	6	0
Seeds, sprouted - ready-to-eat - in total - Monitoring - official sampling	monitoring	Single	5 gramms or 10 gramms	88	1	75	1	13	0	0
Soups - dehydrated - in total - Monitoring - official sampling	monitoring	Single	25 gramms	32	0	32	0	0	0	0

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Spices and herbs - dried - in total - Monitoring - official sampling	monitoring	Single	25 gramms	3	0	3	0	0	0	0
Vegetables - pre-cut - frozen vegetables - in total - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	170	2	141	1	29	1	0
Vegetables - pre-cut - ready-to-eat - in total - Monitoring - official sampling	monitoring	Single	25 gramms or 10 gramms	21	1	14	1	7	0	0

Comments:

[1)] preserved, not cooked
[2)] salamis and sausages with traditinal an rapid rippening method
[3)] salamis and sausages with traditinal an rapid rippening method
[4)] fermented sausages
[5)] and other oil seeds

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Cheeses made from cows' milk - hard - made from pasteurised milk - at retail	monitoring	Single	25 gramms	2	0	2	0	0	0	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at processing plant	monitoring	Single	25 gramms	99	0	78	0	21	0	0
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at retail	monitoring	Single	25 gramms	85	0	13	0	72	0	0
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - at processing plant	monitoring	Single	25 gramms	9	0	6	0	3	0	0
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - at retail	monitoring	Single	25 gramms	3	0	1	0	2	0	0
Cheeses made from sheep's milk - hard - made from pasteurised milk - at processing plant	monitoring	Single	25 gramms	1	0	1	0	0	0	0
Cheeses made from sheep's milk - hard - made from pasteurised milk - at retail	monitoring	Single	25 gramms	1	0	0	0	1	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - at processing plant	monitoring	Single	25 gramms	9	0	9	0	0	0	0
Cheeses made from sheep's milk - soft and semi-soft - made from pasteurised milk - at retail	monitoring	Single	25 gramms	1	0	0	0	1	0	0
Dairy products (excluding cheeses) - butter - at processing plant	monitoring	Single	25 gramms	39	0	37	0	2	0	0
Dairy products (excluding cheeses) - butter - at retail	monitoring	Single	25 gramms	66	0	59	0	7	0	0
Dairy products (excluding cheeses) - cream - at processing plant	monitoring	Single	25 gramms	2	0	2	0	0	0	0

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Dairy products (excluding cheeses) - cream - at retail	monitoring	Single	25 gramms	1	0	0	0	1	0	0
Milk, cows' - pasteurised milk - at processing plant	monitoring	Single	25 ml	24	0	24	0	0	0	0
Milk, cows' - pasteurised milk - at retail	monitoring	Single	25 ml	81	0	81	0	0	0	0
Milk, cows' - raw - intended for direct human consumption	monitoring	Single	25 ml	233	7	232	6	1	1	0
Milk, goats' - raw - intended for direct human consumption	monitoring	Single	25 ml	1	0	1	0	0	0	0
Cheeses made from cows' milk - curd - at processing plant - Monitoring - official sampling - objective sampling [1)]	monitoring	Single	25 gramms	150	0	134	0	16	0	0
Cheeses made from cows' milk - curd - at retail - Monitoring - official sampling - objective sampling [2)]	monitoring	Single	25 gramms	96	0	13	0	83	0	0
Cheeses made from cows' milk - unspecified - made from pasteurised milk - at processing plant - Monitoring [3)]	monitoring	Single	25 gramms	54	0	52	0	2	0	0
Cheeses made from cows' milk - unspecified - made from pasteurised milk - at retail - Monitoring - official sampling - objective sampling [4)]	monitoring	Single	25 gramms	24	0	9	0	15	0	0
Cheeses made from goats' milk - unspecified - made from pasteurised milk - at processing plant - Monitoring - official sampling - objective sampling [5)]	monitoring	Single	25 gramms	3	0	3	0	0	0	0

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Cheeses made from goats' milk - unspecified - made from pasteurised milk - at retail - Monitoring - official sampling - objective sampling [6)]	monitoring	Single	25 gramms	1	0	0	0	1	0	0
Cheeses made from sheep's milk - unspecified - made from pasteurised milk - at retail - Monitoring - official sampling - objective sampling [7)]	monitoring	Single	25 gramms	34	0	31	0	3	0	0
Dairy products (excluding cheeses) - dairy desserts - chilled - at processing plant - Monitoring - official sampling	monitoring	Single	25 gramms	97	0	97	0	0	0	0
Dairy products (excluding cheeses) - dairy desserts - chilled - at retail - Monitoring - official sampling	monitoring	Single	25 gramms	46	0	41	0	5	0	0
Dairy products (excluding cheeses) - fermented dairy products - at processing plant - Monitoring - official sampling	monitoring	Single	25 gramms	167	0	167	0	0	0	0
Dairy products (excluding cheeses) - fermented dairy products - at retail - Monitoring - official sampling	monitoring	Single	25 gramms	92	0	81	0	11	0	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - at processing plant - Monitoring - official sampling	monitoring	Single	25 gramms	143	0	143	0	0	0	0
Dairy products (excluding cheeses) - ice-cream - made from pasteurised milk - at retail - Monitoring - official sampling	monitoring	Single	25 gramms	79	1	59	0	20	1	0
Dairy products (excluding cheeses) - milk powder and whey powder - at processing plant - Monitoring - official sampling	monitoring	Single	25 gramms	39	0	39	0	0	0	0

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Dairy products (excluding cheeses) - milk powder and whey powder - at retail - Monitoring - official sampling	monitoring	Single	25 gramms	38	0	28	0	10	0	0

Comments:

[1] curd and fresh cheese
[2] curd and fresh cheese
[3] re-treated products like toast cheeses
[4] re-treated products like toast cheeses
[5] curd
[6] curd
[7] curd

2.3.4 Listeria in animals

Table Listeria in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria	L. monocytogenes	Listeria spp., unspecified
Cattle (bovine animals)	CAO-VDD	Animal	2	2	2	
Sheep	CAO-VDD	Animal	14	13	13	
Chinchillas - pet animal - at hospital or care home - Clinical investigations	CAO-VDD	Animal	2	2	2	

2.4 E. COLI INFECTIONS

2.4.1 General evaluation of the national situation

2.4.2 Escherichia coli, pathogenic in foodstuffs

Table VT E. coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Meat from bovine animals - fresh - at processing plant [1)]	CAO FFSD	Single	25g	264	0	0	0	0
Meat from bovine animals - fresh - at retail [2)]	CAO FFSD	Single	25g	71	0	0	0	0
Milk, cows' - raw milk for manufacture - intended for manufacture of raw or low heat-treated products [3)]	CAO FFSD	Single	25ml	126	0	0	0	0
Meat from bovine animals - minced meat - intended to be eaten cooked - chilled - at processing plant - domestic production - Monitoring - official sampling - objective sampling [4)]	CAO FFDS	Single	25g	34	0	0	0	0
Meat from bovine animals - minced meat - intended to be eaten cooked - chilled - at retail - domestic production - Monitoring - official sampling - objective sampling [5)]	CAO FFSD	Single	25g	57	0	0	0	0
Other processed food products and prepared dishes - unspecified - non-ready-to-eat foods - frozen - at retail - domestic production - Monitoring - official sampling - objective sampling [6)]	CAO FFSD	Single	25g	46	0	0	0	0

Table VT E. coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Other processed food products and prepared dishes - unspecified - ready-to-eat foods - frozen - at retail - domestic production - Monitoring - official sampling - objective sampling [7)]	CAO FFSD	Single	25g	17	0	0	0	0

Comments:

[1)] no
[2)] no
[3)] no
[4)] no
[5)] no
[6)] no
[7)] no

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 belongig 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.

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 tuberculotic lesions. The legal provisions for tuberculosis require that the organs, together with the lymphnodes belonging to them, shall be sent to the Central Agricultural Office, Veterinary Diagnostic Directorate (former Central Veterinary Institute) for further laboratory examination, if during post mortem inspection of a slaughtered animal the tuberculotic 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 Central Agricultural 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:

Â·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;

Â·samples used for confirming paraallergic reaction must include the tonsils, pharyngal, mesenteric and portal lymphatic glands of the slaughtered animal;

Â·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, 50cm3 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 Central Agricultural 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 tuberculine 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 fals 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 seven 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 unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Badgers [1)]	CAO-VDD	Animal	1	0	0	0	0
Pigs [2)]	CAO-VDD	Herd	5	5	0	0	5
Zoo animals, all [3)]	CAO-VDD	Animal	1	1	0	0	1
Deer - wild - fallow deer - from hunting - Monitoring	CAO-VDD	Animal	4	3	1	0	2
Deer - wild - red deer - from hunting - Monitoring	CAO-VDD	Animal	97	14	1	0	13
Deer - wild - roe deer - from hunting - Monitoring	CAO-VDD	Animal	3	1	0	0	1
Foxes - wild - from hunting - Monitoring	CAO-VDD	Animal	10	2	0	0	2
Pigeons - wild - from hunting - Monitoring	CAO-VDD	Animal	12	0	0	0	0

Comments:

[1)] hunting, monitoring
[2)] control program, slaughterhouse
[3)] Camel

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

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	467	30400	463	99.14	0	0	once a year	23388	377	61	0
Borsod-Abaúj-Zemplén	1046	43938	1046	100	0	0	once a year	39318	1407	94	0
Budapest	27	1164	27	100	0	0	once a year	1059	0	1	0
Bács-Kiskun	2354	70343	2354	100	0	0	once a year	51424	246	38	0
Békés	1649	61756	1649	100	0	0	once a year	51841	585	14	0
Csongrád	1367	41734	1367	100	0	0	once a year	33617	1547	40	0
Fejér	556	44375	556	100	0	0	once a year	38851	1279	18	0
Győr-Moson-Sopron	946	53433	946	100	0	0	once a year	50397	3106	5	0
Hajdú-Bihar	2424	95822	2424	100	0	0	once a year	77802	485	30	0
Heves	374	14801	374	100	0	0	once a year	12300	192	14	0
Jász-Nagykun-Szolnok	1361	56539	1361	100	0	0	once a year	44583	992	6	0
Komárom-Esztergom	227	13823	225	99.12	1	.44	once a year	12280	158	10	1
Nógrád	336	15195	335	99.7	0	0	once a year	12198	614	17	0

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

Pest	1459	50318	1458	99.93	0	0	once a year	44860	6342	55	0
Somogy	529	33734	526	99.43	1	.19	once a year	37110	8604	50	1
Szabolcs-Szatmár-Bereg	1208	43276	1207	99.92	0	0	once a year	34278	1061	4	0
Tolna	466	27056	465	99.79	1	.21	once a year	23483	3004	3	3
Vas	692	29136	692	100	0	0	once a year	26654	1798	4	0
Veszprém	487	40821	487	100	0	0	once a year	39153	5346	10	0
Zala	525	24841	525	100	0	0	once a year	20062	2575	13	0
Total : [1)]	18500	792505	18487	99.93	3	.02	N.A.	674658	39718	487	5

Comments:

[1)] N.A.

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.

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

During the last 24 years 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.

Monitoring system

Sampling strategy

Given, that B. melitensis is not an agent which can be spread under Hungaryâ€™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. In 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

In 2007, Hungary was 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.) MÃ‰M 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.) MÃ‰M of the Minister of Agriculture and Alimentation.

Results of the investigation

No evidence of infection with B. melitensis were found in 2007.

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.

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. In 2007, all ovine animals tested for B. melitensis were negative.

Frequency of the sampling

Approximately 10% 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

In 2007, Hungary was 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 Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella	B. abortus	B. melitensis	B. suis	Brucella spp., unspecified
Pigs	CAO-VDD	Animal	365	0				
Buffalos - at farm - Surveillance		Animal	1	0				
Cats - at farm - Surveillance		Animal	1	0				
Dogs - pet animals - at farm - Surveillance		Animal	38	4				4
Zoo animals, all - at zoo - Surveillance		Animal	4	0				

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

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
Magyarország	7518	1129563	7518	100	0	0	2900	55408	0	0	0	0	0	0
Total : [1)]	7518	1129563	7518	100	0	0	2900	55408	0	0	0	0	0	0

Comments:

[1)] N.A.

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk			Information about			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds	Number of bovine herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals		Number of animals examined microbio logically	Number of animals positive microbio logically
																		Sero logically	BST		
Baranya	467	30400	467	100	0	0	314	13708	0	0	0	0	42	0	0	0	0	0	0	0	0
Borsod-Abaúj-Zemplén	1046	43938	1046	100	0	0	959	23394	0	0	0	0	86	0	0	0	0	0	0	0	0
Budapest	27	1164	27	100	0	0	26	639	0	0	0	0	0	0	0	0	0	0	0	0	0
Bács-Kiskun	2354	70343	2354	100	0	0	1755	34604	0	27	2079	0	44	0	0	0	0	0	0	0	0
Békés	1649	61756	1649	100	0	0	1006	26345	0	0	0	0	185	0	0	0	0	0	0	0	0
Csongrád	1367	41734	1367	100	0	0	960	15447	0	0	0	0	96	0	0	0	0	0	0	0	0
Fejér	556	44375	556	100	0	0	390	37771	0	6	2185	0	170	0	0	0	0	0	0	0	0
Győr-Moson-Sopron	946	53433	946	100	0	0	562	25851	0	7	1125	0	164	0	0	0	0	0	0	0	0
Hajdú-Bihar	2424	95822	2424	100	0	0	2122	44879	0	0	0	0	202	0	0	0	0	0	0	0	0
Heves	374	14801	374	100	0	0	259	11573	0	0	0	0	18	0	0	0	0	0	0	0	0
Jász-Nagykun-Szolnok	1361	56539	1361	100	0	0	1024	23344	0	0	0	0	41	0	0	0	0	0	0	0	0
Komárom-Esztergom	227	13823	226	99.56	0	0	200	5670	0	0	0	0	23	0	0	0	0	0	0	0	0
Nógrád	336	15195	336	100	0	0	268	7851	0	0	0	0	21	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

Pest	1459	50318	1459	100	0	0	634	29047	0	6	3324	0	47	0	0	0	0	0	0	0
Somogy	529	33734	528	99.81	0	0	448	18225	0	0	0	0	24	0	0	0	0	0	0	0
Szabolcs-Szatmár-Bereg	1208	43276	1208	100	0	0	1208	19659	0	0	0	0	17	0	0	0	0	0	0	0
Tolna	466	27056	466	100	0	0	231	10622	0	6	698	0	38	0	0	0	0	0	0	0
Vas	692	29136	692	100	0	0	692	15115	0	0	0	0	43	0	0	0	0	0	0	0
Veszprém	487	40821	487	100	0	0	438	25073	0	0	0	0	9	0	0	0	0	0	0	0
Zala	525	24841	525	100	0	0	446	10987	0	0	0	0	16	0	0	0	0	0	0	0
Total : [1)]	18500	792505	18498	99.99	0	0	13942	399804	0	52	9411	0	1286	0	0	0	0	0	0	0

Comments:

[1)] N.A.

2.7 YERSINIOSIS

2.7.1 General evaluation of the national situation

2.7.2 Yersiniosis in humans

A. Yersinosis 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 unit	Units tested	Total units positive for Yersinia	Y. enterocolitica	Y. pseudotuberculosis	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - Y. enterocolitica, unspecified
Cattle (bovine animals)	CAO-VDD	Animal	2	2		1	1			
Chinchillas - pet animal - at hospital or care home - Clinical investigations	CAO-VDD	Animal	1	1	1					1
Monkeys - at zoo - Clinical investigations	CAO-VDD	Animal	1	1	1					1
Pigeons - wild - at hospital or care home - Clinical investigations	CAO-VDD	Animal	1	1	1					1

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, T. britovi is the dominant species; nevertheless, T. 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 Helmithozoonotic 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 were investigated in 2008, there was no positive finding for Trichinella. There was only one family outbreak involving 8 people. The source of infection was home-made raw swine sausage. Trichinella spiralis was identified in the meat sample. Outbreak investigation was carried out (see tables).

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 36 slaughtered horses (as all other susceptible animals) were investigated in 2008. 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 unit	Units tested	Total units positive for Trichinella	T. spiralis	Trichinella spp., unspecified	T. britovi
Foxes [1)]	wildlife monitoring	Animal	230	7	0	1	6
Pigs [2)]	mandatory testing	Animal	4445592	0	0	0	0
Pigs - fattening pigs - not raised under controlled housing conditions in integrated production system [3)]	outbreak investigation(digestion test and/or serology)	Animal	159	24	4	20	0
Rats [4)]	outbreak investigation (digestion test)	Animal	7	1	1	0	0
Solipeds, domestic - horses [5)]	mandatory testing	Animal	121	0	0	0	0
Wild boars - wild [6)]	mandatory testing	Animal	37455	1	1	0	0
Dogs - pet animals - at farm - animal sample - blood - Clinical investigations [7)]	outbreak investigation (serology)	Animal	8	7	0	7	0

Comments:

[1)] CAO VDD
[2)] CAO FFSD and CAO VDD
[3)] CAO VDD
[4)] CAO VDD
[5)] CAO FFSD anc CAO VDD
[6)] CAO FFSD and CAO VDD
[7)] CAO VDD

Footnote:
CAO VDD: Central Agricultural Office, Veterinary Diagnostic Directorate
CAO FFSD: Central Agricultural Office, Food and Feed Safety Directorate

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 intitiated 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 then 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, autochtonous human case has not been identified as E. multilocularis infection.

2.9.3 Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Foxes [1)]	CAO VDD	Animal	840	90	0	90	0

Comments:

[1)] Wildlife monitoring

Footnote:

CAO VDD: Central Agricultural Office, 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 cycler 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 Helmithozoonotic Reference Laboratory of National Centre for Epidemiology in 2001. 6 985 persons without sings 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.

2.10.3 Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii
Cattle (bovine animals)	CAO-VDD	Animal	1	1	1
Zoo animals, all - at zoo - Clinical investigations [1)]	CAO-VDD	Animal	1	1	1

Comments:

[1)] wallaby

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 1997. 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%.

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

It is of high importance that the countrywide oral vaccination of foxes is continued. This practice should be extended to neighbouring countries which do not apply such measures.

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 from 3 months of age.
Unattended dogs are removed from public areas and are vaccinated against the disease.
Oral vaccination of foxes is done on the whole territory of Hungary.

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

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	Lyssavirus, unspecified	Classical rabies virus (genotype 1)	European Bat Lyssavirus - unspecified
Badgers - wild		Animal	65	0			
Bats - wild	CAO-VDD	Animal	10	1			1
Cats		Animal	337	0			
Cats - stray cats		Animal	0	0			
Cattle (bovine animals)		Animal	22	0			
Deer - wild - fallow deer		Animal	1	0			
Deer - wild - red deer		Animal	2	0			
Deer - wild - roe deer		Animal	43	0			
Dogs		Animal	252	0			
Dogs - stray dogs		Animal	0	0			
Foxes - wild		Animal	7019	2		2	
Goats		Animal	6	0			
Marten - wild		Animal	25	0			
Pigs		Animal	2	0			
Raccoon dogs - wild		Animal	9	0			
Raccoons - wild		Animal	0	0			
Sheep		Animal	11	0			

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	Lyssavirus, unspecified	Classical rabies virus (genotype 1)	European Bat Lyssavirus - unspecified
Solipeds, domestic		Animal	12	0			
Other animals - in total - Clinical investigations		Animal	50	0			

2.12 Q-FEVER

2.12.1 General evaluation of the national situation

2.12.2 Coxiella (Q-fever) in animals

Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii
Cattle (bovine animals) [1)]	CAO-VDD	Animal	453	34	34
Goats [2)]	CAO-VDD	Animal	2	1	1
Sheep [3)]	CAO-VDD	Animal	42	3	3

Comments:

[1)] CF
[2)] CF
[3)] CF

Footnote:

CF: complement-fixation test

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 broilers (Gallus gallus)

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	68	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	68	11
Amphenicols - Florfenicol	0	0
Cephalosporins - 3rd generation cephalosporins	0	0
Fluoroquinolones - Ciprofloxacin	68	42
Fluoroquinolones - Enrofloxacin	0	0
Quinolones - Nalidixic acid	0	0
Trimethoprim	68	17
Sulfonamides - Sulfonamide	0	0
Aminoglycosides - Streptomycin	68	39
Aminoglycosides - Gentamicin	68	10
Aminoglycosides - Neomycin	0	0
Aminoglycosides - Kanamycin	0	0
Trimethoprim + sulfonamides	0	0
Penicillins - Ampicillin	68	31

Table Antimicrobial susceptibility testing of E. coli in Meat from broilers (Gallus gallus)

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	68	
Antimicrobials:	N	n
Tetracyclines - Tetracycline	68	35
Fully sensitive	68	8
Resistant to 1 antimicrobial	68	2
Resistant to 2 antimicrobials	68	10
Resistant to 3 antimicrobials	68	13
Resistant to 4 antimicrobials	68	8
Resistant to >4 antimicrobials	68	27
Cephalosporins - Cefotaxim	68	5
Sulfonamides - Sulfamethoxazol	68	25

Table Antimicrobial susceptibility testing of E. coli in Meat from pig

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	61	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	61	6
Amphenicols - Florfenicol	0	0
Cephalosporins - 3rd generation cephalosporins	0	0
Fluoroquinolones - Ciprofloxacin	61	13
Fluoroquinolones - Enrofloxacin	0	0
Quinolones - Nalidixic acid	61	14
Trimethoprim	61	10
Sulfonamides - Sulfonamide	0	0
Aminoglycosides - Streptomycin	61	33
Aminoglycosides - Gentamicin	61	1
Aminoglycosides - Neomycin	0	0
Aminoglycosides - Kanamycin	0	0
Trimethoprim + sulfonamides	0	0
Penicillins - Ampicillin	61	23
Tetracyclines - Tetracycline	61	28
Fully sensitive	61	14
Resistant to 1 antimicrobial	61	13
Resistant to 2 antimicrobials	61	8
Resistant to 3 antimicrobials	61	10
Resistant to 4 antimicrobials	61	4

Table Antimicrobial susceptibility testing of E. coli in Meat from pig

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	61	
Antimicrobials:	N	n
Resistant to >4 antimicrobials	61	12
Cephalosporins - Cefotaxim	61	3
Sulfonamides - Sulfamethoxazol	61	20

Table Antimicrobial susceptibility testing of E. coli in Meat from bovine animals

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	93	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	93	8
Amphenicols - Florfenicol	0	0
Cephalosporins - 3rd generation cephalosporins	0	0
Fluoroquinolones - Ciprofloxacin	93	8
Fluoroquinolones - Enrofloxacin	0	0
Quinolones - Nalidixic acid	93	8
Trimethoprim	93	6
Sulfonamides - Sulfonamide	0	0
Aminoglycosides - Streptomycin	93	26
Aminoglycosides - Gentamicin	93	1
Aminoglycosides - Neomycin	0	0
Aminoglycosides - Kanamycin	0	0
Trimethoprim + sulfonamides	0	0
Penicillins - Ampicillin	93	22
Tetracyclines - Tetracycline	93	21
Fully sensitive	93	45
Resistant to 1 antimicrobial	93	22
Resistant to 2 antimicrobials	93	9
Resistant to 3 antimicrobials	93	3
Resistant to 4 antimicrobials	93	8

Table Antimicrobial susceptibility testing of E. coli in Meat from bovine animals

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	93	
Antimicrobials:	N	n
Resistant to >4 antimicrobials	93	6
Cephalosporins - Cefotaxim	93	4
Sulfonamides - Sulfamethoxazol	93	17

Table Antimicrobial susceptibility testing of E. coli in Meat from other poultry species

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	82	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	82	24
Amphenicols - Florfenicol	0	0
Cephalosporins - 3rd generation cephalosporins	0	0
Fluoroquinolones - Ciprofloxacin	82	26
Fluoroquinolones - Enrofloxacin	0	0
Quinolones - Nalidixic acid	82	26
Trimethoprim	82	22
Sulfonamides - Sulfonamide	0	0
Aminoglycosides - Streptomycin	82	42
Aminoglycosides - Gentamicin	82	5
Aminoglycosides - Neomycin	0	0
Aminoglycosides - Kanamycin	0	0
Trimethoprim + sulfonamides	0	0
Penicillins - Ampicillin	82	44
Tetracyclines - Tetracycline	82	57
Fully sensitive	82	13
Resistant to 1 antimicrobial	82	11
Resistant to 2 antimicrobials	82	10
Resistant to 3 antimicrobials	82	6
Resistant to 4 antimicrobials	82	16

Table Antimicrobial susceptibility testing of E. coli in Meat from other poultry species

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	82	
Antimicrobials:	N	n
Resistant to >4 antimicrobials	82	26
Cephalosporins - Cefotaxim	82	3
Sulfonamides - Sulfamethoxazol	82	36

Table Antimicrobial susceptibility testing of E. coli in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Pigs - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	75																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	17	72	23	12		1	3	2	2	3						2		2	3	5	4	6	5	6	1	5
Amphenicols - Florfenicol		71	10	7						2	1				1		3	5	4	9	4	8	7	10	2	2
Tetracyclines - Tetracycline	18	74	60	55	1	1	1	2		3			1		2	2	2		3	1						
Fluoroquinolones - Enrofloxacin	16	70	17	5		2	1	2	2	5							2	1		1	8	2	2	2	1	6
Quinolones - Nalidixic acid	18	70	31	24				3	1	2	1			1					1	3	2	12	4	4	4	
Sulfonamides - Sulfonamide		74	46	46						4						1	1		1			3	4	5	1	3
Aminoglycosides - Streptomycin	14	74	41	18	1	3	5	10	4	4			5	6	2	8	1	2						1	1	
Aminoglycosides - Gentamicin		75	10	1			1	1	3	4	1		4	4	5	14	5	9	3	9	3	1		1		
Penicillins - Ampicillin	16	74	50	45				1		3	1	1			3	4	3	4	5	1	1	2				
Cephalosporins - Cefotaxim		68	8	1														1				2		2	2	24
Aminoglycosides - Apramycin	11																									
Cephalosporins - Ceftiofur	17																									

E.coli, non-pathogenic, unspecified	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	75						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	2	1	2	1			4
Amphenicols - Florfenicol			1	2	1		2

Table Antimicrobial susceptibility testing of E. coli in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

E.coli, non-pathogenic, unspecified	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	75						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	1	10	1	8		5	3
Quinolones - Nalidixic acid	2	2	1	2			1
Sulfonamides - Sulfonamide		2		1		1	1
Aminoglycosides - Streptomycin	1					1	1
Aminoglycosides - Gentamicin		1					5
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	8	7	5	1	3	6	6
Aminoglycosides - Apramycin							
Cephalosporins - Ceftiofur							

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

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Cattle (bovine animals) - at farm - animal sample - Monitoring																									
Isolates out of a monitoring program (yes/no)	yes																									
Number of isolates available in the laboratory	232																									
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	214	29	18	1			2	2	6						3	1	15	14	23	16	38	22	16	3	17
Amphenicols - Florfenicol	18	216	10	9						1					1	2	7	21	12	38	18	42	15	25	4	13
Tetracyclines - Tetracycline	18	218	43	39	1	2		1		10				8	5	28	21	30	19	20	6	8	5	1		
Fluoroquinolones - Enrofloxacin	16	214	21	12		4		1	1	1	1	1					1	1	1		6	6	1	10	6	25
Quinolones - Nalidixic acid	18	57	21	21									1					3	3	6	2	2	2	1	6	3
Sulfonamides - Sulfonamide		65	33	33						1					1		2	3	3	2	3	4	2	2	1	3
Aminoglycosides - Streptomycin	14	188	37	24		1	2	1	9	6	4	1	47	28	30	14	7		1	1			1	1		
Aminoglycosides - Gentamicin	14	218	16	10		1		1		4			7	10	16	37	29	28	24	31	5	8		1		
Penicillins - Ampicillin	16	209	83	48		2	3	2	2	14	12	1	6	1	31	17	13	19	10	2	2	3	1	5		2
Cephalosporins - Cefotaxim		204	16	2						1	1	1								1		5	3	1	1	63

E.coli, non-pathogenic, unspecified	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	232						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	1	6	2	2		1	5
Amphenicols - Florfenicol		3		1			4
Tetracyclines - Tetracycline						3	11
Fluoroquinolones - Enrofloxacin	10	33	14	41	2	24	12

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

E.coli, non-pathogenic, unspecified	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	232						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid	1	2			1	1	2
Sulfonamides - Sulfonamide	1	2		1			1
Aminoglycosides - Streptomycin		4		2		1	3
Aminoglycosides - Gentamicin						1	5
Penicillins - Ampicillin						7	6
Cephalosporins - Cefotaxim	15	36	12	26	5	16	15

Table Antimicrobial susceptibility testing of E. coli in Sheep - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Sheep - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	15																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	15	0																2	3	2	2		4	1	
Amphenicols - Florfenicol	18	14	0															1	1	4	1	2	2	3		
Tetracyclines - Tetracycline	18	14	5	5										1				3	2	3						
Fluoroquinolones - Enrofloxacin		15	0																							2
Quinolones - Nalidixic acid	18	15	0																	2	1	5	1	4	1	1
Sulfonamides - Sulfonamide		15	2	2					1				4	1	3	2		2								
Aminoglycosides - Streptomycin	14	14	2	2														1		1	2	3	3	2		
Aminoglycosides - Gentamicin	14	15	0												1	4	2	3	1	3		1				
Penicillins - Ampicillin	16	15	2	1							1	1			4	2	4	1	1							
Cephalosporins - Cefotaxim		15	1																				1			4

E.coli, non-pathogenic, unspecified	Sheep - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	15						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol		1					
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	1	5	3	1		1	2

Table Antimicrobial susceptibility testing of E. coli in Sheep - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

E.coli, non-pathogenic, unspecified	Sheep - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	15						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	4	3		1		2	

Table Antimicrobial susceptibility testing of E. coli in Pheasants - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Pheasants - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	6																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	6	2	1				1													1	2	1			
Amphenicols - Florfenicol	18	6	0														1		1			3				
Tetracyclines - Tetracycline	18	6	5	5																			1			
Fluoroquinolones - Enrofloxacin	16	6	1	1																1	1	1				1
Quinolones - Nalidixic acid	18	4	4	3						1																
Sulfonamides - Sulfonamide		6	3	3																	1			1		
Aminoglycosides - Streptomycin	14	6	2	1				1					1		1		1	1								
Aminoglycosides - Gentamicin	14	5	0													1		1	1		2					
Penicillins - Ampicillin	16	6	4	3							1		1						1							
Cephalosporins - Cefotaxim		5	0																							2

E.coli, non-pathogenic, unspecified	Pheasants - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	6						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol							
Amphenicols - Florfenicol		1					
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin			1				

Table Antimicrobial susceptibility testing of E. coli in Pheasants - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

E.coli, non-pathogenic, unspecified	Pheasants - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	6						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid							
Sulfonamides - Sulfonamide		1					
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	1			1	1		

Table Antimicrobial susceptibility testing of E. coli in Ducks - at farm - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Ducks - at farm - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	132																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	128	7	6				1								1		6	1	11	13	15	20	26	2	17
Amphenicols - Florfenicol	18	128	4	4														6	1	12	10	20	19	27	3	19
Tetracyclines - Tetracycline	11	131	43	38			1	3	1	1			1		1	13	8	22	15	16	3	3	1	1		
Fluoroquinolones - Enrofloxacin		130	9	3				3	1	2											3	4	6	5	6	6
Quinolones - Nalidixic acid	18	129	30	26			1	1	1	1							1	2	1	2	3	7	10	9	16	18
Sulfonamides - Sulfonamide		131	18	18						1					1		1	4	4	13	8	13	15	18	5	9
Aminoglycosides - Streptomycin	14	132	20	9			2	4	5	2	1		8	13	20	34	18	10	4	1						
Aminoglycosides - Gentamicin	14	132	0										1	1	2	25	12	33	13	25	12	6	2			
Penicillins - Ampicillin	16	132	30	27				1		2					4	17	13	33	12	15	2	4		1		
Cephalosporins - Cefotaxim		132	0																							11

E.coli, non-pathogenic, unspecified	Ducks - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	132						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	1	7		1			
Amphenicols - Florfenicol		5		1	1		
Tetracyclines - Tetracycline						1	2
Fluoroquinolones - Enrofloxacin	4	7	5	23	7	9	36

Table Antimicrobial susceptibility testing of E. coli in Ducks - at farm - Monitoring - quantitative data [Diffusion method]

E.coli, non-pathogenic, unspecified	Ducks - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	132						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid	7	15	1	5	1	1	
Sulfonamides - Sulfonamide	2	10	1	6		1	1
Aminoglycosides - Streptomycin		1					
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							1
Cephalosporins - Cefotaxim	5	25	7	27	9	19	29

Table Antimicrobial susceptibility testing of E. coli in Poultry, unspecified - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Poultry, unspecified - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	217																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	206	36	25		1		3	1	6				1		4		6	2	11	10	28	21	27	11	23
Amphenicols - Florfenicol	18	24	12	11						1							6	3	3							
Tetracyclines - Tetracycline	18	208	67	61	1	4			1	16			1	1	3	10	16	28	9	16	14	7	4	2	2	
Fluoroquinolones - Enrofloxacin	16	210	31	6	1	3	2	4	3	6		5	1			2		7	4		17	17	13	11	6	13
Quinolones - Nalidixic acid	18	204	117	82	2	3	4	11	2	10	3	1	1	3		2	2	3		1	1	6	6	12	10	16
Sulfonamides - Sulfonamide		185	64	63	1					11						3		3	5	13	7	11	9	15	1	21
Aminoglycosides - Streptomycin		212	35	23			4	3	5	6	4		8	18	25	41	19	28	3	5	1					
Aminoglycosides - Gentamicin	14	211	5			1		2		2			3		7	17	17	37	27	51	26	12	5	1		
Penicillins - Ampicillin	16	211	120	103						17			2		2	18	7	16	10	6	3	2	3			
Cephalosporins - Cefotaxim		190	40								2	2	2	3	1	5	5	4	6	2	4	3	1			10

E.coli, non-pathogenic, unspecified	Poultry, unspecified - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	217						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	3	11	3	1	1		7
Amphenicols - Florfenicol							
Tetracyclines - Tetracycline				1			11
Fluoroquinolones - Enrofloxacin	6	16	4	14	3	16	30

Table Antimicrobial susceptibility testing of E. coli in Poultry, unspecified - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

E.coli, non-pathogenic, unspecified	Poultry, unspecified - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	217						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid	4	9	1	6			3
Sulfonamides - Sulfonamide	4	9	2	1		2	4
Aminoglycosides - Streptomycin						6	13
Aminoglycosides - Gentamicin							3
Penicillins - Ampicillin						2	20
Cephalosporins - Cefotaxim	8	23	4	34	4	22	45

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

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Pigs - at farm - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	249																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	17	239	38	25		5	1		5	2		1	1			8		20	11	31	19	47	18	25	5	12
Amphenicols - Florfenicol		249	25	24								1		5	1		18	24	11	34	28	44	17	23	1	12
Tetracyclines - Tetracycline	18	249	189	152		12	5	16	4	2			1	3	2	7	7	14	10	6	4	3	1			
Fluoroquinolones - Enrofloxacin	16	249	5	1				1	1	1	1							2			5	5	6	19	10	29
Quinolones - Nalidixic acid		249	13	11			1	1						1				5	10	21	35	39	36	34	15	20
Sulfonamides - Sulfonamide		249	99	99								1		1		7	2	11	6	23	10	28	8	25	4	11
Aminoglycosides - Streptomycin	14	249	97	32		11	5	17	32	6	2		48	39	21	22	10	4								
Aminoglycosides - Gentamicin	14	249	3					2		1			11	18	14	50	33	61	27	22	4	6				
Penicillins - Ampicillin		249	92	87	1			1			3	1	2	2	38	34	32	20	8	8	8	3		1		
Cephalosporins - Cefotaxim		249	4																1			1	1	1		99
Aminoglycosides - Apramycin	11	248	2	1					1			1	5	26	31	80	47	33	12	10	1					
Cephalosporins - Ceftiofur	17	243	0													1			17	39	33	48	34	30	11	18

E.coli, non-pathogenic, unspecified	Pigs - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	249						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	2	1					
Amphenicols - Florfenicol	1	3	2				

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

E.coli, non-pathogenic, unspecified	Pigs - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	249						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	8	57	7	45	6	16	29
Quinolones - Nalidixic acid	6	7	3	4			
Sulfonamides - Sulfonamide	1	9		1	1	1	
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	17	49	15	32	5	11	17
Aminoglycosides - Apramycin							
Cephalosporins - Ceftiofur	3	9					

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

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Gallus gallus (fowl) - laying hens - at farm - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	176																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	176	13	11		2										6		15	10	31	14	33	12	21	3	12
Amphenicols - Florfenicol	18	176	6	6													12	25	13	28	16	42	9	20	1	3
Tetracyclines - Tetracycline	18	176	82	55		14	3	4	6					7	3	13	10	18	14	15	7	4	3			
Fluoroquinolones - Enrofloxacin	16	176	35	7		2		3	5	4	6	2	2	4		2	6	7	4		43	16	8	8	7	8
Quinolones - Nalidixic acid	18	176	118	97		4	2	8	3	2	2						3	3	5	7	4	8	7	11	3	5
Sulfonamides - Sulfonamide		176	60	60											4	3		6	6	19	6	24	8	24	3	9
Aminoglycosides - Streptomycin	14	176	43	24		2	2	4	11	7	7		45	26	20	17	9	1	1							
Aminoglycosides - Gentamicin	14	176	2							2			11	17	9	33	28	31	23	14	4	4				
Penicillins - Ampicillin	16	176	85	81		1					3	3	2	1	26	21	12	11	10	4	1					
Cephalosporins - Cefotaxim		176	8						1							1		2	1			1	1	1		75

E.coli, non-pathogenic, unspecified	Gallus gallus (fowl) - laying hens - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	176						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	1	4				1	
Amphenicols - Florfenicol				1			
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	6	6	2	9		7	2

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

E.coli, non-pathogenic, unspecified	Gallus gallus (fowl) - laying hens - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	176						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid	2						
Sulfonamides - Sulfonamide		3			1		
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	23	26	6	16	3	8	11

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

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Cattle (bovine animals) - at farm - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	137																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	137	2	2										1		3		15	6	16	9	32	9	27	3	8
Amphenicols - Florfenicol	18	137	1	1													6	19	7	26	10	29	9	18		4
Tetracyclines - Tetracycline	18	137	13	8	1		2	2						4	5	23	12	28	22	16	4	5	3	1		1
Fluoroquinolones - Enrofloxacin	16	137	0																		2	5	5	10	6	18
Quinolones - Nalidixic acid	18	137	1	1													1		6	11	17	28	24	22	10	6
Sulfonamides - Sulfonamide		137	15	14		1				2					4	4	2	13	5	20	9	25	5	17	4	10
Aminoglycosides - Streptomycin	11	136	7	4			1		2	3	2	1	37	35	23	20	4	3		1						
Aminoglycosides - Gentamicin	14	137	1							1			3	13	16	27	12	32	14	9	4	4		2		
Penicillins - Ampicillin	16	137	12	11						1		1	3		42	26	24	16	8	2	2	1				
Cephalosporins - Cefotaxim		136	6	1																	1	2		2		48

E.coli, non-pathogenic, unspecified	Cattle (bovine animals) - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	137						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	1	4		1			
Amphenicols - Florfenicol	2	3	1	2			
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	6	31	7	25	2	10	10

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

E.coli, non-pathogenic, unspecified	Cattle (bovine animals) - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	137						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid	2	3	2	1	2	1	
Sulfonamides - Sulfonamide		2					
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	10	28	11	18	2	6	7

Table Antimicrobial susceptibility testing of E. coli in Dogs - pet animals - in total - Clinical investigations - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Dogs - pet animals - in total - Clinical investigations																									
Isolates out of a monitoring program (yes/no)	yes																									
Number of isolates available in the laboratory	40																									
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	33	4	3						1	1		1			2	1	1	1	6	4	4	3	1		2
Amphenicols - Florfenicol	18	39	0														4	2	3	9	4	8	3	3		2
Tetracyclines - Tetracycline	18	38	18	14		1	2	1							1	4	2	3	2	1	4	2		1		
Fluoroquinolones - Enrofloxacin	16	39	4	1						1			2				1	2			2	1	2	2	2	2
Quinolones - Nalidixic acid	18	38	8	7		1									1		1		4	3	3	3	6	2	3	3
Aminoglycosides - Streptomycin	14	38	17	11			1	2	3		2	2	6	3	3	3	1	1								
Aminoglycosides - Gentamicin	14	40	4			1			1	2			1		2	7	6	8	4	1	4		1			1
Penicillins - Ampicillin	16	37	21	19							2				1	3	3	5	1	2	1					
Cephalosporins - Cefotaxim		35	7	1																		1		3	2	9

E.coli, non-pathogenic, unspecified	Dogs - pet animals - in total - Clinical investigations						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	40						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol		2					
Amphenicols - Florfenicol				1			
Tetracyclines - Tetracycline							
Fluoroquinolones - Enrofloxacin	1	6	1	4		6	3
Quinolones - Nalidixic acid	1						

Table Antimicrobial susceptibility testing of E. coli in Dogs - pet animals - in total - Clinical investigations - quantitative data [Diffusion method]

E.coli, non-pathogenic, unspecified	Dogs - pet animals - in total - Clinical investigations						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	40						
Antimicrobials:	29	30	31	32	33	34	>=35
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin		1					
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	3	7	1	4	1	2	1

Table Antimicrobial susceptibility testing of E. coli in Turkeys - at farm - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Turkeys - at farm - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	173																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	129	33	4	2	2	3	3	4	15				1		1		6	3	5	12	16	10	16	6	10
Amphenicols - Florfenicol	18	169	25	19		1				5				2			1	6	8	15	11	27	13	19	5	17
Tetracyclines - Tetracycline	18	166	137	118	2	7	5	1	4				1	1	2	2	2	3	2	4	2	3				
Fluoroquinolones - Enrofloxacin	16	161	23	4		2		2	5	3	2	1	2	2		1		5	1		9	16	14	8	9	3
Quinolones - Nalidixic acid	18	157	94	61	3	2	4	6	4	9	5		1	1		3	1			1	3	7	7	12	4	5
Sulfonamides - Sulfonamide	10	166	91	91						8					1	1	3		2	1	2	8	9	14	5	10
Aminoglycosides - Streptomycin	14	169	54	30	1	4	3	8	8	4	2	1	6	12	18	22	17	11	3	2	1	1				
Aminoglycosides - Gentamicin	14	171	1							1				2	6	14	12	35	31	33	15	12	1	2		1
Penicillins - Ampicillin	16	98	98	87						11																
Cephalosporins - Cefotaxim		170	1																				1			13

E.coli, non-pathogenic, unspecified	Turkeys - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	173						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	2	4		1		1	2
Amphenicols - Florfenicol	1	8					11
Tetracyclines - Tetracycline							7
Fluoroquinolones - Enrofloxacin	2	7	3	10	6	5	39

Table Antimicrobial susceptibility testing of E. coli in Turkeys - at farm - Monitoring - quantitative data [Diffusion method]

E.coli, non-pathogenic, unspecified	Turkeys - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	173						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid	3	8	2	2			3
Sulfonamides - Sulfonamide	1	4				1	5
Aminoglycosides - Streptomycin		5		4		3	3
Aminoglycosides - Gentamicin						1	5
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	12	32	7	36	11	26	32

Table Antimicrobial susceptibility testing of E. coli in Geese - at farm - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E.coli, non-pathogenic, unspecified	Geese - at farm - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	97																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Chloramphenicol	13	96	30	23	1		1	3	1	1					1			1	1	4	9	9	10	10	3	10
Amphenicols - Florfenicol	18	96	11	11													1	4	4	6	7	8	12	24	2	11
Tetracyclines - Tetracycline	18	96	59	55	1	1	1		1		1			1	1	3	2	10	8	4	3	2	1			
Fluoroquinolones - Enrofloxacin	16	97	23	6			1	5	4	4	2		1				2	2			7	3	8	5	1	4
Quinolones - Nalidixic acid	18	96	52	34	1	6	3	2	4		2								1	1	1	4	7	5	10	6
Aminoglycosides - Streptomycin	14	97	42	29		2		6	5				9	6	16	8	6	6	1	2	1					
Aminoglycosides - Gentamicin	14	97	0										3		5	13	13	20	12	15	8	5	1	2		
Penicillins - Ampicillin	16	97	63	63										1	4	4	5	5	4	6	2	1	2			
Cephalosporins - Cefotaxim		97	0																							11
Sulfonamides		97	0	54											1			3	1	4	2	4	7	6	2	4

E.coli, non-pathogenic, unspecified	Geese - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	97						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Chloramphenicol	1	4		3			
Amphenicols - Florfenicol		2		4			
Tetracyclines - Tetracycline		1					
Fluoroquinolones - Enrofloxacin	3	8	4	5	3	10	9

Table Antimicrobial susceptibility testing of E. coli in Geese - at farm - Monitoring - quantitative data [Diffusion method]

E.coli, non-pathogenic, unspecified	Geese - at farm - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	97						
Antimicrobials:	29	30	31	32	33	34	>=35
Quinolones - Nalidixic acid	1	5	1			1	1
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Cephalosporins - Cefotaxim	7	16	2	17	6	17	21
Sulfonamides		7	1	1			

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

Test Method Used	Standard methods used for testing
Disc diffusion	NCCLS/CLSI

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol			12
	Florfenicol			14
Tetracyclines	Tetracycline			11
Fluoroquinolones	Ciprofloxacin			15
	Enrofloxacin			16
Quinolones	Nalidixic acid			13
Sulfonamides	Sulfonamide			10
Aminoglycosides	Streptomycin			11
	Gentamicin			12
	Neomycin			12
	Kanamycin			13
Cephalosporins	3rd generation cephalosporins			22
	Cefotaxim			27
Penicillins	Ampicillin			13

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

Test Method Used	Standard methods used for testing
Disc diffusion	EFSA Q 2007 131

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol		16	15
	Florfenicol		0	0
Tetracyclines	Tetracycline		8	15
Fluoroquinolones	Ciprofloxacin		0.03	30
	Enrofloxacin		0	0
Quinolones	Nalidixic acid		16	18
Trimethoprim	Trimethoprim		2	9
Sulfonamides	Sulfonamide		256	9
	Sulfonamides		256	9
Aminoglycosides	Streptomycin		16	13
	Gentamicin		2	15
	Neomycin		0	0
	Kanamycin		0	0
Trimethoprim + sulfonamides	Trimethoprim + sulfonamides		0	0

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

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Cephalosporins	3rd generation cephalosporins		0	0
	Cefotaxim		0.25	28
Penicillins	Ampicillin		19	18

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 <=
Amphenicols	Chloramphenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.03	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulfonamides	Sulfonamides		256	
Aminoglycosides	Streptomycin		16	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.25	
Penicillins	Ampicillin		8	

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. faecium in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E. faecium	Pigs - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	10																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Amphenicols - Florfenicol	14	10	6	5					1					2				1		1						
Aminoglycosides - Streptomycin	6	10	0					1				1		3	1	1		1			1				1	
Aminoglycosides - Gentamicin	6	10	0											2		2		2		2	1			1		
Penicillins - Ampicillin	16	10	0													3				1	2	1		1	1	1
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	14	10	0												4	2	1	1	1			1				
Macrolides - Erythromycin	13	10	3	1						1	1	1	1	2							1	1	1			
Streptogramins - Quinupristin	16	10	0													3				1	2	1		1	1	1

E. faecium	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	10						
Antimicrobials:	29	30	31	32	33	34	>=35
Amphenicols - Florfenicol							
Aminoglycosides - Streptomycin							

Table Antimicrobial susceptibility testing of E. faecium in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

E. faecium	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	10						
Antimicrobials:	29	30	31	32	33	34	>=35
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin							
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin							
Macrolides - Erythromycin							
Streptogramins - Quinupristin							

Table Antimicrobial susceptibility testing of E. faecalis in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E. faecalis	Pigs - at farm - animal sample - Monitoring																									
Isolates out of a monitoring program (yes/no)	yes																									
Number of isolates available in the laboratory	77																									
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Tetracyclines - Tetracycline	14	77	52	36		8	1	5	1			1		2			1	5	5	4	2	2		1		2
Aminoglycosides - Streptomycin	6	76	3	3				5	3	2	2	1	7	2	4	7		8	12	6	4	6		3		
Aminoglycosides - Gentamicin	6	77	0					1			1	1	1	7	2	6	6	6	8	20	7	3	4	1	2	1
Penicillins - Ampicillin	16	77	0																2	1	1	7	2	4	3	12
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	14	77	2						1			1			21	15	13	14	9	2				1		
Macrolides - Erythromycin	13	77	18	16				1			1				4	3	7	3			12	7	6	5	4	2

E. faecalis	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	77						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline		1					
Aminoglycosides - Streptomycin				1			
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin	2	11	5	11	4	5	7
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin							
Macrolides - Erythromycin	1	3		1		1	

Table Antimicrobial susceptibility testing of Enterococcus spp., unspecified in Pigs - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

Enterococcus spp., unspecified	Pigs - at farm - animal sample - Monitoring																									
Isolates out of a monitoring program (yes/no)	yes																									
Number of isolates available in the laboratory	106																									
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Tetracyclines - Tetracycline	14	104	72	45		12	1	7	2	2		3					5	4	3	5	1	3	2	2		3
Aminoglycosides - Streptomycin	6	106	6	6				1	2	4	4	3	1	10	8	12	5	8	7	9	7	7	3	5		2
Aminoglycosides - Gentamicin	6	106	0							1		1		2	2	13	8	18	10	16	7	8	12	4	1	2
Penicillins - Ampicillin	16	106	0												1	1			1	3	4	4	4	12	4	30
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	14	105	1									1		1	23	17	13	14	10	11	7	3	1	1		2
Macrolides - Erythromycin	13	103	18	10				2		3	3	1	3			9	5	9	1		13	9	4	9	3	7

Enterococcus spp., unspecified	Pigs - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	106						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline			1	1		1	1
Aminoglycosides - Streptomycin					1		1
Aminoglycosides - Gentamicin				1			
Penicillins - Ampicillin	2	18	2	9	1	3	7
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	1						
Macrolides - Erythromycin	1	5	2	2			2

Table Antimicrobial susceptibility testing of E. faecalis in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E. faecalis	Cattle (bovine animals) - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	72																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Tetracyclines - Tetracycline	14	72	35	14		3		6	4	4	2	2					2	7	2	4	6	6	2	2		2
Aminoglycosides - Streptomycin	6	72	6	6				3		3	6			2	7	5	8	10	6	3	4	3	4		1	
Aminoglycosides - Gentamicin	6	72	0									4	1	2	3	11	6	11	7	8	9	4	4		1	
Penicillins - Ampicillin	16	72	0																1	2		2	2	5		12
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	14	72	1									1		1	9	14	19	11	8	5	1	2			1	
Macrolides - Erythromycin	13	72	18	16						2						1	3	4	8		10	3	6	2	5	5
Streptogramins - Quinupristin	16	69	57				1	3	4	12	15	9	11	2		5		1	5			1				

E. faecalis	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	72						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline		1					3
Aminoglycosides - Streptomycin							1
Aminoglycosides - Gentamicin		1					
Penicillins - Ampicillin	4	10	7	9	5	8	5
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin							
Macrolides - Erythromycin		3	1	1		1	1
Streptogramins - Quinupristin							

Table Antimicrobial susceptibility testing of E. faecium in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E. faecium	Cattle (bovine animals) - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	5																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Tetracyclines - Tetracycline	14	5	4	3		1															1					
Aminoglycosides - Streptomycin	6	5	1	1		2										1			1							
Aminoglycosides - Gentamicin	6	5	0					1		1		1						1	1							
Penicillins - Ampicillin	16	5	0																	1						1
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	14	5	0												3	1			1							
Macrolides - Erythromycin	13	5	3	2				1										1							1	
Streptogramins - Quinupristin	16	5	2											2		2	1									

E. faecium	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	5						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline							
Aminoglycosides - Streptomycin							
Aminoglycosides - Gentamicin							
Penicillins - Ampicillin	1	1	1				
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin							
Macrolides - Erythromycin							
Streptogramins - Quinupristin							

Table Antimicrobial susceptibility testing of Enterococcus spp., unspecified in Cattle (bovine animals) - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

Enterococcus spp., unspecified	Cattle (bovine animals) - at farm - animal sample - Monitoring																									
Isolates out of a monitoring program (yes/no)	yes																									
Number of isolates available in the laboratory	69																									
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Tetracyclines - Tetracycline	14	69	19	13				1		5							8	5	2	5	3	6	3	1		3
Aminoglycosides - Streptomycin	6	69	2	2				2	2			3		4	8	8	2	5	6	8	10	2	1	2		1
Aminoglycosides - Gentamicin	6	69	0									2		1	2	8	4	10	7	13	7	4	4	2	2	
Penicillins - Ampicillin	16	69	0																			6	4	7	4	12
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	14	69	0										1		11	19	9	12	2	6	3	3		2		
Macrolides - Erythromycin	13	62	10	5				2		2	1	1	1	1	1	2	2	8	2		5	4	6	7	4	1
Streptogramins - Quinupristin	16	68	36				1	2		9	12	3	4	5		7	5	4	1	4	1		7	1		

Enterococcus spp., unspecified	Cattle (bovine animals) - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	69						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline		3		2	2	1	6
Aminoglycosides - Streptomycin		2				1	
Aminoglycosides - Gentamicin		2		1			
Penicillins - Ampicillin	2	15	2	9	1		7
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin		1					
Macrolides - Erythromycin	2	1	1				3
Streptogramins - Quinupristin	2						

Table Antimicrobial susceptibility testing of E. faecium in Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E. faecium	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring																									
Isolates out of a monitoring program (yes/no)	yes																									
Number of isolates available in the laboratory	99																									
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Tetracyclines - Tetracycline	14	97	60	31		11	2	3	3	3	2	5	1	3	2		2	2	2	5	5	3	2	4		1
Aminoglycosides - Streptomycin	6	99	3	3				2	1	1	3	4	1	8	5	5	10	12	9	8	10	7	2	6	1	
Aminoglycosides - Gentamicin	6	99	0									2	1	1	2	11	4	20	13	15	8	9	8	2	1	1
Penicillins - Ampicillin	16	99	0																	1		2	1	10	2	13
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	14	99	4							1		3			16	17	17	18	15	8	3			1		
Macrolides - Erythromycin	13	98	33	22		1		1	1	4	4			1		2	2	5	4		12	8	7	3	6	4
Streptogramins - Quinupristin	16	99	91	1		4	1	12	7	23	12	10	11	10		3		1				3				

E. faecium	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	99						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline		4		1			
Aminoglycosides - Streptomycin						1	
Aminoglycosides - Gentamicin	1						
Penicillins - Ampicillin	2	21	5	18	6	8	10
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin							
Macrolides - Erythromycin	5	1	1	2			2
Streptogramins - Quinupristin							1

Table Antimicrobial susceptibility testing of E. faecalis in Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

E. faecalis	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	10																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Tetracyclines - Tetracycline	14	10	3	2			1								1		2									1
Aminoglycosides - Streptomycin	6	10	0											1		3				1						1
Aminoglycosides - Gentamicin	6	10	0											2			1				1			1		2
Penicillins - Ampicillin	16	9	0												1					1		1		2		1
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	14	10	1									1			1	1	1			1				1		
Macrolides - Erythromycin	13	10	1	1											1	1					3					
Streptogramins - Quinupristin	16	10	2					1		1									1	1	1				1	2

E. faecalis	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	10						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline						2	1
Aminoglycosides - Streptomycin			3			1	
Aminoglycosides - Gentamicin	1			1			1
Penicillins - Ampicillin							3
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	2	1		1			
Macrolides - Erythromycin		1			1		2
Streptogramins - Quinupristin		2					

Table Antimicrobial susceptibility testing of Enterococcus spp., unspecified in Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring - quantitative data [Diffusion method]

Zone diameter (mm), number of isolates with a zone of inhibition equal to

Enterococcus spp., unspecified	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	78																								
Antimicrobials:	Cut-off value	N	n	<=6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Tetracyclines - Tetracycline	14	78	54	36	1	6		2	2	3	3	1	1	2			1	3	2	2	1	1		2		3
Aminoglycosides - Streptomycin	6	78	2	2				1	1	2	1	2	4	1	1	8	8	12	5	9	5	3	2	4		4
Aminoglycosides - Gentamicin	6	77	1	1								1				2	3	17	12	7	3	15	4	5	1	3
Penicillins - Ampicillin	16	78	0															1				1	3	9	3	12
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	14	77	0												13	22	7	9	9	5	3	4	1			2
Macrolides - Erythromycin	13	78	22	15				2	2		3		2		1	3	2	1	4	1	15	8	4	1		3
Streptogramins - Quinupristin	16	77	51					4	4	12	10	12	2	7		4	1	1	4		2	5		1		3

Enterococcus spp., unspecified	Gallus gallus (fowl) - laying hens - at farm - animal sample - Monitoring						
Isolates out of a monitoring program (yes/no)	yes						
Number of isolates available in the laboratory	78						
Antimicrobials:	29	30	31	32	33	34	>=35
Tetracyclines - Tetracycline		1		2			3
Aminoglycosides - Streptomycin	1	2					
Aminoglycosides - Gentamicin	1	1			1		
Penicillins - Ampicillin	9	14	3	9	3	6	5
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin		1					1
Macrolides - Erythromycin	1	3		1		3	3
Streptogramins - Quinupristin				1	1		3

Table Cut-off values for antibiotic resistance of Enterococcus, non-pathogenic in Animals

Test Method Used	Standard methods used for testing
Disc diffusion	NCCLS/CLSI

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin			6
	Gentamicin			6
Penicillins	Ampicillin			16
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin			14
Macrolides	Erythromycin			13
Streptogramins	Quinupristin/Dalfopristin			16
Tetracyclines	Tetracycline			14

Table Cut-off values for antibiotic resistance of Enterococcus, non-pathogenic in Food

Test Method Used	Standard methods used for testing
Disc diffusion	EFSA Q 2007 131.

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		512	12
	Gentamicin		32	10
Amphenicols	Chloramphenicol		32	12
Penicillins	Ampicillin		4	19
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	14
Macrolides	Erythromycin		4	15
Streptogramins	Quinupristin/Dalfopristin		32	11
	Pristinamycin		0	0
Tetracyclines	Tetracycline		2	17
Oxazolidines	Linezolid		4	20
Cephalosporins	Cefotaxim		0	0
Trimethoprim	Trimethoprim		0	0
Sulfonamides	Sulfonamides		0	0

Table Cut-off values for antibiotic resistance of Enterococcus, non-pathogenic in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		512	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		32	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1 ENTEROBACTER SAKAZAKII

4.1.1 General evaluation of the national situation

4.1.2 Enterobacter sakazakii in foodstuffs

Table Enterobacter sakazakii in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Enterobacter sakazakii	E. sakazakii
Foodstuffs intended for special nutritional uses - dried dietary foods for special medical purposes intended for infants below 6 months	CAO FFSD	Batch	30x10 gramms	19	0	0
Infant formula - dried	CAO FFSD	Batch	30x10 gramms	132	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 unit	Sample weight	Units tested	Total units in non-conformity	<= 100 mg/kg	>100 - <= 200 mg/kg	>200 - <= 400 mg/kg	> 400 mg/kg
Fish - Fishery products from fish species associated with a high amount of histidine - not enzyme maturated	CAO FFSD	Single	5 gramms	12	0	12	0	0	0
Fishery products, unspecified - at catering - Clinical investigations [1)]	CAO FFSD	Single	5 gramms	2	0	2	0	0	0

Comments:

[1)] outbreak investigation

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 staphyloccocci/gram are tested for the presence of enterotoxin.
Only those product groups are routinely tested for coagulase positive staphyloccocci, for which there is a criterion in 2073/2005/EC.

Type of specimen taken

milk products

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 CRL based on VIDAS enterotoxin test is used.

Table Staphylococcal enterotoxins in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Staphylococcal enterotoxins
Cheeses made from cows' milk - hard - made from pasteurised milk [1)]	CAO FFSD	Single	10 gramms	1	0
Confectionery products and pastes - Unspecified - Clinical investigations [2)]	CAO FFSD	Single	10 gramms	9	0
Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos) - meat products - Unspecified - Clinical investigations [3)]	CAO FFSD	Single	10 gramms	4	0
Vegetables - pre-cut - Unspecified - Clinical investigations [4)]	CAO FFSD	Single	10 gramms	2	0

Comments:

[1)] outbreak investigation
[2)] outbreak investigatio
[3)] outbreak investigation
[4)] outbreak investigatio

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, epidemological investigations and reporting of foodborne outbreaks

Data on food-borne outbreaks are collected in Hungary since 1931 by legal background. There are three surveillance systems for identifying/recognition of food-borne outbreaks (the obligatory report of a physician / a food business operator/ a drinking water supplier / a representative of an institution about an outbreak; the increasing number of cases in the communicable disease reporting system/ the increasing number of laboratory confirmed cases). The reporting systems of human cases belong to the National Public Health and Medical Officer's Service. 1st January 2007 an organisation for the control of food chain was established (Central Agricultural Office), which is working under the supervision of Ministry of Agriculture. Based on the new legal background, the official control of food chain is the task of the veterinary and food control service of this organisation, and this task involves the foodborn outbreak investigation, collection and analysis of data obtained – in all the cases, when the outbreak is 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 by the information provided by the public health service on the human cases. The two authorities are cooperariting in the whole process of investigation.

Description of the types of outbreaks covered by the reporting:

Outbreak: At least two cases of the disease with epidemiological link (exposed by the same food)/The number of cases are higher than expected surveillance data. It is not necessary to identify the agent in the food sample.

Household outbreak: At least two cases of a foodborne disease in the same household, exposed by the same food.

General outbreak: At least two cases of a foodborne disease in the same institute (school, kindergarten, hospital etc.) exposed by the same food.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

General outbreaks: Based on the data collected by Central Agricultural Office, in 2009 there were 50 verified or possible general food-borne outbreaks in Hungary, and those represented altogether 1035 cases. Altogether 75 patients were hospitalised. There was 1 lethal case. These data do not contain the household cases where the role of a product produced by the food industry and/or catering could be excluded. The trend showes a significant decrease a sin the number of outbreaks (-25 %) and int he number of cases (-42%) The decrease int he number of hospitalised cases is prominent (-54%). Based on the laboratory confirmed data ont he implicated food, 22% of the outbreaks were cased by Salmoella spp. 2% by Clostridium botulinum, and 2 % by Trichinella spiralis. In 24 % of cases other agents as C. perfringens, B. cereus, S. aureus or other facultatively pathogenic organisms were responsible for the illness.

It seems that the number of outbreaks caused by foodborn viruses shows an increasing trend (6 outbreaks in 2008 and 12 in 2009).

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

National Epidemiological Centre (NCE) and National Institute for Food Safety and Nutrition (NIFSN) collect the data on household outbreaks as well. In 2009 there were 199 verified or possible food-borne outbreaks (outbreak=two or more linked cases) registered by their system, and those (household+general outbreaks) represented altogether 1266 cases. Out of these 1266 cases 16,8% (213 people) were

hospitalised There were two lethal cases. [In 2008 there were registered 273 outbreaks (in 2007 269 outbreaks) with 3205 cases (2007: 1818 cases) of whom 386 persons (2007: 426 persons) (12%, 2007: 23%) were hospitalised.]
Out of the 199 registered outbreaks 64,3%(2008: 69.2%) were caused by Salmonella (128 outbreaks), 16,6% (2008:16,5%) by Campylobacter (33 outbreaks), 8,5% (2008:5,1%) by unknown origin (17 outbreaks), 3,5% (2008: 4,8% (7 events) by mushroom toxins, 3,5% viral agent (7 outbreaks). The rest (3,6%) of the outbreaks were caused by Clostridium perfringens (3 outbreaks), C. botulinum (2 outbreaks), T. spiralis (one outbreak), S. aureus enterotoxin (one outbreak).
Out of 199 outbreak 164 event (82,4%) were transmitted by food/meal made at household, 35 outbreak spread by meal originated from professional vendor.

12,0% (2008: 13,2%) of the outbreaks had either laboratory and/or analytical epidemiological evidence for being food-borne event (24 outbreaks: 9 salmonellosis, 5 mushroom toxins, 3 Clostridium perfringens, 2 norovirus, 2 C. botulinum, 1 T. spiralis, 1 Staphylocuccus aureus, and one outbreak of unknown etiology).
Out of the 1266 reported cases with food-borne origin 43,4% (549 people) have suffered from salmonellosis, 248 cases 19,6%) from C.perfringens-infection, 209 cases (16,5%) from viral gastroenteritis, 67 cases (5,3%)from campylobacteriosis, 22 from mushroom toxin, 8 from trichinellosis and 7 from botulism and 156 cases (12,3%) from unknown agent.

Salmonellosis
In 2009 there were 6029 cases (2008: 7166 cases) and 178 outbreaks (2008: 243 outbreaks) of salmonellosis confirmed by laboratory and epidemiological investigation based on the register of the NCE. The number of salmonellosis cases and outbreaks decreased significantly. The most frequent serotypes of human isolates were: S.Enteritidis (60,1%, 2008: 72,7%), S.Typhimurium (16,9%, 2008: 10,5%) and S.Infantis (7,3%, 2008: 4,5%). The dominance of S.Enteritidis decreased remarkably.

Campylobacteriosis
On the basis of the laboratory or epidemiological data altogether 6583 campylobacteriosis cases (2008: 5563) and 50 outbreaks (2008: 67) were registered in the database of NCE in 2009. The trend of campylobacteriosis changed, nearly 20% increasing was observed. On the contrary with the increasing number of cases, the decreasing trend of outbreaks continued. The most frequent species of human isolates were: C.jejuni (19,8%), C.coli (3,1%), C.lari (1,1%); 76,1% of isolates were not typed.

Table Foodborne Outbreaks: summarised data

	Total number of outbreaks	Outbreaks	Human cases	Hospitalized	Deaths	Number of verified outbreaks
Bacillus	0	0	0	0	0	0
Campylobacter	0	0	0	0	0	0
Clostridium	5	2	155	1	0	3
Escherichia coli, pathogenic	0	0	0	0	0	0
Foodborne viruses	12	12	454	30	0	0
Listeria	0	0	0	0	0	0
Other agents	10	5	28	6	0	5
Parasites	1	0	0	0	0	1
Salmonella	23	12	164	24	1	11
Staphylococcus	1	0	0	0	0	1
Unknown	7	7	47	3	0	0
Yersinia	0	0	0	0	0	0

Table Verified Foodborne Outbreaks: detailed data for Clostridium

Please use CTRL for multiple selection fields

C. perfringens

	Value
Code	10
Outbreaks	1
Human cases	51
Hospitalized	0
Deaths	0
Foodstuff implicated	Bovine meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Other Agent (Mixed Outbreaks)	
Comment	

C. perfringens

	Value
Code	42
Outbreaks	1
Human cases	38
Hospitalized	0
Deaths	0
Foodstuff implicated	Pig meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Residential institution (nursing home, prison, boarding school)
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Infected food handler
Other Agent (Mixed Outbreaks)	
Comment	

C. botulinum

	Value
Code	28
Outbreaks	1
Human cases	3
Hospitalized	3
Deaths	0
Foodstuff implicated	Pig meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	
Other Agent (Mixed Outbreaks)	
Comment	

Table Verified Foodborne Outbreaks: detailed data for Other agents

Please use CTRL for multiple selection fields

Mushroom toxins

	Value
Code	OETI 38
Outbreaks	1
Human cases	3
Hospitalized	2
Deaths	0
Foodstuff implicated	Other or mixed red meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Other contributory factor
Other Agent (Mixed Outbreaks)	
Comment	

Mushroom toxins

	Value
Code	OETI 69
Outbreaks	1
Human cases	2
Hospitalized	2
Deaths	0
Foodstuff implicated	Other or mixed red meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Other contributory factor
Other Agent (Mixed Outbreaks)	
Comment	

Mushroom toxins

	Value
Code	OETI 35
Outbreaks	1
Human cases	2
Hospitalized	2
Deaths	0
Foodstuff implicated	Other or mixed red meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Other contributory factor
Other Agent (Mixed Outbreaks)	
Comment	

Mushroom toxins

	Value
Code	OETI 33
Outbreaks	1
Human cases	5
Hospitalized	5
Deaths	0
Foodstuff implicated	Other or mixed red meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Other contributory factor
Other Agent (Mixed Outbreaks)	
Comment	

Mushroom toxins

	Value
Code	OETI 65
Outbreaks	1
Human cases	2
Hospitalized	2
Deaths	0
Foodstuff implicated	Other or unspecified poultry meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Other contributory factor
Other Agent (Mixed Outbreaks)	
Comment	

Table Verified Foodborne Outbreaks: detailed data for Parasites

Please use CTRL for multiple selection fields

Trichinella - T. spiralis

	Value
Code	1
Outbreaks	1
Human cases	8
Hospitalized	3
Deaths	0
Foodstuff implicated	Pig meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Other Agent (Mixed Outbreaks)	
Comment	

Table Verified Foodborne Outbreaks: detailed data for Salmonella

Please use CTRL for multiple selection fields

S. Enteritidis - PT 23

	Value
Code	OEK 47
Outbreaks	1
Human cases	3
Hospitalized	0
Deaths	0
Foodstuff implicated	Eggs and egg products
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Inadequate heat treatment
Other Agent (Mixed Outbreaks)	
Comment	

S. Enteritidis

	Value
Code	OEK 100
Outbreaks	1
Human cases	13
Hospitalized	11
Deaths	0
Foodstuff implicated	Eggs and egg products
More Foodstuff information	
Type of evidence	Analytical epidemiological evidence
Outbreak type	Household
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Other Agent (Mixed Outbreaks)	
Comment	

S. Enteritidis - PT 21

	Value
Code	9
Outbreaks	1
Human cases	17
Hospitalized	10
Deaths	0
Foodstuff implicated	Eggs and egg products
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Cross-contamination
Other Agent (Mixed Outbreaks)	
Comment	Pig product also involved.

S. Enteritidis - 6a

	Value
Code	43
Outbreaks	1
Human cases	26
Hospitalized	3
Deaths	0
Foodstuff implicated	Pig meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Mobile retailer, market/street vendor
Place of origin of problem	Processing plant
Origin of foodstuff	Domestic
Contributory factors	Infected food handler
Other Agent (Mixed Outbreaks)	Salmonella; S. Poona
Comment	

S. Infantis

	Value
Code	31
Outbreaks	1
Human cases	29
Hospitalized	0
Deaths	0
Foodstuff implicated	Broiler meat (Gallus gallus) and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Cross-contamination
Other Agent (Mixed Outbreaks)	
Comment	C. perfringens cfu 1000000, S. aureus

S. Enteritidis - PT 21

	Value
Code	41
Outbreaks	1
Human cases	5
Hospitalized	0
Deaths	0
Foodstuff implicated	Broiler meat (Gallus gallus) and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Cross-contamination
Other Agent (Mixed Outbreaks)	
Comment	

S. Enteritidis - PT 2

	Value
Code	35
Outbreaks	1
Human cases	6
Hospitalized	3
Deaths	0
Foodstuff implicated	Other or mixed red meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Cross-contamination
Other Agent (Mixed Outbreaks)	
Comment	

S. Enteritidis - PT 8

	Value
Code	6
Outbreaks	1
Human cases	4
Hospitalized	0
Deaths	0
Foodstuff implicated	Sweets and chocolate
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Processing plant
Origin of foodstuff	Domestic
Contributory factors	Infected food handler
Other Agent (Mixed Outbreaks)	
Comment	

S. Enteritidis - 1

	Value
Code	47
Outbreaks	1
Human cases	35
Hospitalized	5
Deaths	0
Foodstuff implicated	Sweets and chocolate
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Hospital or medical care facility
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Inadequate heat treatment
Other Agent (Mixed Outbreaks)	
Comment	

S. Manhattan

	Value
Code	5
Outbreaks	1
Human cases	3
Hospitalized	1
Deaths	0
Foodstuff implicated	Pig meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Mobile retailer, market/street vendor
Place of origin of problem	Processing plant
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Other Agent (Mixed Outbreaks)	Salmonella; S. Infantis
Comment	

S. Typhimurium

	Value
Code	21
Outbreaks	1
Human cases	5
Hospitalized	1
Deaths	1
Foodstuff implicated	Bovine meat and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	Household
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Unknown
Other Agent (Mixed Outbreaks)	
Comment	C. perfringens cfu 1000000

Table Verified Foodborne Outbreaks: detailed data for Staphylococcus

Please use CTRL for multiple selection fields

S. aureus

	Value
Code	48
Outbreaks	1
Human cases	6
Hospitalized	0
Deaths	0
Foodstuff implicated	Broiler meat (Gallus gallus) and products thereof
More Foodstuff information	
Type of evidence	Laboratory characterization of food and human isolates;Laboratory detection in human cases;Laboratory detection in implicated food
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Infected food handler
Other Agent (Mixed Outbreaks)	
Comment	