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 2006

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Hungary**
Reporting Year: **2006**

Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
Ministry of Agriculture and Rural Development		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[1]. The information has also been forwarded to the European Food Safety Authority (EFSA).
The report contains information on trends and sources of zoonoses and zoonotic agents in Hungary during the year 2006. The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given.
The information given covers both zoonoses that are important for the public health in the whole European Community as well as zoonoses, which are relevant on the basis of the national epidemiological situation.
The report describes the monitoring systems in place and the prevention and control strategies applied in the country. For some zoonoses this monitoring is based on legal requirements laid down by the Community Legislation, while for the other zoonoses national approaches are applied.
The report presents the results of the examinations carried out in the reporting year. A national evaluation of the epidemiological situation, with special reference to trends and sources of zoonotic infections, is given. Whenever possible, the relevance of findings in foodstuffs and animals to zoonoses cases in humans is evaluated.
The information covered by this report is used in the annual Community Summary Report on zoonoses that is published each year by EFSA.

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

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1. ANIMAL POPULATIONS

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

A. Information on susceptible animal population

Sources of information:

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 2006.

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 animal populations continued.
On the 1st of December the number of cattle was fewer than one year before.
Total pig population was almost 4 million in December; it increased by 134 thousand over the last year. There was a 78 thousand decrease compared to the survey of August 2006. The number of breeding sows increased by 13 thousand over the last 12 months; the stock amounted to 290 thousand. There has been a 5 thousand increase since August 2006.
Number of sheep decreased decreased by 107 thousand over the last year. The number of ewes increased by 6 thousand compared to August 2006 reaching 1.03 million in December.
Number of horses was 60 thousand, 3 thousand fewer than 4 months before.
Gallinaceous bird stock was 30.3 million; 1.6 million fewer than one year ago. The stock has decreased by 7.2 million since August 2006.
The number of geese was 2.7 million (increased by 1.3 million over the last year), while that of ducks was 2.6 million (by 810 thousand fewer than in December 2005) and the number of turkeys amounted to 4.1 million (decreased by 328 thousand over the last 12 months).

Table Susceptible animal populations

* Only if different than current reporting year

Animal species	Category of animals	Number of herds or flocks	Year*	Number of holdings	Year*	Number of slaughtered animals	Year*	Livestock numbers (live animals)	Year*
Cattle (bovine animals)	in total	22943				125840		800882	
Ducks	in total (1)							2579000	
Gallus gallus (fowl)	laying hens							14815000	
	in total (2)							30303000	
Geese	in total (3)							2708000	
Goats	in total			492				16021	
Pigs	fattening pigs							1816000	
	in total					3643000		3987000	
Sheep	in total			6842				1121971	
Solipeds, domestic	horses - in total (4)							60000	
Turkeys	in total (5)							4087000	
Pigeons	in total					267000			
Rabbits	in total (6)							941000	

(1): Source of information: Hungarian Central Statistical Office
(2): Source of information: Hungarian Central Statistical Office
(3): Source of information: Hungarian Central Statistical Office
(4): Source of information: Hungarian Central Statistical Office
(5): Source of information: Hungarian Central Statistical Office
(6): Source of information: Hungarian Central Statistical Office

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 (Bábolna, Bóly, Nádudvar) 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. In 2005 Hungary joined the Community baseline study on the prevalence of salmonella in laying flocks of Gallus gallus and in 2006 the Community baseline survey on the prevalence of Salmonella spp. in broiler flocks of Gallus gallus.

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

Preparations for the introduction of risk assessment in the control of salmonellosis are being made in the framework of the MedVetNet, (EU-FP6 Network of Excellence), through the Hungarian partner institute (VMRI). The general understanding between public health-, veterinary- and food safety officials is that the main source of S. Enteritidis infections in humans could be the S. Enteritidis infection of table egg producing flocks (see Hungarian report on layers), which most likely has its vertical origin in the breeding flocks (see Hungarian report on breeders). Earlier comparative investigations detected essentially the same PT in human as in animal and food isolates (Gadó et al, 1998). S. Typhimurium is much less frequently isolated from breeders than from layers. Phage type DT104 has been detected as an emerging type from 1991 in both human and animal (food) isolates

(Szmollény, et al., 2000, Pászti et al, 2001). Based on studies of the Hungarian National Research and Development Plan (NKFP 4/ 040/ 2001) it can be stated that the majority of isolates of S. Typhimurium in porcine, in poultry as well as in humans belong to the DT104 phage type and are essentially representing one main multiresistant clone with characteristic integron pattern (Gadó et al. 2003, Nógrády et al, 2003).
With regard to other serovars, the increase of S. Infantis in several animal species, especially in broiler flocks (above 80 % of the isolated strains) has to be mentioned (Kostyák 2001). This is also reflected in an increase of S. Infantis in human strains (in 2003 the 2nd most frequent human serovar with 7,5%), (Anon 2004.) which is a matter of increasing concern.

Recent actions taken to control the zoonoses

In 2006, control of Salmonella (S. Enteritidis and S. Typhimurium) was compulsory in breeding flocks of Gallus gallus as well as in hatcheries.
Laying flocks are vaccinated on a compulsory basis.

2.1.2. Salmonellosis in humans

A. Salmonellosis in humans

Case definition

Notification system in place

History of the disease and/ or infection in the country

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

Relevance as zoonotic disease

Table Salmonella in humans - Species/ serotype distribution

Salmonella	Cases 0	Cases Inc. 0	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0	Unknown status 0
S. Enteritidis							
S. Typhimurium							

Footnote

to be reported via ECDC

Table Salmonella in humans - Age distribution

Age Distribution	S. Enteritidis			S. Typhimurium			Salmonella spp.		
	All	M	F	All	M	F	All	M	F
<1 year									
1 to 4 years									
5 to 14 years									
15 to 24 years									
25 to 44 years									
45 to 64 years									
65 years and older									
Age unknown									
Total :	0	0	0	0	0	0	0	0	0

Footnote

to be reported via ECDC

Table Salmonella in humans - Seasonal distribution

Month	S. Enteritidis	S. Typhimurium	Salmonella spp.
	Cases	Cases	Cases
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
not known			
Total :	0	0	0

Footnote

to be reported via ECDC

2.1.3. Salmonella in foodstuffs

A. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

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

At meat processing plant

The sampling strategy in processing plants is randomised based on the previous years' data on production volume. The 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

Other: minced meat, meat prep., meat products

At retail

Other: 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.

B. Salmonella spp. in pig meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

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

C. Salmonella spp. in bovine meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

Food business operators perform continuous sampling system determined in their HACCP plans, and nearby there is an official control system of the competent authorities with a randomised sampling as well. The data of self control processes are checked in the frame of official control of course, but are not collected to a database, therefore these are not involved in this report. The test results of samples examined by competent authorities in their own laboratories are reported, but the data collection system do not allow to report the data separately for 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

Other: 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

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Infantis
Meat from broilers (Gallus gallus)									
fresh	monitoring	single	25 G	136	92	4	0	0	88
minced meat									
intended to be eaten cooked	monitoring	batch	10 g	90	36	0	0	36	0
meat preparation									
intended to be eaten cooked	monitoring	batch	10 g	501	162	0	0		162
meat products									
raw but intended to be eaten cooked	monitoring	batch	10 g	140	10	0	0		10
cooked, ready-to-eat	monitoring	batch	25 g	515	4	0	0		4
Meat from turkey									
fresh	monitoring	single	25 g	114	15	0	1	12	2
minced meat									
intended to be eaten cooked	monitoring	batch	10 g	202	21	0	0	20	1
meat preparation									
intended to be eaten cooked	monitoring	batch	10 g	21	2	0	0	2	0
meat products									
raw but intended to be eaten cooked	monitoring	batch	10 g	156	6	0	2	4	0
cooked, ready-to-eat	monitoring	batch	25 g	79	0	0	0	0	0
Meat from duck	monitoring	single	25 g	60	25	2	20	3	0
Meat from geese	monitoring	single	25 g	36	2	1	0	1	0

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Milk, cows'								
raw								
intended for direct human consumption	monitoring	single	25 ml	437	2	0	0	2
pasteurised milk	monitoring	batch	25 ml	380	0	0	0	0
Cheeses made from cows' milk								
soft and semi-soft	monitoring	batch	25 g	451	0	0	0	0
made from raw or low heat-treated milk	monitoring	batch	25 g	64	0	0	0	0
made from pasteurised milk	monitoring	batch	25 g	401	0	0	0	0
Dairy products (excluding cheeses)								
butter								
made from raw or low heat-treated milk (1)	monitoring	batch	25 g	106	0	0	0	0
milk powder and whey powder	monitoring	batch	25 g	171	0	0	0	0
ice-cream	monitoring	batch	25 g	281	0	0	0	0

(1) : butter made from heat-treated milk

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from pig								
fresh	monitoring	single	25 g	168	8	0	4	4
minced meat								
intended to be eaten cooked	monitoring	batch	10 g	360	17	1	5	11
meat preparation								
intended to be eaten cooked	monitoring	batch	10 g	23	1	0	0	1
meat products								
raw but intended to be eaten cooked	monitoring+ofl control	batch	25 g	2777	76	1	20	55
cooked, ready-to-eat	monitoring+ofl control	batch	25 g	2584	2	0	0	2
Meat from bovine animals								
fresh	monitoring	single	25 g	202	4	1	1	2
minced meat								
intended to be eaten cooked	monitoring	batch	10 g	163	2	0	0	2
meat products								
cooked, ready-to-eat	monitoring	batch	25 g	63	0	0	0	0
Other products of animal origin								
gelatin and collagen	monitoring	batch	25 g	40	0	0	0	0
Meat from other animal species or not specified								
- Monitoring	monitoring	single	25 g	124	3	0	0	3

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Eggs								
table eggs								
- at retail	monitoring	batch	25 g	54	0	0	0	0
raw material (liquid egg) for egg products	monitoring	batch	25 g	237	26	24	0	2
Egg products	monitoring	batch	25 g	112	1	1	0	0
Molluscan shellfish								
cooked	monitoring	batch	25 g	72	0	0	0	0
Sprouted seeds								
ready-to-eat	monitoring	batch	25 g	114	0	0	0	0
Fruits and vegetables								
precut								
ready-to-eat	monitoring	batch	25 g	121	0	0	0	0
Ready-to-eat salads	monitoring	batch	25 g	577	1	0	0	1

2.1.4. Salmonella in animals

A. Salmonella spp. in Gallus gallus - breeding flocks for meat production and broiler flocks

Monitoring system

Sampling strategy

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

As described in the general evaluation of the situation.

Broiler flocks

Sampling is voluntary for broiler producers in Hungary. In 2006 the data were collected in the frame of the EU baseline study. Up-to-date information were collected by the regional authorities on broiler producers before the initation of the study. The sampling plan was stratified on the basis of production level and region with an equal sesonal distribtion.
There is a control program on voluntary basis for broiler flocks in Hungary as well. Those who participate take fecal samples before the planned date of slaughter.
As the results of baseline study are reported, the following informations are connected to this strategy.

Frequency of the sampling

Broiler flocks: Rearing period

Sampling distributed evenly throughout the year

Broiler flocks: Before slaughter at farm

maximum 3 weeks weeks prior to slaughter

Type of specimen taken

Broiler flocks: Rearing period

Socks/ boot swabs

Methods of sampling (description of sampling techniques)

Broiler flocks: Rearing period

As described in the technical specifications of the study.

Case definition

Broiler flocks: Rearing period

A flock is considered to be positive if Salmonella was isolated of any of the samples.

Diagnostic/ analytical methods used

Broiler flocks: Rearing period

With following modifications: ISO 6579 with the modifications of CRL Salmonella

Vaccination policy

Broiler flocks

Flocks can be vaccinated on a voluntary basis.

Control program/ mechanisms

The control program/ strategies in place

Broiler flocks

Taking part in the control program is voluntary and concentrated only on Salmonella Enteritidis and Typhimurium. Many slaughterhouses require salmonella testing from the producers with S. Enteritidis and Typhimurium negative status.

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

Based on the results of baseline study, salmonella prevalence is high in broiler flocks in Hungary. The dominance of Salmonella Infantis strains is well-known in the past years. 90 % of the isolated strains are belongig to this serovar now as in broiler flocks and in meat thereof. 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 possibles reasons for this marked change is intensively investigated by the Veterinary Medical Research Institute of the Hungarian Academy of Sciences and National Center for Epidemiolgy. As the Salmonella control program concentrated only for Salmonella Enteritidis and Typhimurium, and the vaccines widely used are also protect from these two serovars, it can be suggested that the dominance of S. Infantis might be - partly -the result of such a selection pressure. The antimicrobioal resistance of S. Infantis strains could also influence this change.

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

The marked increase of Salmonella Infantis serovar in broiler and 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 breeding flocks of Gallus gallus

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Virchow	S. Hadar	S. Infantis
Gallus gallus (fowl)										
elite breeding flocks for egg production line		single								
elite breeding flocks, unspecified	CAO, Animal Health and Animal Welfare Directorate	flock	27	0						
grandparent breeding flocks, unspecified	CAO, Animal Health and Animal Welfare Directorate	flock	36	0						
parent breeding flocks, unspecified	CAO, Animal Health and Animal Welfare Directorate	flock	940	7	5					2
day-old chicks	CAO, Animal Health and Animal Welfare Directorate	flock	20	5	2		2			1
during rearing period	CAO, Animal Health and Animal Welfare Directorate	flock	49	10	3		3	1		3
during production period	CAO, Animal Health and Animal Welfare Directorate	flock	96	22	3	1	15			3

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Infantis	S. Virchow
Gallus gallus (fowl)									
laying hens	CAO, Animal Health and Animal Welfare Directorate	flock	417	9	9				
broilers									
sampling in the framework of the broiler baseline study	Central Agricultural Office, Food and Feed Safety Directorate, EU baseline study	flock	359	237	18	11	15	210	
unspecified (1)	Central Agricultural Office, Veterinary Diagnostic Directorate	batch	25572	1608	188	5	1415		
Ducks	Central Agricultural Office, Veterinary Diagnostic Directorate	batch	730	116	12	95	9		
Geese	Central Agricultural Office, Veterinary Diagnostic Directorate	batch	246	92	9	49	34		
Turkeys	Central Agricultural Office, Veterinary Diagnostic Directorate	batch	170	23	19	1	3		

(1) : Independent from baseline study (payed by producers)

Footnote

The number of the total units positive for Salmonella spp. in broilers is lower than the sum of the serovars due to the mixed infections.

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Pigeons	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	13	0	0	0	0
Parrots	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	1	1	0	1	0

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Cattle (bovine animals)	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	485	22	2	3	17
Pigs	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	601	79	6	6	67
Solipeds, domestic							
horses	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	1	1	0	0	1

2.1.5. Salmonella in feedingstuffs

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of land animal origin	official control	batch	25 g	50	0			
Feed material of marine animal origin	official control	batch	25 g	48	0			

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified
Feed material of cereal grain origin	official control	batch	25 g	76	1			1
Feed material of oil seed or fruit origin	official control	batch	25 g	42	0			
Other feed material								
legume seeds and similar products	official control	batch	25 g	4	0			
tubers, roots and similar products	official control	batch	25 g	1	0			
other seeds and fruits	official control	batch	25 g	1	0			
forages and roughages	official control	batch	25 g	3	0			

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Tennessee	S. Infantis	S. Bredeney
Compound feedingstuffs for cattle											
final product	official control	batch	25 g	50	0						
Compound feedingstuffs for pigs											
final product	official control	batch	25 g	316	5	0	1	1	1		2
Compound feedingstuffs for poultry (non specified)											
final product	official control	batch	25 g	4	0						
Compound feedingstuffs for poultry - laying hens											
final product	official control	batch	25 g	160	2			2			
Compund feedingstuffs for poultry - broilers											
final product	official control	batch	25 g	174	2					1	1
Pet food	official control	batch	25 g	210	0						
Compound feedingstuffs for fish	official control	batch	25 g	3	0						
Compound feedingstuffs for horses	official control	batch	25 g	1	0						
Compound feedingstuffs for rabbits	official control	batch	25 g	9	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

Serovars		Ducks		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Geese		Turkeys	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=		48	6	3	27	40	71	64				30		90
Number of isolates serotyped	N=	0	48	6	3	27	40	71	64	0	0	0	30	0	90
Number of isolates per type															
S. Agona				1					1						
S. Anatum			1												
S. Banana						1							1		
S. Blockley			1										1		4
S. Bovismorbificans			2										1		
S. Bredeney															34
S. Choleraesuis							36								
S. Derby						11	2								27
S. Enteritidis			6	1	1	2		4	20				5		6
S. Hadar									1				1		
S. Indiana			2			1									
S. Infantis			1					63	26				1		15
S. Kottbus			1		1										
S. Manhattan									2						
S. Mbandaka									5						
S. Newport				1				1							
S. Ohio									1						

S. Saintpaul														1
S. Schwarzengrund			1											
S. Senftenberg								4						1
S. Typhimurium		34	1	1	11	2	1	2				20		1
S. enterica subsp. enterica, rough			1		1		2	2						1

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella serovars in food

Serovars		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	20		128		1982					
Number of isolates serotyped	N=	20	0	128	0	1982	0	0	0	0	0
Number of isolates per type											
S. Bovismorbificans		1		0		0					
S. Bredeney		0		0		4					
S. Choleraesuis		0		4		0					
S. Derby		0		24		0					
S. Enteritidis		2		0		27					
S. Infantis		0		27		1909					
S. London		0		7		0					
S. Newport		5		0		0					
S. Ohio		1		0		0					
S. Saintpaul		0		0		4					
S. Typhimurium		4		53		11					
S. Virchow		0		0		5					
S. 1,4,12:d:-		4		0		0					
S. 1,4,5,12:-:i		0		13		0					

S. enterica subsp. enterica, rough	3		0		22					

Footnote

(*) M : Monitoring, C : Clinical
Monitor means: strains of monitoring + official control origin

Table Salmonella Enteritidis phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=					51			
Number of isolates phagetyped	N=	0	0	0	0	50	0	0	0
Number of isolates per type									
PT 4						22			
PT 8						9			
PT 4b						4			
PT 7						9			
6						5			
PT 5a						1			

Footnote

(*) M : Monitoring, C : Clinical
Data from Salmonella baseline study

Table Salmonella Enteritidis phagetypes in food

Phagetype		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	2		0		27					
Number of isolates phagetyped	N=	0	0	0	0	27	0	0	0	0	0
Number of isolates per type											
PT 4		0		0		12					
PT 6		0		0		4					
PT 8		0		0		5					
PT 4b		0		0		2					
PT 7		0		0		4					

Footnote

(*) M : Monitoring, C : Clinical
Monitor means: strains of monitoring and official control origin

Table Salmonella Enteritidis phagetypes in humans

Phagetype	humans	
Sources of isolates (*)	M	C
Number of isolates in the laboratory N=		
Number of isolates phagetyped N=	0	2018
Number of isolates per type		
PT 1 (1)		22
PT 4 (2)		398
PT 6 (3)		246
PT 8 (4)		642
PT 14b		20
PT 21 (5)		174
Not typable		28
PT 1b (6)		85
PT 13a (7)		113
PT 2		32
PT 4b		22
PT 23		20
Other		59
PT 6c		24
PT 13		44
RDNC (8)		89

(1) : 1 isolate from food
(2) : 2 isolates from food
(3) : 2 isolates from food
(4) : 9 isolates from food
(5) : 15 isolates from food
(6) : 11 isolates from food
(7) : 6 isolates from food
(8) : 4 isolates from food

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=								
Number of isolates phagetyped	N=	0	0	0	0	26	0	0	0
Number of isolates per type									
DT 8						21			
Not typable						1			
DT 135						2			
DT 125						2			

Footnote

(*) M : Monitoring, C : Clinical
Data from broiler Salmonella baseline study

Table Salmonella Typhimurium phagetypes in food

Phagetype		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	4		53		11					
Number of isolates phagetyped	N=	0	0	0	0	11	0	0	0	0	0
Number of isolates per type											
DT 8		0		0		9					
DT 135		0		0		1					
DT 125		0		0		1					

Footnote

(*) M : Monitoring, C : Clinical
Monitor means: strains of monitoring and official control origin

Table Salmonella Typhimurium phagetypes in humans

Phagetype	humans	
Sources of isolates (*)	M	C
Number of isolates in the laboratory N=		
Number of isolates phagetyped N=	0	432
Number of isolates per type		
DT 104l		103
DT 104b		64
DT 193		62
DT 208		14
U 302		45
Not typable		33
DT 193a		5
U 310		5
DT 195		7
other		30
35		14
DT 125 (1)		13
RDNC		24
DT 14		13

(1) : One isolate from food

Footnote

(*) M : Monitoring, C : Clinical

2.1.7. Antimicrobial resistance in Salmonella isolates

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

A. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Frequency of the sampling

The tests in 2006 were performed in the frame of Salmonella baseline study in broiler flocks. 360 flocks were sampled. All the S. Enteridis, Typhimurium and Infantis isolates were Tested for resistance.

Type of specimen taken

Boot swab samples (5/ flocks)
were taken.

Methods of sampling (description of sampling techniques)

Technical specifications of baseline study were followed.

Procedures for the selection of isolates for antimicrobial testing

All the isolates were tested.

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

Antimicrobials can be seen in the tables. Disc diffusion method according to NCCLS is used. The inhibitive zone diameters are measured by a computerised system.

Breakpoints used in testing

Breakpoints can be seen in the tables.

Results of the investigation

Level of antimicrobial resistance is low in Salmonella Enteritidis strains. 1 of the 20 was

multiresistant (data shown in baseline study report). None of the 12 S. Typhimurium was multiresistant. 189 S. Infantis strains were examined, nalidixic acid, streptomycin and tetracyclin resistance was very widespread in this population. 12 strains were multiresistant(data shown in S. Infantis resistance table).

B. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Sampling strategy used in monitoring

Frequency of the sampling

Frequency: as described previously in prevalence tables. As only Salmonella Enteritidis and Typhimurium strains are involved in the 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

Antimicrobials can be seen in the tables. Disc diffusion method according to NCCLS is used. The inhibitive zone diameters are measured by a computerised system.

Breakpoints used in testing

Can be seen in the tables.

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.
Antimicrobial resistance in Salmonella Infantis strains is very widespread. Most of the strains are resistant for tetracycline, ampicillin and nalidixic acid. Therefore rate of the resistance for three antimicrobials is very high. The rate of multiresistant isolates is near 5%.

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

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

S. Enteritidis

Gallus gallus (fowl)

Isolates out of a monitoring programme	no
Number of isolates available in the laboratory (1)	19

Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	19	0												1		2	7	6	2				1									
Amphenicols																																
Chloramphenicol	19	0																1	6	4	6	0	2									
Florfenicol	19	0														2	3	1	2	1	6	2	1							1		
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	18	1							1										1	1	7	3	1		1		2					1
Ceftriaxon	18	1						1													1		1	1	2	1	4		4		1	2
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	19	0																1					5	2	7	1	2					1
Quinolones																																
Nalidixic acid	4	0															1	2			1											
Sulfonamides																																
Sulfonamide	19	5	4				1							2	1	3			1		3	1	2		1							
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	15	0												1	1	6	4	1	1	1												
Gentamicin	17	0										1			1	1	3	4	4	1	2											
Neomycin	18	0										1		4	4	6	1	1	1													
Kanamycin	0																															
Penicillins																																
Ampicillin	19	1				1												1		6	6		4		1							
Trimethoprim + sulfonamides	18	0									1					1			2	1	3	4	4		2							

(1) : 4 out of 19 isolates derived from a monitoring programme

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

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

S. Enteritidis

Pigs - Monitoring

Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	2

Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	2	0														1			1													
Amphenicols																																
Chloramphenicol	2	0																				1	1									
Florfenicol	2	0																			2											
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	2	0																		1			1									
Ceftriaxon	2	0																						1					1			
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	2	0																					1			1						
Quinolones																																
Nalidixic acid	2	0																1		1												
Sulfonamides																																
Sulfonamide	2	0																	1		1											
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	2	0													2																	
Gentamicin	2	0													1	1																
Neomycin	2	0										1		1																		
Kanamycin	0																															
Penicillins																																
Ampicillin	2	0																		1	1											
Trimethoprim + sulfonamides	2	0																	1	1												

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	S. Enteritidis																															
	Ducks																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory	5																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	5	0														1		1	2	1												
Amphenicols																																
Chloramphenicol	5	0															1			1	1		1	1								
Florfenicol	5	0															1		3	1												
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	5	0																			1					3	1					
Ceftriaxon	5	0																				1						1	1	1		1
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	5	0																								1	1	1	1		1	
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	5	1	1														1			1	1		1									
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	5	0															2	1	1	1												
Gentamicin	5	0																1	3				1									
Neomycin	5	0													2	1	1			1												
Kanamycin	0																															
Penicillins																																
Ampicillin	5	0																	1		1	1		2								
Trimethoprim + sulfonamides	5	0																			1		1		2				1			

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	S. Enteritidis																															
	Turkeys																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory	2																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	2	1	1																1													
Amphenicols																																
Chloramphenicol	2	0														1									1							
Florfenicol	2	0																1		1												
Cephalosporins																																
3rd generation cephalosporins	1																								1							
Ceftiofur	1	0																1														
Ceftriaxon	2	0																					1								1	
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	2	0																							1						1	
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	2	1	1													1																
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	2	0														1	1															
Gentamicin	2	0													1			1														
Neomycin	2	0									1				1																	
Kanamycin	0																															
Penicillins																																
Ampicillin	2	0																		1				1								
Trimethoprim + sulfonamides	2	1	1																								1					

Table Antimicrobial susceptibility testing of S.Enteritidis in animals

n = Number of resistant isolates	S. Enteritidis											
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**		**Geese**		**Ducks**	
Isolates out of a monitoring programme	yes		yes		no		no		no		no	
Number of isolates available in the laboratory	1		2		19		2		4		5	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines												
Tetracyclin	1	0	2	0	19	0	2	1	4	0	5	0
Amphenicols												
Chloramphenicol	1	0	2	0	19	0	2	0	4	0	5	0
Florfenicol	1	0	2	0	19	0	2	0	3	0	5	0
Cephalosporins												
Ceftiofur	1	0	2	0	18	1	2	0	3	0	5	0
Ceftriaxon	1	0	2	0	18	1	2	0	4	0	5	0
Fluoroquinolones												
Enrofloxacin	1	0	2	0	19	0	2	0	4	0	5	0
Quinolones												
Nalidixic acid	1	0	2	0	4	0	2	0				
Sulfonamides												
Sulfonamide	1	0	2	0	19	5	2	1	4	0	5	1
Aminoglycosides												
Streptomycin	1	0	2	0	15	0	2	0	4	0	5	0
Gentamicin	1	0	2	0	17	0	2	0	4	0	5	0
Neomycin	1	0	2	0	18	0	2	0	3	0	5	0
Penicillins												
Ampicillin	1	0	2	0	19	1	2	0	4	0	5	0
Trimethoprim + sulfonamides	1	0	2	0	19	0	2	1	4	0	5	0
Fully sensitive	1	1	2	2					4	4		
Resistant to 1 antimicrobial											5	1

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

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

S. Enteritidis

Geese

Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	4

Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	4	0													1		2	1														
Amphenicols																																
Chloramphenicol	3	0																	1		1	1										
Florfenicol	3	0																			1		2									
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	3	0																							2	1						
Ceftriaxon	4	0																								1			2		1	
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	4	0																								1	1		2			
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	4	2	2											1	1																	
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	4	0														1	1		2													
Gentamicin	4	0																3		1												
Neomycin	3	0														1	2															
Kanamycin	0																															
Penicillins																																
Ampicillin	4	0																					4									
Trimethoprim + sulfonamides	4	0																			1	1			2							

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from broilers (Gallus gallus) - Monitoring (not only monitoring+official control) - quantitative data [Diffusion method]

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

S. Enteritidis

Meat from broilers (Gallus gallus) - Monitoring (not only monitoring+official control)

Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	27

Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	20	0														10	7	3														
Amphenicols																																
Chloramphenicol	20	0														6		8	6													
Florfenicol	0																															
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	20	0																	3			12	5									
Ceftriaxon	20	0																			7	3	10									
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	20	0																						13	4		3					
Quinolones																																
Nalidixic acid	20	0														3			11	5	1											
Sulfonamides																																
Sulfonamide (1)	0																															
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	20	0										10			9	1																
Gentamicin	20	0													4		9	4	3													
Neomycin	20	0												4	7		9															
Kanamycin	20										1								5	11		3										
Penicillins																																
Ampicillin	20	0														11	5	4														
Trimethoprim + sulfonamides	20	0														2				5	9		4									

(1) : trimethoprim/ sulfonamide

Table Antimicrobial susceptibility testing of S. Hadar in Geese - quantitative data [Diffusion method]

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

S. Hadar

Geese

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

Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	2	2	2																													
Amphenicols																																
Chloramphenicol	2	0																		1							1					
Florfenicol	2	0																			1	1										
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	2	0																	1				1									
Ceftriaxon	2	0																					1				1					
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	2	0															1			1												
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	2	1	1												1																	
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	2	2						2																								
Gentamicin	2	0													1	1																
Neomycin	2	0												1					1													
Kanamycin	0																															
Penicillins																																
Ampicillin	2	0																	1			1										
Trimethoprim + sulfonamides	2	0																				1	1									

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																	
	S. Hadar																																
	Gallus gallus (fowl)																																
Isolates out of a monitoring programme	no																																
Number of isolates available in the laboratory	1																																
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**	
Tetracyclines																																	
Tetracyclin	1	1	1																														
Amphenicols																																	
Chloramphenicol	1	0																		1													
Florfenicol	1	0																				1											
Cephalosporins																																	
3rd generation cephalosporins	0																																
Ceftiofur	1	0																	1														
Ceftriaxon	1	0																					1										
Fluoroquinolones																																	
Ciprofloxacin	0																																
Enrofloxacin	1	0																		1													
Quinolones																																	
Nalidixic acid	0	0																															
Sulfonamides																																	
Sulfonamide	1	0																	1														
Trimethoprim	0																																
Aminoglycosides																																	
Streptomycin	1	1						1																									
Gentamicin	1	0													1																		
Neomycin	1	0												1																			
Kanamycin	0																																
Penicillins																																	
Ampicillin	1	0																	1														
Trimethoprim + sulfonamides	1	0																			1												

Table Antimicrobial susceptibility testing of S. Hadar - qualitative data

n = Number of resistant isolates	S. Hadar			
	Gallus gallus (fowl)		**Geese**	
Isolates out of a monitoring programme	no		no	
Number of isolates available in the laboratory	1		2	
Antimicrobials:	**N**	**n**	**N**	**n**
Tetracyclines				
Tetracyclin	1	1	2	2
Amphenicols				
Chloramphenicol	1	0	2	0
Florfenicol	1	0	2	0
Cephalosporins				
Ceftiofur	1	0	2	0
Ceftriaxon	1	0	2	0
Fluoroquinolones				
Enrofloxacin	1	0	2	0
Sulfonamides				
Sulfonamide	1	0	2	1
Aminoglycosides				
Streptomycin	1	1	2	2
Gentamicin	1	0	2	0
Neomycin	1	0	2	0
Penicillins				
Ampicillin	1	0	2	0
Trimethoprim + sulfonamides	1	1	2	0

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	S. Infantis																															
	Gallus gallus (fowl)																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory (1)	93																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	90	80	75	2					2		1		3	1	1	2	1	1									1					
Amphenicols																																
Chloramphenicol	82	0												2	13	6	10	4	23	3	15	1	3		2							
Florfenicol	78	0												2	4	10	14	9	17	3	9	5	2		1							2
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	93	0														1	2	5	18	14	15	10	19	3	2		2	1				1
Ceftriaxon	69	0																	1		1	3	3	12	9	3	14	7	6	4	4	2
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	87	0												3	5	5	14	11	4	18	5	2	2	2	10		2		2			2
Quinolones																																
Nalidixic acid	65	63	63															1				1										
Sulfonamides																																
Sulfonamide	93	72	72						2			1		2	2		2		2		2	4	2		1		1					
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	93	17	2		1	2	5	7	4	20	9	25	10	6										1	1							
Gentamicin	87	0												1	8	13	17	17	13	7	8	1			1							1
Neomycin	93	0								1		4	3	29	23	17	8	4	2										2			
Kanamycin	0																															
Penicillins																																
Ampicillin	93	3	3											1	2	3	9	13	10	15	15	8	10	1			2					1
Trimethoprim + sulfonamides	93	10	10					1	1		2	1	11	6	17	6	5	5	3	4	4	2	5	1	4	2	1			1		1

(1) : 65 out of 93 isolates derived from a monitoring programme

Table Antimicrobial susceptibility testing of S. Infantis - qualitative data

n = Number of resistant isolates

S. Infantis

	Pigs - Monitoring		Gallus gallus (fowl)		Turkeys		Gallus gallus (fowl) - at farm		Cattle (bovine animals) - Monitoring	
Isolates out of a monitoring programme	yes		no		no		yes		yes	
Number of isolates available in the laboratory	2		93		1		189		1	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines										
Tetracyclin	2	0	90	80	1	1	189	175	1	0
Amphenicols										
Chloramphenicol	2	0	82	0	1	0	189	0	1	0
Florfenicol	2	0	78	0	1	0			1	0
Cephalosporins										
Ceftiofur	2	0	93	0	1	0	189	1	1	0
Ceftriaxon	2	0	69	0	1	0	189	1	1	0
Fluoroquinolones										
Enrofloxacin	2	0	87	0	1	0	189	5	1	0
Quinolones										
Nalidixic acid	2	2	65	63			189	181	1	0
Sulfonamides										
Sulfonamide	2	2	93	72	1	1			1	1
Aminoglycosides										
Streptomycin	2	1	93	17	1	0	189	174	1	0
Gentamicin	2	0	87	0	1	0	189	0	1	0
Neomycin	2	0	93	0	1	0	189	0	1	0
Penicillins										
Ampicillin	2	0	93	3	1	0	189	8	1	0
Trimethoprim + sulfonamides	2	0	93	10	1	0	189	0	1	0

Footnote

Gallus gallus farm data originated from baseline study

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	S. Manhattan																															
	Gallus gallus (fowl)																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory	14																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	14	0															2	2	1		3	4										2
Amphenicols																																
Chloramphenicol	12	0										1							1	1			6		3							
Florfenicol	12	0																1	1		3		1	1	5							
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	12	0																						2	2		2		3	2		1
Ceftriaxon	0	0																														
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	11	0																							1	2	2	1	2	1	2	
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	13	2	2											1	1		2	2	2		2											1
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	14	2						2		2		5	1	1					1								1					1
Gentamicin	13	0											1	1	5	1	3		1													1
Neomycin	14	0									1	2	1	5	2		1															2
Kanamycin	0																															
Penicillins																																
Ampicillin	11	0																		1	1	1	3	2	3							
Trimethoprim + sulfonamides	11	1	1																		1	1	3	1		1	2	1				

Table Antimicrobial susceptibility testing of S. Manhattan - qualitative data

n = Number of resistant isolates		
	S. Manhattan	
	Gallus gallus (fowl)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		14
Antimicrobials:	**N**	**n**
Tetracyclines		
Tetracyclin	14	0
Amphenicols		
Chloramphenicol	12	0
Florfenicol	12	0
Cephalosporins		
Ceftiofur	12	0
Fluoroquinolones		
Enrofloxacin	11	0
Sulfonamides		
Sulfonamide	13	2
Aminoglycosides		
Streptomycin	14	2
Gentamicin	13	0
Neomycin	14	0
Penicillins		
Ampicillin	11	0
Trimethoprim + sulfonamides	11	1

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	S. Typhimurium																															
	Ducks																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory	26																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	26	1	1											1		5	6	6	3	2	1		1									
Amphenicols																																
Chloramphenicol	26	0														2			1	2	6	2	7	1	3	1					1	
Florfenicol	26	0													1	2	1		1	4	9		4		3		1					
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	0	0																														
Ceftriaxon	0	0																														
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	0	0																														
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	0	0																														
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	26	0								1	2	4	6	7	3	2		1														
Gentamicin	26	0											1		1	1		5	9	2	2	2		1	1		1					
Neomycin	22	0										1		2	5	3	4	3	2		2											
Kanamycin	0																															
Penicillins																																
Ampicillin	26	0																2	2	1	3	3	3	2	7		2				1	
Trimethoprim + sulfonamides	26	0															2	1	1				3	3	5	1	5	1	2			2

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	S. Typhimurium																															
	Cattle (bovine animals)																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory	3																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	3	2			1		1									1																
Amphenicols																																
Chloramphenicol	3	2	2																		1											
Florfenicol	3	2					1				1								1													
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	3	0																	1						1		1					
Ceftriaxon	3	0																							1				1			1
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	3	0																			1						1					1
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	3	3	3																													
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	3	2	1					1	1																							
Gentamicin	3	0											1		1				1													
Neomycin	3	0									1			1	1																	
Kanamycin	0																															
Penicillins																																
Ampicillin	3	3	3																													
Trimethoprim + sulfonamides	3	0											1		1					1												

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	S. Typhimurium																															
	Geese																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory	16																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	16	0												1		4	3	3	1	1	1		2									
Amphenicols																																
Chloramphenicol	16	0																2	2			2	4		3		2				1	
Florfenicol	16	0															1			2	6	1	2	1	1		2					
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	16	0																	1					1	4	1	5	1			2	1
Ceftriaxon	16	0																							1		1	2		3	1	8
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	16	0																							1		4	1		1	3	6
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	16	1	1					1				2		1	1	1	2	1			1	1	2				1			1		
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	16	0										2	6	1	6	1																
Gentamicin	16	0															3	3	2	3	2	2	1									
Neomycin	16	0												3	4	3	4		1	1												
Kanamycin	0																															
Penicillins																																
Ampicillin	16	0																		1	1	1	1	2	3	2	4		1			
Trimethoprim + sulfonamides	16	0																		2		1	1	1			3		3	1	2	2

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	S. Typhimurium																															
	Pigs - Monitoring																															
Isolates out of a monitoring programme	yes																															
Number of isolates available in the laboratory	2																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	2	0														1			1													
Amphenicols																																
Chloramphenicol	2	0																	1				1									
Florfenicol	2	0																	1				1									
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	2	0																				1	1									
Ceftriaxon	2	0																									1		1			
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	2	0																								1	1					
Quinolones																																
Nalidixic acid	2	0																1		1												
Sulfonamides																																
Sulfonamide	2	1	1													1																
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	2	0										1		1																		
Gentamicin	2	0													1	1																
Neomycin	2	0										1		1																		
Kanamycin	0																															
Penicillins																																
Ampicillin	2	0																	1				1									
Trimethoprim + sulfonamides	2	0																			1	1										

Table Antimicrobial susceptibility testing of S.Typhimurium in animals

n = Number of resistant isolates	S. Typhimurium											
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**		**Geese**		**Ducks**	
Isolates out of a monitoring programme	no		yes		no				no		no	
Number of isolates available in the laboratory	3		2		4				16		26	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines												
Tetracyclin	3	2	2	0	4	1			16	0	26	1
Amphenicols												
Chloramphenicol	3	2	2	0	4	0			16	0	26	0
Florfenicol	3	2	2	0	4	0			16	0	26	0
Cephalosporins												
Ceftiofur	3	0	2	0	4	0			16	0	26	0
Ceftriaxon	3	0	2	0	4	0			16	0	26	0
Fluoroquinolones												
Enrofloxacin	3	0	2	0	4	0			16	0	26	0
Quinolones												
Nalidixic acid			2	0	3	0						
Sulfonamides												
Sulfonamide	3	3	2	1	4	0			16	1	26	3
Aminoglycosides												
Streptomycin	3	2	2	0	4	0			16	0	26	0
Gentamicin	3	0	2	0	4	1			16	0	26	0
Neomycin	3	0	2	0	4	0			16	0	22	0
Penicillins												
Ampicillin	3	3	2	0	4	1			16	0	26	0
Trimethoprim + sulfonamides			2	0	4	0			16	0	26	0

Footnote

Gallus gallus farm data originated from baseline study

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	S. Typhimurium																															
	Gallus gallus (fowl)																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory	4																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	4	1									1		2						1													
Amphenicols																																
Chloramphenicol	4	0															1		1		2											
Florfenicol	4	0																	2		1		1									
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	4	0																			3				1							
Ceftriaxon	4	0																											2		2	
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	4	0																							1	1			1			1
Quinolones																																
Nalidixic acid	3	0										2							1													
Sulfonamides																																
Sulfonamide	4	0													1		1	1									1					
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	4	0											3						1													
Gentamicin	3	0														1	1		1													
Neomycin	4	0												2	2																	
Kanamycin	0																															
Penicillins																																
Ampicillin	3	0															1		1	1												
Trimethoprim + sulfonamides	4	0											1										2			1						

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																	
	S. Virchow																																
	Gallus gallus (fowl)																																
Isolates out of a monitoring programme	no																																
Number of isolates available in the laboratory	17																																
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																	
Tetracyclin	0	0																															
Amphenicols																																	
Chloramphenicol	16	0														1	2	1	2	1	6	2											1
Florfenicol	14	0													1			2	3	3	4	1											
Cephalosporins																																	
3rd generation cephalosporins	0																																
Ceftiofur	15	0																4		4	4		3										
Ceftriaxon	13	0																		1		4	2	2	1	1	1		1				
Fluoroquinolones																																	
Ciprofloxacin	0																																
Enrofloxacin	16	0																			2	2	2	1	3	2	3						1
Quinolones																																	
Nalidixic acid	0	0																															
Sulfonamides																																	
Sulfonamide	0	0																															
Trimethoprim	0																																
Aminoglycosides																																	
Streptomycin	17	0										7	5	3															1	1			
Gentamicin	15	0													1	4	6	3	1														
Neomycin	16	0											1	11	4																		
Kanamycin	0																																
Penicillins																																	
Ampicillin	17	0													1		1	2	3	2	4	1	1						1	1			
Trimethoprim + sulfonamides	15	0																1			5	3	3	3									

Table Antimicrobial susceptibility testing of S. Virchow - qualitative data

n = Number of resistant isolates		
	S. Virchow	
	Gallus gallus (fowl)	
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		17
Antimicrobials:	**N**	**n**
Amphenicols		
Chloramphenicol	16	0
Florfenicol	14	0
Cephalosporins		
Ceftiofur	15	0
Ceftriaxon	13	0
Fluoroquinolones		
Enrofloxacin	16	0
Aminoglycosides		
Streptomycin	17	0
Gentamicin	15	0
Neomycin	16	0
Penicillins		
Ampicillin	17	0

Table Antimicrobial susceptibility testing of Salmonella spp. in Pigs - quantitative data [Diffusion method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																	
	Salmonella spp.																																
	Pigs																																
Isolates out of a monitoring programme	yes																																
Number of isolates available in the laboratory	1																																
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**	
Tetracyclines																																	
Tetracyclin	1	0											1																				
Amphenicols																																	
Chloramphenicol	1	0															1																
Florfenicol	1	0															1																
Cephalosporins																																	
3rd generation cephalosporins	0																																
Ceftiofur	1	0																	1														
Ceftriaxon	1	0																							1								
Fluoroquinolones																																	
Ciprofloxacin	0																																
Enrofloxacin	1	0																					1										
Quinolones																																	
Nalidixic acid	1	0																1															
Sulfonamides																																	
Sulfonamide	1	0												1																			
Trimethoprim	0																																
Aminoglycosides																																	
Streptomycin	1	0										1																					
Gentamicin	1	0													1																		
Neomycin	1	0										1																					
Kanamycin	0																																
Penicillins																																	
Ampicillin	1	1	1																														
Trimethoprim + sulfonamides	1	0																				1											

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	Salmonella spp.																															
	Cattle (bovine animals)																															
Isolates out of a monitoring programme	yes																															
Number of isolates available in the laboratory	1																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	1	1	1																													
Amphenicols																																
Chloramphenicol	1	0																						1								
Florfenicol	1	0																1														
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	1	0																			1											
Ceftriaxon	1	0																									1					
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	1	0																							1							
Quinolones																																
Nalidixic acid	1	0																		1												
Sulfonamides																																
Sulfonamide	1	0																							1							
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	0	0																														
Gentamicin	1	0										1																				
Neomycin	1	0																1														
Kanamycin	1															1																
Penicillins																																
Ampicillin	1	1	1																													
Trimethoprim + sulfonamides	1	0																					1									

Table Antimicrobial susceptibility testing of Salmonella spp. in Geese - quantitative data [Diffusion method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	Salmonella spp.																															
	Geese																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory	4																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	4	0														2	1	1														
Amphenicols																																
Chloramphenicol	4	0																	1		3											
Florfenicol	4	0																	1	1	1		1									
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	4	0																				2			2							
Ceftriaxon	4	0																						1			1		1		1	
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	4	0																								2	1		1			
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	4	1	1													1			1				1									
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	4	0										1		2			1															
Gentamicin	4	0														1	1		2													
Neomycin	4	0												1	1		2															
Kanamycin	0																															
Penicillins																																
Ampicillin	4	1	1																		2		1									
Trimethoprim + sulfonamides	4	1	1																	1					1		1					

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	Salmonella spp.																															
	Gallus gallus (fowl)																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory (1)	10																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	7	1	1										1			1	1			2							1					
Amphenicols																																
Chloramphenicol	10	0										1			2		1	1		1	2				1						1
Florfenicol	10	1							1			1				1		1	3		1			1								1
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	10	1								1								1	1		1	1	2		2				1			
Ceftriaxon	8	0																		1					1	1	1	1			1	2
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	10	0												1		1	1			1	1			1	1	1	1					1
Quinolones																																
Nalidixic acid	3	2	2															1														
Sulfonamides																																
Sulfonamide	9	4	3		1														2		1	1					1					
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	10	2	1			1				2		3	1		1	1																
Gentamicin	10	0														3	2	2		1				1	1							
Neomycin	8	0												4			1	1			1	1										
Kanamycin	0																															
Penicillins																																
Ampicillin	10	0												1				1		1	1	1	3		1		1					
Trimethoprim + sulfonamides	10	1	1								1	1				1					1		2		1		2					

(1) : 3 out of 10 isolates derived from a monitoring programme

Table Antimicrobial susceptibility testing of Salmonella in animals

n = Number of resistant isolates

Salmonella spp.

	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys		Geese	
Isolates out of a monitoring programme	yes		yes		no				no	
Number of isolates available in the laboratory	1		1		10				4	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines										
Tetracyclin	0	1	1	0	7	1			4	0
Amphenicols										
Chloramphenicol	1	0	1	0	10	0			4	0
Florfenicol	1	0	1	0	10	1			4	0
Cephalosporins										
Ceftiofur	1	0	1	0	10	1			4	0
Ceftriaxon	1	0	1	0	8	0			4	0
Fluoroquinolones										
Enrofloxacin	1	0	1	0	10	0			4	0
Quinolones										
Nalidixic acid	1	0	1	0	3	2				
Sulfonamides										
Sulfonamide	1	0	1	0	9	4			4	1
Aminoglycosides										
Streptomycin	1	0	1	0	10	2			4	0
Gentamicin	1	0	1	0	10	0			4	0
Neomycin	1	0	1	0	8	0			4	0
Penicillins										
Ampicillin	1	1	1	1	10	0			4	1
Trimethoprim + sulfonamides	1	0	1	0	10	1			4	1

Table Antimicrobial susceptibility testing of Salmonella spp. in food

n = Number of resistant isolates	Salmonella spp.							
	Meat from bovine animals		**Meat from pig**		**Meat from broilers (Gallus gallus)**		**Meat from other poultry species**	
Isolates out of a monitoring programme					yes			
Number of isolates available in the laboratory					1982			
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin					202	170		
Amphenicols								
Chloramphenicol					202	0		
Cephalosporins								
Ceftiofur					202	1		
Ceftriaxon					202	1		
Quinolones								
Nalidixic acid					202	181		
Aminoglycosides								
Streptomycin					202	167		
Gentamicin					202	0		
Neomycin					202	0		
Penicillins								
Amoxicillin / Clavulanic acid					202	7		
Ampicillin					202	8		
Trimethoprim + sulfonamides								
Trimethoprim + Sulfonamide					202	0		
Fully sensitive					5			
Resistant to 1 antimicrobial					5			
Resistant to 2 antimicrobials					12			
Resistant to 3 antimicrobials					160			
Resistant to 4 antimicrobials					15			
Resistant to >4 antimicrobials					4			

Footnote

Strains of monitoring and official control origin

Table Breakpoints for antibiotic resistance testing in Animals

Test Method Used

Disc diffusion

Agar dilution

Broth dilution

E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol							30	18		12
Florfenicol							30	19		14
Tetracyclines										
Tetracyclin							30	19		14
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin							15	23		16
Quinolones										
Nalidixic acid							30	19		13
Trimethoprim										
Sulfonamides										
Sulfonamide							300	17		10
Aminoglycosides										
Streptomycin							10	15		11
Gentamicin							10	15		12
Neomycin							30	17		12
Kanamycin										
Trimethoprim + sulfonamides								16		10
Cephalosporins										
Ceftiofur							30	21		17
Ceftriaxon							30	21		13
3rd generation cephalosporins										
Penicillins										
Ampicillin							10	17		13

Table Breakpoints for antibiotic resistance testing in Food

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol							30	18	13	12
Florfenicol										
Tetracyclines										
Tetracyclin							30	19	15	14
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin							5	20	17	16
Quinolones										
Nalidixic acid							30	19	14	13
Trimethoprim										
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin							10	15	12	11
Gentamicin							10	15	13	12
Neomycin							30	17	13	12
Kanamycin										
Trimethoprim + sulfonamides							23.75	16	11	10
Cephalosporins										
Ceftiofur							30	21	18	17
Ceftriaxon							30	21	14	13
3rd generation cephalosporins										
Penicillins										
Ampicillin							10	15	12	11

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

Case definition

Notification system in place

History of the disease and/ or infection in the country

Relevance as zoonotic disease

Table Campylobacter in humans - Species/ serotype distribution

Campylobacter	Cases 0	Cases Inc. 0	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0	Unknown status 0
C. coli							
C. jejuni							
C. upsaliensis							

Footnote

to be reported via ECDC

Table Campylobacter in humans - Age distribution

Age Distribution	C. coli			C. jejuni			Campylobacter spp., unspecified		
	All	M	F	All	M	F	All	M	F
<1 year									
1 to 4 years									
5 to 14 years									
15 to 24 years									
25 to 44 years									
45 to 64 years									
65 years and older									
Age unknown									
Total :	0	0	0	0	0	0	0	0	0

Footnote

to be reported via ECDC

Table Campylobacter in humans - Seasonal distribution

Month	C. coli	C. jejuni	C. upsaliensis	Campylobacter spp., unspecified
	Cases	Cases	Cases	Cases
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
not known				
Total :	0	0	0	0

Footnote

to be reported via ECDC

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 meat processing plant

As the monitorig program in 2006 concentrated only on fresh meat and not on meat products, there was no specific monitoring at processing plant level.

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. There was no significant change in the prevalence compared to 2005. (In 2004, the prevalence was higher, but in that year the sampling program did not covered the whole year.)

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. coli	C. lari	C. jejuni	C. upsaliensis	thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus)										
fresh	monitoring	single	25g	136	62	5		56	1	
Meat from turkey										
fresh	monitoring	single	25g	114	20	2		17	1	
Meat from duck	monitoring	single	25g	60	14	1		13		
Meat from geese	monitoring	single	25g	36	2			2		

Table Campylobacter in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. upsaliensis	C. lari	thermophilic Campylobacter spp., unspecified
Meat from pig										
fresh	monitoring	single	25g	168	8	7	1	0	0	0
Meat from bovine animals										
fresh	monitoring	single	25g	202	5	3	2			
Milk, cows'										
raw										
intended for direct human consumption		single	25ml	437	3	3				
raw milk for manufacture										
intended for manufacture of raw or low heat-treated products		single	25ml	46	1	1				

2.2.4. Campylobacter in animals

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. lari	C. upsaliensis	thermophilic Campylobacter spp., unspecified
Cattle (bovine animals)									
dairy cows	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	456	31					31
Pigs	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	505	41					41
Gallus gallus (fowl)									
broilers									
- at slaughterhouse	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	499	50					50

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 Campylobacter in animals

n = Number of resistant isolates	Campylobacter spp., unspecified					
	Gallus gallus (fowl)		**Cattle (bovine animals)**		**Pigs**	
Isolates out of a monitoring programme	yes		yes		yes	
Number of isolates available in the laboratory	50		31		41	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines						
Tetracyclin	50	12	31	10	41	27
Fluoroquinolones						
Enrofloxacin	50	38	30	11	41	13
Quinolones						
Nalidixic acid	50	38	31	15	41	29
Macrolides						
Erythromycin	50	5	30	10	41	10
Penicillins						
Ampicillin	50	14	31	2	41	3

Table Antimicrobial susceptibility testing of Campylobacter in food

n = Number of resistant isolates

Campylobacter spp., unspecified

	Meat from other poultry species		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Meat from turkey		Meat from duck		Meat from geese	
Isolates out of a monitoring programme			yes		yes		yes		yes		yes		yes	
Number of isolates available in the laboratory			5		7		61		20		14		2	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines														
Tetracyclin			5	0	7	0	49	12	17	6	13	8	2	1
Fluoroquinolones														
Ciprofloxacin			5	0	7	1	49	28	17	6	13	3	2	1
Quinolones														
Nalidixic acid			5	0	7	1	49	32	17	8	13	4	2	1
Aminoglycosides														
Gentamicin			5	0	7	0	49	0	17	0	13	0	2	0
Macrolides														
Erythromycin			5	0	7	3	49	1	17	0	13	1	2	0
Penicillins														
Ampicillin			5	0	7	1	49	7	17	3	13	4	2	0
Fully sensitive				5		3		16		7		1		1
Resistant to 1 antimicrobial				0		2		5		2		4		0
Resistant to 2 antimicrobials				0		1		15		3		2		0
Resistant to 3 antimicrobials				0		1		11		5		4		3
Resistant to 4 antimicrobials				0		0		1		0		0		0
Resistant to >4 antimicrobials				0		0		1		0		0		0

Table Antimicrobial susceptibility testing of Campylobacter spp., unspecified in Cattle (bovine animals) - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to	Campylobacter spp., unspecified Cattle (bovine animals) - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	31

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	31	8	5	5		7	2	1	1			2	2	2		4						
Fluoroquinolones																						
Ciprofloxacin	0	0																				
Enrofloxacin	24	5	3	4	1	6	3	1	1		3	1				1						
Quinolones																						
Nalidixic acid	31	13						2	5	6	2		3		1	12						
Aminoglycosides																						
Gentamicin	0	0																				
Macrolides																						
Erythromycin	28	3			1	10	5	6	3			1	1			1						
Penicillins																						
Ampicillin	31	2			1	1		3	10	5	6	3				2						

Table Antimicrobial susceptibility testing of Campylobacter spp., unspecified in Pigs - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	Campylobacter spp., unspecified																					
	Pigs																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	41																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	41	27	1	1		4	1	1	1	1	4		5	3	4	15						
Fluoroquinolones																						
Ciprofloxacin	0	0																				
Enrofloxacin	41	15	3	5	3	9	2	3	1	1	2	1	10			1						
Quinolones																						
Nalidixic acid	41	27	4					1		4	2	1	2	5	2	20						
Aminoglycosides																						
Gentamicin	0	0																				
Macrolides																						
Erythromycin	41	9	1	2		9	5	11		3	1	1	3	1		4						
Penicillins																						
Ampicillin	41	2	1			7	5	7	10	2	6		1	1		1						

Table Antimicrobial susceptibility testing of Campylobacter spp., unspecified in Gallus gallus (fowl) - Monitoring - quantitative data [Dilution method]

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

Campylobacter spp., unspecified

Gallus gallus (fowl) - Monitoring

Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	50

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	50	12	7	3	2	12	5	1	1	1	4	2	3	2	3	4						
Fluoroquinolones																						
Ciprofloxacin	0	0																				
Enrofloxacin	50	37	2	3		6		1	1	3	6	2	24			2						
Quinolones																						
Nalidixic acid	50	38		1				1	4	1	4		1	7	3	28						
Aminoglycosides																						
Gentamicin	0	0																				
Macrolides																						
Erythromycin	50	4	2	3		11	16	5	7	1	1	1	1			2						
Penicillins																						
Ampicillin	49	14					5	1	8	7	5	7	2	1	2	11						

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin		4		16	0.016	256				
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin		0.25		2	0.002	32				
Quinolones										
Nalidixic acid		16		32	0.016	256				
Aminoglycosides										
Gentamicin										
Macrolides										
Erythromycin		0.5		8	0.016	256				
Penicillins										
Ampicillin		8		32	0.016	256				

Table Breakpoints used for antimicrobial susceptibility testing in Food

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin							30	19	11	10
Fluoroquinolones										
Ciprofloxacin							5	21	16	15
Enrofloxacin										
Quinolones										
Nalidixic acid										
Aminoglycosides										
Gentamicin							10	15	13	12
Macrolides										
Erythromycin							15	26	20	19
Penicillins										
Ampicillin							10	22	15	14

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

Table Listeria in humans - Species/ serotype distribution

Listeria	Cases		Cases Inc.	
	0		0	
Listeria spp.				
Congenital cases				
Deaths				

Footnote

to be reported via ECDC

Table Listeria in humans - Age distribution

Age Distribution	L. monocytogenes			Listeria spp.		
	All	M	F	All	M	F
<1 year						
1 to 4 years						
5 to 14 years						
15 to 24 years						
25 to 44 years						
45 to 64 years						
65 years and older						
Age unknown						
Total :	0	0	0	0	0	0

Footnote

to be reported via ECDC

2.3.3. Listeria in foodstuffs

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g	> detection limit but =< 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Milk, cows'								
raw								
intended for direct human consumption	monitoring	single	25 ml	437	3	3	3	
pasteurised milk	monitoring	batch	25 ml	380	0			
Cheeses made from cows' milk								
soft and semi-soft								
made from raw or low heat-treated milk	monitoring	batch	25 g	64	1	1	1	
made from pasteurised milk	monitoring	batch	25 g	401	4	4	4	
Dairy products (excluding cheeses)								
butter	monitoring	batch	25 g	106	0			
ice-cream	monitoring	batch	25 g	281	0			
milk powder and whey powder (1)	monitoring	batch	25 g	171	0			
yoghurt (2)	monitoring	batch	25 g	120	0			
Other food (3)	monitoring	batch	25 g	451	0			

(1) : only milk powder
(2) : fermented milk products
(3) : fresh cheese

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g	> detection limit but =< 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Meat from broilers (Gallus gallus)								
meat products								
cooked, ready-to-eat	monitoring	batch	25 g	515	0			
Meat from pig								
fresh (1)	monitoring	batch	25 g	619	20	20	20	0
meat products								
cooked, ready-to-eat	monitoring	batch	25 g	1721	11	11	11	0
Fish								
smoked (2)	monitoring	batch	25 g	124	3	2	1	0
Molluscan shellfish								
cooked	monitoring	batch	25 g	72	0			
Ready-to-eat salads	monitoring	batch	25 grams	577	18	18	18	

(1) : non heat treated meat products (eg.sausages, salami)
(2) : fish smoked or preserved by the use of preservatives

Footnote

In case of fish, not all the positve samples were enumerated.

2.3.4. Listeria in animals

Table Listeria in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria spp.	L. monocytogenes	Listeria spp., unspecified
Cattle (bovine animals)	Central Agricultural Office, Veterinary Diagnostic Directorate	herd		2	2	
Sheep		herd		5	3	2
Gallus gallus (fowl)	Central Agricultural Office, Veterinary Diagnostic Directorate	flock		1	1	
Deer	Central Agricultural Office, Veterinary Diagnostic Directorate	herd		1		1
Chinchillas	Central Agricultural Office, Veterinary Diagnostic Directorate	herd		5		

Footnote

Unfortunately, the structure of available data is not suitable for the proper filling out of the "Units tested" column.

2.4. E. COLI INFECTIONS

2.4.1. General evaluation of the national situation

2.4.2. E. Coli Infections in humans

Table Escherichia coli, pathogenic in humans - Age distribution

Escherichia coli, pathogenic	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
HUS						
- clinical cases						
- lab. confirmed cases						
- caused by O157 (VT+)						
- caused by other VTEC						
E.coli infect. (except HUS)						
- clinical cases						
- laboratory confirmed						
- caused by 0157 (VT+)						
- caused by other VTEC						

Footnote

to be reported via ECDC

Table Escherichia coli, pathogenic in humans - Species/ serotype distribution

Age Distribution	Verotoxigenic E. coli (VTEC)			VTEC O157:H7			VTEC non-O157		
	All	M	F	All	M	F	All	M	F
<1 year									
1 to 4 years									
5 to 14 years									
15 to 24 years									
25 to 44 years									
45 to 64 years									
65 years and older									
Age unknown									
Total :	0	0	0	0	0	0	0	0	0

Footnote

to be reported via ECDC

2.4.3. Escherichia coli, pathogenic in foodstuffs

Table VT E. coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Escherichia coli, pathogenic	E.coli, pathogenic, unspecified	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Meat from bovine animals									
fresh	monitoring	single	25 g	202	1	0	1	1	
minced meat									
intended to be eaten raw	monitoring	batch	25 g	163	0				
Milk, cows'									
raw	monitoring	single	25 ml	13	0				

2.4.4. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Frequency of the sampling

Animals at slaughter (herd based approach)

Sampling distributed evenly throughout the year

Type of specimen taken

Animals at slaughter (herd based approach)

Other: 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)

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. Tuberculosis, Mycobacterial Diseases in humans

Table Mycobacterium in humans - Species/ serotype distribution

Mycobacterium	Cases 0	Cases Inc. 0	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0
M. bovis						
M. tuberculosis						
Reactivation of previous cases						

Footnote

to be reported via ECDC

Table Mycobacterium in humans - Age distribution

Age Distribution	M. bovis		
	All	M	F
<1 year			
1 to 4 years			
5 to 14 years			
15 to 24 years			
25 to 44 years			
45 to 64 years			
65 years and older			
Age unknown			
Total :	0	0	0

Footnote

to be reported via ECDC

2.5.3. 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 Zoo-Sanitary Code, 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:
·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;
·samples used for confirming paraallergic reaction must include the tonsils, pharyngal, mesenteric and portal lymphatic glands of the slaughtered animal;
·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

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 by the Ministry of Agriculture and Rural Development (in 2005 and 2006) 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
·the conditions for retention of the officially free status are not complied with, or
·classical lesions of tuberculosis are seen at post-mortem examination,
·an epidemiological enquiry establishes the likelihood of infection,
·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. The detailed rules regarding bovine brucellosis 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.) MÉM 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. In 2006, 7 outbreaks with 38 cases was recorded.

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium spp.	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Pigs	Central Agricultural Office, Veterinary Diagnostic Directorate	herd		1	1		
Zoo animals, all	Central Agricultural Office, Veterinary Diagnostic Directorate	animal		1	1		
Wild boars							
wild							
- from hunting - Clinical investigations	Central Agricultural Office, Veterinary Diagnostic Directorate	animal		10	10		
Deer							
farmed	Central Agricultural Office, Veterinary Diagnostic Directorate	animal		1	1		

Footnote

Unfortunately, the structure of available data is not suitable for the proper filling out of the "Units tested" column.

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 examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests (*)	Number of animals tested			
MAGYARORSZÁG	22943	800882	22928	99.935	7	0.031	1	640087	53892	707	38
Total	22943	800882	22928	99.935	7	0.031		640087	53892	707	38

Footnote

Regarding this examination, the aviable data are grouped by counties, because the current administrative system based on the counties in Hungary. The regions in the pick list are only statistical ones. In the ADNS-system and all official reports to the Commission , we report according to counties (that are the real administrative regions in Hungary now). On request we can provide the information in that county-grouped form.

(*) Legend:

In column "Interval between routine tuberculin tests" use the following numeric codes: (0) no routine tests; (1) tests once a year; (2) tests each two years; (3) tests each three years concerning 24 month-old animals; (4) tests each 4 years; (5) others (please give details).

Table Tuberculosis in farmed deer

Region	Total number of existing farmed deer		Free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests (*)	Number of animals tested			
MAGYARORSZÁG											0
Total	0	0	0	0	0	0		0	0	0	0

(*) Legend:

In column "Interval between routine tuberculin tests" use the following numeric codes: (0) no routine tests; (1) tests once a year; (2) tests each two years; (3) tests each three years concerning 24 month-old animals; (4) tests each 4 years; (5) others (please give details).

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. No cases of the disease were reported during 2006. For detailed information, please refer to the specific texts.

2.6.2. Brucellosis in humans

Table Brucella in humans - Species/ serotype distribution

Brucella	Cases 0	Cases Inc. 0	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0
B. abortus						
B. melitensis						
B. suis						
Occupational cases						

Footnote

to be reported via ECDC

Table Brucella in humans - Age distribution

Age Distribution	B. abortus			B. melitensis			Brucella spp.		
	All	M	F	All	M	F	All	M	F
<1 year									
1 to 4 years									
5 to 14 years									
15 to 24 years									
25 to 44 years									
45 to 64 years									
65 years and older									
Age unknown									
Total :	0	0	0	0	0	0	0	0	0

Footnote

to be reported via ECDC

2.6.3. Brucella in foodstuffs

2.6.4. Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

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 Veterinary Act No CLXXVI of 2005 that is effective since 1 January 2006 (before 1 January 2006 the Act XCI. of 1995 was the relevant) 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.) MÉM of the Minister of Agriculture and Alimentation, which have contained the same provisions for the diseases mentioned above.
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 Zoo-Sanitary code, 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 seven years no infection of B. abortus has been found.

B. 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 2006, 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 2006, 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.) MÉM 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.) MÉM of the Minister of Agriculture and Alimentation.

Results of the investigation

No evidence of infection with B. melitensis were found.

C. 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 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. In 2006, 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 2006, 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.) MÉM 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.) MÉM of the Minister of Agriculture and Alimentation.

Results of the investigation

No evidence of infection with B. melitensis were found in 2006.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella spp.	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Pigs	Central Agricultural Office	herd	5730	0	0	0	0	0
Hares	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	16	1			1	

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk samples			Information about abortions			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds tested	Number of bovine herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals		Number of animals examined microbio logically	Number of animals positive microbio logically
																		Serologically	BST		
MAGYARORSZÁG	22943	800882	22940	99.987	0	0	14865	134033	0	76	2603	0	1316	0	0	0	0	0	0	0	0
Total	22943	800882	22940	99.987	0	0	14865	134033	0	76	2603	0	1316	0	0	0	0	0	0	0	0

Footnote

In case of 3 herds the serological investigations were not carried out on time, therefore the officially free status was suspended on 31 December 2006.

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

Region	Total number of existing ovine / caprine		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of herds	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbiologically	Number of animals positive microbiologically	Number of suspended herds
MAGYARORSZÁG	7334	1137992	7334	100	0	0	2996	61352	0	0	0	0	0	0
Total	7334	1137992	7334	100	0	0	2996	61352	0	0	0	0	0	0

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

2.7.2. Yersiniosis in humans

A. Yersinosis in humans

Notification system in place

Table Yersinia in humans - Species/ serotype distribution

Yersinia	Cases 0	Cases Inc. 0	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0
Y. enterocolitica						
Y. enterocolitica - O:3						
Y. enterocolitica - O:9						

Footnote

to be reported via ECDC

Table Yersinia in humans - Age distribution

Age Distribution	Y. enterocolitica			Yersinia spp.		
	All	M	F	All	M	F
<1 year						
1 to 4 years						
5 to 14 years						
15 to 24 years						
25 to 44 years						
45 to 64 years						
65 years and older						
Age unknown						
Total :	0	0	0	0	0	0

Footnote

to be reported via ECDC

Table Yersinia in humans - Seasonal distribution

Month	Y. enterocolitica	Yersinia spp.
	Cases	Cases
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		
not known		
Total :	0	0

Footnote

to be reported via ECDC

2.7.3. Yersinia in foodstuffs

2.7.4. Yersinia in animals

Table Yersinia in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. pseudotuberculosis	Y. enterocolitica - O:9	Y. enterocolitica - O:3	Y. enterocolitica - unspecified
Ducks	Central Agricultural Office, Veterinary Diagnostic Directorate	flock		1			1			

Footnote

Unfortunately, the structure of available data is not suitable for the proper filling out of the "Units tested" column.

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. Between 1960 and 1974, 32 cases were confirmed, while no positive finding were reported between 1975-1999.
In 2000, 4 cases were reported from wild game and 1 case from domestic animal. In 2001, 14 wild game cases and 0 cases from domestic animals were reported. As regards 2002, only 2 cases were reported, both from wild game. In 2003, 3 cases were reported from wild game and 2 cases in domestic animals. Slaughtered susceptible animals intended to be placed on the market or for private consumption, 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 1950's and 1960's. Due to the introduction of control strategies, the average annual incidence of trichinellosis decreased to 0-0.7 cases per 100,000 for the 1980's and early 1990's. In the past 10 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. In contrast with some other countries in Central Eastern Europe (e.g. Poland, Slovak Republic), the taxonomic status of the human isolates was not determined in the past years. Therefore, it is unknown, which Trichinella spp. was responsible for human infections. 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 five years. As the taxonomic status of swine and wild boar isolates was not determined in recent years, it was unknown whether Trichinella spiralis still persists in the synanthropic or sylvatic cycle. Typing of isolates began in 2006. Sporadic Trichinella infections (in average few cases per year) were also detected in wild boars and in less than 1% of foxes. In foxes Trichinella britovi was responsible for all infections.

Recent actions taken to control the zoonoses

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

Suggestions to the Community for the actions to be taken

In positive human and animal cases the national reference laboratories and public health and veterinary authorities should be immediately notified.Human and animals isolates should be sent for verification of diagnosis to the national reference laboratories with all background information. All human and animal isolates sent to the national reference laboratories (Johan Béla Epidemiological Center and Central Veterinary Institute) should be forwarded to the CRL (Instituto Superiore di Sanita, Laboratorio di Parasitologia, Rome, Italy) for the determination of the taxonomic status of Trichinella isolates.

2.8.2. Trichinellosis in humans

A. Trichinellosis in humans

History of the disease and/ or infection in the country

Table Trichinella in humans - Species/ serotype distribution

Trichinella	Cases 0	Cases Inc. 0	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0
Trichinella spp.						

Footnote

to be reported via ECDC

Table Trichinella in humans - Age distribution

Age Distribution	Trichinella spp.		
	All	M	F
<1 year			
1 to 4 years			
5 to 14 years			
15 to 24 years			
25 to 44 years			
45 to 64 years			
65 years and older			
Age unknown			
Total :	0	0	0

Footnote

to be reported via ECDC

2.8.3. Trichinella in animals

A. Trichinella in pigs

Monitoring system

Sampling strategy

Trichinella sampling and testing is mandatory for all slaughtered pig.

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.

Notification system in place

Measures specified in National Regulation 69/ 2002 (VIII. 15.) FVM based on Dir. 77/ 96/ EEC, Dir. 84/ 319/ EEC, Dir. 94/ 59/ EEC, Dir. 89/ 321/ EEC and Dir. 92/ 45/ EEC.

Results of the investigation

All slaughtered swine and wild boars (as well as horses and other susceptible animals) were investigated in 2006. Trichinella infection was not noted in pigs, 10 cases were noted in wild boars. 1

of the wild boar was infected with Trichinella spiralis.

B. Trichinella in horses

Monitoring system

Sampling strategy

Meat inspection 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 slaughtered horses (as all other susceptible animals) were investigated in 2006. Trichinella infection was not noted in horses.

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. spiralis	Trichinella spp., unspecified
Pigs						
fattening pigs						
not raised under controlled housing conditions in integrated production system	Central Agricultural Office, Veterinary Diagnostic Directorate and Agricultural Office Food and Feed Safety Directorate	animal	4333000	0	0	0
Solipeds, domestic						
horses	Central Agricultural Office, Veterinary Diagnostic Directorate and Agricultural Office Food and Feed Safety Directorate	animal	17	0	0	0
Wild boars						
wild	Central Agricultural Office, Veterinary Diagnostic Directorate and Agricultural Office Food and Feed Safety Directorate	animal	30000	10	1	9

2.9. ECHINOCOCCOSIS

2.9.1. General evaluation of the national situation

2.9.2. Echinococcosis in humans

A. Echinococcus spp. in humans

Diagnostic/ analytical methods used

Table Echinococcus in humans - Species/ serotype distribution

Echinococcus	Cases 0	Cases Inc. 0	Autochthon cases 0	Autochthon Inc. 0	Imported cases 0	Imported Inc. 0
E. granulosus						
E. multilocularis						
Echinococcus spp.						

Footnote

to be reported via ECDC

Table Echinococcus in humans - Age distribution

Age Distribution	E. granulosus			E. multilocularis			Echinococcus spp.		
	All	M	F	All	M	F	All	M	F
<1 year									
1 to 4 years									
5 to 14 years									
15 to 24 years									
25 to 44 years									
45 to 64 years									
65 years and older									
Age unknown									
Total :	0	0	0	0	0	0	0	0	0

Footnote

to be reported via ECDC

2.9.3. Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals)	Central Agricultural Office, Veterinary Diagnostic Directorate and Agricultural Office Food and Feed Safety Directorate	animal	125840	0	0	0	0
Sheep	Central Agricultural Office, Veterinary Diagnostic Directorate and Agricultural Office Food and Feed Safety Directorate	animal	50000	0	0	0	0
Pigs	Central Agricultural Office, Veterinary Diagnostic Directorate and Agricultural Office Food and Feed Safety Directorate	animal	4333000	392	392	0	0

2.10. TOXOPLASMOSIS

2.10.1. General evaluation of the national situation

2.10.2. Toxoplasmosis in humans

Table Toxoplasma in humans - Species/ serotype distribution

Toxoplasma	Cases 0	Cases Inc. 0
Toxoplasma spp.		
Congenital cases		

Footnote

to be reported via ECDC

Table Toxoplasma in humans - Age distribution

Age Distribution	Toxoplasma spp.		
	All	M	F
<1 year			
1 to 4 years			
5 to 14 years			
15 to 24 years			
25 to 44 years			
45 to 64 years			
65 years and older			
Age unknown			
Total :	0	0	0

Footnote

to be reported via ECDC

2.10.3. Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma gondii
Cattle (bovine animals)	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	8	0
Sheep	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	9	2
Dogs	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	6	0
Cats	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	10	0
Rabbits	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	3	1
Mice	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	27	0
Monkeys	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	1	0
Rats	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	29	0
Guinea pigs	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	4	0

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. Lyssavirus (rabies) in animals

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	unspecified Lyssavirus	European Bat Lyssavirus - unspecified	classical rabies virus (genotype 1)
Cattle (bovine animals)	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	31	1	1		
Sheep	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	19	0			
Goats	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	5	0			
Pigs	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	3	0			
Solipeds, domestic	Central Agricultural Office, Veterinary Diagnostic Directorate						
Dogs	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	270	0			
Cats	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	401	0			
Bats							

wild	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	4	0			
Foxes							
wild	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	3601	2	2		
Badgers							
wild	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	58	0			
Marten							
wild	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	12	0			
Wild boars							
wild	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	9	0			
Deer	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	47	0			
Other animals	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	88	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 burnetii
Cattle (bovine animals)	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	510	33
Sheep	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	70	3
Goats	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	50	1
Pigs	Central Agricultural Office, Veterinary Diagnostic Directorate	animal	4	2

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 isolates

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	E. coli																															
	Sheep																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory	27																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	27	9	9											2	2	7	2	2	1	1	1											
Amphenicols																																
Chloramphenicol	27	1	1													2	1	2	4	2	6	2	5	1	1							
Florfenicol	27	0														1	3	1	3	1	11	4	2		1							
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	26	0																3	2		4	5	2	1	8				1			
Ceftriaxon	25	0																	1	1	1		4	4	3	1	4	1	4		1	
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	27	0															1				1		3	1	6	3	3	3	4		2	
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	26	8	8													1	1		1	1	3	2	4		5							
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	25	6	4			1		1	3				3	6	6	1																
Gentamicin	26	0											2	2	6	7	4	4	1													
Neomycin	26	2							2		2	2	4	10	3	2					1											
Kanamycin	0																															
Penicillins																																
Ampicillin	27	6	5							1	1	1	1	5	4	5	1	3														
Trimethoprim + sulfonamides	27	5	5								1					1	1			2	3	3	1	1	4		3		2			

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to	
	E. coli
	Turkeys
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	96

Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	96	67	64						1	1	1			3		7	10	2	4	2	1											
Amphenicols																																
Chloramphenicol	93	34	30		1	1		1	1		1						1	1	3	5	8	10	12	6	6	3	3					
Florfenicol	93	17	17										1			7	5	2	5	6	15	13	18		2		2					
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	94	1												1				4	5	3	3	6	6	9	12	6	23	3	8	1	4	
Ceftriaxon	95	0													1			1	1	1	2	1	1	6	4	1	9	8	18	7	13	21
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	95	27	7		4	5		5			1	2	3		2	2	3	4		6	8	4	1	2	4	1	4	1	4		6	16
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	95	57	56						1				1		1		2		2	1	3	3	4		8		10		3			
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	95	37	27		3	3	3	1	1	1		4	6	5	12	13	10	4	1		1											
Gentamicin	96	2						1	1	1		2	3	1	6	10	20	23	16	8	2		1	1								
Neomycin	95	6						2	4	1	2	4	1	30	23	15	9	3														1
Kanamycin	0																															
Penicillins																																
Ampicillin	96	60	59							1	1	1	2	9	6	7	3		3	1	2											1
Trimethoprim + sulfonamides	95	35	35						1		1		2	2	4		3	3	1		2	3	3	1	8	2	10		9		4	1

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	E. coli																															
	Cattle (bovine animals)																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory (1)	397																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	346	65	60	1		1					3	5	29	33	7	87	39	34	22	12	8	3			1							1
Amphenicols																																
Chloramphenicol	395	32	24		3	3		1	1						5	4	21	21	50	45	77	48	45	11	27	2	5	1				1
Florfenicol	397	22	19	1	1					1				1	3	20	32	20	79	43	70	37	43	10	10	1	4	1				1
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	291	1	1															6	16	21	46	56	42	37	27	9	21	1	7	1		
Ceftriaxon	312	2			1		1										1	2	1	2	3	7	21	19	44	24	73	17	38	17	28	13
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	391	22	11		2		7	1	1						1			4	1	4	10	12	30	19	54	26	94	20	57	10	20	7
Quinolones																																
Nalidixic acid	220	5	4				1				1	1				2	9	27	52	37	32	23	16	8	2	3	1					1
Sulfonamides																																
Sulfonamide	297	79	76		1				2						5	4	9	9	14	20	25	18	38	15	20	9	15		7	2	4	4
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	371	61	33	1	5	6	13	3	28	78	72	77	30	15	7														1			2
Gentamicin	377	7						5	2	1		7	20	29	70	73	65	47	35	11	6	2	1	1	1		1					
Neomycin	382	24			1	1	4	5	13	3	18	47	27	149	68	21	18		2		1		1				2				1	
Kanamycin	0																															
Penicillins																																
Ampicillin	398	96	72	1			1	1	8	13	8	39	20	97	41	28	18	23	5	7	3	4	4	1	2	1			1			
Trimethoprim + sulfonamides	391	38	38						2	1	1	1	7	5	6	3	5	8	6	18	33	41	56	37	60	13	29	3	11	3	2	2

(1) : 220 out of 397 isolates derived from monitoring programme

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																																
	E. coli																															
	Gallus gallus (fowl)																															
Isolates out of a monitoring programme	no																															
Number of isolates available in the laboratory (1)	421																															
Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	404	184	173	1		1		2			7		7	16	13	58	42	25	26	13	14	3	2	1								
Amphenicols																																
Chloramphenicol	417	29	28				1				1				4	4	15	14	44	38	78	52	60	22	33	3	13	1	2	1	3	
Florfenicol	412	5	2				1		1	1			2	7	2	4	28	31	64	58	79	39	50	8	28		4		1		1	1
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	377	3	1								1			1	4			3	6	9	7	3	17	12	35	19	69	22	41	18	46	63
Ceftriaxon	372	3	1							2				1		1	1	12	15	26	35	45	43	25	51	9	51	8	28	1	12	5
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	418	101	15	2	3	11	20	16	18	2	6	2	6	4	10	9	23	17	10	31	24	20	18	12	21	9	29	8	21	7	21	23
Quinolones																																
Nalidixic acid	170	133	117	1	7	2	5	1									2	5	7	7	8	3	2	1		1			1			
Sulfonamides																																
Sulfonamide	415	145	145							1		1		1	1	1	4	9	9	15	27	21	27	14	48	11	40	1	17	3	9	10
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	417	82	43	3	3	7	10	16	6	12	4	32	35	46	63	52	48	27	5	2	1		1				1					
Gentamicin	388	8	1	1		1	1		4	1		4	6	20	38	59	82	75	45	33	15	2										
Neomycin	404	20	2				2	4	12	3	10	33	23	108	98	51	43	11	3													1
Kanamycin	0																															
Penicillins																																
Ampicillin	420	191	176					2	1	12	8	21	13	50	36	34	36	17	4	2	5	1	1						1			
Trimethoprim + sulfonamides	421	87	85				2				2	2	9	5	12	5	7	3	11	12	9	24	36	23	46	15	51	10	28	5	13	6

(1) : 170 out of 421 isolates derived from a monitoring programme

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

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

E. coli

Ducks

Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	73

Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	71	37	34						1		2		2	3	1	6	5	3	3	7	2	1						1				
Amphenicols																																
Chloramphenicol	69	0											1		1			3	4	8	13	5	14	4	6	2	6	2				
Florfenicol	69	1									1					2	5	3	8	7	16	8	11	3	4		1					
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	69	0																	1		3	4	5	3	12	5	15	3	9	3	2	4
Ceftriaxon	72	0																		1	1		1	1	3	3	9	3	13	8	10	19
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	73	6	1				3	1	1							1				3		2	4	1	3	4	5	4	6	3	8	23
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	73	19	19											1		1		4	1	1	2	5	8	4	12		7	2	4		1	1
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	70	14	8		1	1	2	2	1	1	1	3	6	6	10	14	7	5	1						1							
Gentamicin	72	0									1		2	2	3	6	17	17	14	5	2	3										
Neomycin	73	3							3	1	1	2	1	20	18	15	7	1	3			1										
Kanamycin	0																															
Penicillins																																
Ampicillin	73	26	24						1	1		2	1	12	8	9	6	4	2				1	2								
Trimethoprim + sulfonamides	64	12	12												1	2		3				3	3	3	8	4	1	2	5	11	2	4

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

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

E. coli

Pigs

Isolates out of a monitoring programme	no
Number of isolates available in the laboratory (1)	316

Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	306	241	226	3	3	1		2	5		1		3	9	2	21	13	4	3	3	3	1	2									1
Amphenicols																																
Chloramphenicol	309	57	38	3	3	4	2	3	4			1	1		2	5	10	16	37	26	54	29	32	9	17	2	7			2	1	1
Florfenicol	311	38	37	1									1	2	2	15	24	24	38	29	51	22	35	5	15		5	1	2		1	1
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	303	3					1		1		1						2	5	16	18	39	45	57	27	33	8	28	6	11	1	4	
Ceftriaxon	266	3					2	1			1								1	3	2	6	20	19	32	22	47	16	42	10	23	19
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	304	19	9	1	3	1	4						1			2	1	5	1	10	13	4	20	19	37	17	62	14	42	7	21	10
Quinolones																																
Nalidixic acid	174	12	9				2			1						4	8	22	25	40	25	18	11	3	5			1				
Sulfonamides																																
Sulfonamide	306	152	147		1				4						2	1	5	5	9	11	18	15	17	12	24	6	16	3	4	1		5
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	312	125	47	3	12	15	23	25	13	23	6	27	22	24	37	13	13	5	1			1										2
Gentamicin	301	17	2			1	4	4	6	5	2	13	8	18	52	46	58	35	25	6	8	1		1	1		1		1			3
Neomycin	294	24	2			1	2	6	13	1	18	26	18	101	62	22	12	2	1	1						1	4					1
Kanamycin	0																															
Penicillins																																
Ampicillin	316	139	126				1	2	6	4	10	8	5	53	31	16	18	12	8	3	3		2	1	4		1	1	1			
Trimethoprim + sulfonamides	315	85	84				1		2		1		8	13	5	4	9	6	6	11	13	18	26	26	33	12	21	1	9		4	2

(1) : 174 out of 316 isolates derived from monitoring programme

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

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

E. coli

Geese

Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	71

Antimicrobials:	**N**	**n**	**<=6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**>=35**
Tetracyclines																																
Tetracyclin	70	41	39	1						1		1	1	2	1	6	6	4	7			1										
Amphenicols																																
Chloramphenicol	69	16	15						1									2	4	2	7	10	11	7	6		3	1				
Florfenicol	70	0														2	2	2	6	11	17	9	9	2	6		4					
Cephalosporins																																
3rd generation cephalosporins	0																															
Ceftiofur	71	0																1		1	4	4	5	7	14	2	19	2	7		4	1
Ceftriaxon	69	0																		1			2	3	8	2	9	3	10	3	13	15
Fluoroquinolones																																
Ciprofloxacin	0																															
Enrofloxacin	71	28	8		2	2	8	6	1		1			1	1					8	1	1	5	2		1	1	2	6		5	9
Quinolones																																
Nalidixic acid	0	0																														
Sulfonamides																																
Sulfonamide	70	39	39															1	1	2	3		5		5		9	2	1		1	1
Trimethoprim	0																															
Aminoglycosides																																
Streptomycin	69	25	17		1	2	1	4		1		2	4	4	14	10	2	6	1													
Gentamicin	69	3					1		2			1	1	3	4	8	17	19	6	3	2	2										
Neomycin	71	13	1				3	5	4	2	2	3	14	12	15	5	3	1		1												
Kanamycin	0																															
Penicillins																																
Ampicillin	71	39	38							1	2	2	3	8	3	8	3	1	1	1												
Trimethoprim + sulfonamides	70	24	24											2	6	4	2	1	1		2		2	5	7		6	1	5		2	

Table Antimicrobial susceptibility testing of E. coli in animals

n = Number of resistant isolates

E. coli

	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys		Sheep		Ducks		Geese	
Isolates out of a monitoring programme	no		no		no		no		no		no		no	
Number of isolates available in the laboratory	398		316		421		96		27		73		71	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines														
Tetracyclin	346	65	306	241	404	184	96	67	27	9	71	37	70	41
Amphenicols														
Chloramphenicol	395	32	309	57	417	29	93	34	27	1	69	0	69	16
Florfenicol	397	22	311	38	412	5	93	17	27	0	69	1	70	0
Cephalosporins														
Ceftiofur	291	1	303	2	377	3	94	1					71	0
Ceftriaxon	312	2	266	3	372	3	95	0					69	0
Fluoroquinolones														
Enrofloxacin	391	22	304	19	418	101	95	27					71	28
Quinolones														
Nalidixic acid	220	4	174	12	170	133								
Sulfonamides														
Sulfonamide	297	79	306	152	415	146	95	57	26	8	73	19	70	39
Aminoglycosides														
Streptomycin	399	61	312	125	417	82	95	37	25	6	70	14	69	25
Gentamicin	377	7	301	17	386	8	96	2	26	0	72	0	69	3
Neomycin	382	24	294	20	404	20	95	6	26	2	73	3	71	13
Penicillins														
Ampicillin	398	96	316	139	420	191	96	60	27	6	73	26	71	39
Trimethoprim + sulfonamides	391	38	315	85	421	87	95	35	27	5	64	12	70	24

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol							30	18		12
Florfenicol							30	19		14
Tetracyclines										
Tetracyclin							30	19		14
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin							5	23		16
Quinolones										
Nalidixic acid							30	19		13
Trimethoprim										
Sulfonamides										
Sulfonamide							300	17		12
Aminoglycosides										
Streptomycin							10	15		11
Gentamicin							10	15		12
Neomycin							30	17		12
Kanamycin										
Trimethoprim + sulfonamides								16		10
Cephalosporins										
Ceftiofur							30	21		17
Ceftriaxon							30	25		13
3rd generation cephalosporins										
Penicillins										
Ampicillin							10	17		13

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1. HISTAMINE

4.1.1. General evaluation of the national situation

4.1.2. 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	monitoring	batch	5.00 g	56	1	0	0	1	0

4.2. ENTEROBACTER SAKAZAKII

4.2.1. General evaluation of the national situation

4.2.2. Enterobacter sakazakii in foodstuffs

Table Enterobacter sakazakii in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Enterobacter sakazakii
Foodstuffs intended for special nutritional uses					
dried dietary foods for special medical purposes intended for infants below 6 months (1)	Annual report of National Public Healt and Medical Officer's Service	single	~250-300 g	250	0

(1) : dried infant formulae for special medical purposes, intended for infants below 6 months

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

Other: 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					
soft and semi-soft					
made from pasteurised milk	M	batch	10 g	4	0

5. FOODBORNE OUTBREAKS

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

A. Foodborne outbreaks

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

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 vendor / 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 belong to the National Public Health and Medical Officer's Service. The animal health authorities are involved in the investigation, if data indicate that the suspected food had been made by the food industry.
The physician reports data about the event by telephone to the municipal institute of NPHMOS. The specialist of the institute enter the data immediately in to the electronic system of the NPHMOS. A laboratory based surveillance system also exists in Hungary. The database on food-borne outbreaks is in the National Centre for Epidemiology and in the National Institute for Food Safety and Nutrition.

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

Table Foodborne outbreaks in humans

Causative agent	General outbreak	Household outbreak	Total Number of persons			Food implicated			Type of evidence for implication of the food	Place where food was consumed	Contributing factors
			ill (in total)	died	in hospital	Food (sub)category	Suspected as a source	Confirmed as a source			
1	2	3	4	5	6	7			8	9	10
Campylobacter - C. jejuni	0	1	1	0	0	egg	1	0	epidemiological e.	home	inadequate cooking
Campylobacter - C. jejuni	0	1	1	0	0	egg	1	0	epidemiological e.	home	inadequate cooking
Campylobacter - C. jejuni	0	1	1	0	0	egg	1	0	epidemiological e.	home	inadequate cooking
Campylobacter - C. jejuni	0	1	1	0	0	egg	1	0	epidemiological e.	home	inadequate cooking
Campylobacter - C. jejuni	0	1	1	0	0	egg	1	0	epidemiological e.	home	using contaminated ingredient
Campylobacter - C. jejuni	0	1	1	0	1	egg	1	0	epidemiological e.	home	inadequate cooking
Campylobacter - C. jejuni	0	1	1	0	1	egg	1	0	epidemiological e.	home	inadequate cooking
Campylobacter - C. jejuni	0	1	1	0	1	egg	1	0	epidemiological e.	home	using contaminated ingredient
Campylobacter - C. jejuni	1	0	18	0	0	unknown	1	0	epidemiological e.	home	unknown
Campylobacter - C. jejuni	1	0	65	0	0	other	1	0	epidemiological e.	school/ kindergarten	unknown
Clostridium - C. botulinum	0	1	1	0	1	meat	0	1	laboratory confirmed.	home	using toxic ingredient
Clostridium - C. botulinum	0	1	1	0	1	meat	0	1	laboratory confirmed.	home	using toxic ingredient
Clostridium - C. botulinum	0	1	1	0	1	meat	1	0	epidemiological e.	home	using toxic ingredient
Clostridium - C. botulinum	0	1	1	0	1	meat product	1	0	epidemiological e.	home	using toxic ingredient
Clostridium - C. botulinum	0	1	1	1	1	meat product	1	0	epidemiological e.	unknown	using toxic ingredient

Clostridium - C. botulimum	0	1	2	0	2	meat product	0	1	laboratory confirmed.	home	using toxic ingredient
Clostridium - C. perfringens	0	1	3	0	0	other	0	1	laboratory confirmed.	restaurant	unknown
Clostridium - C. perfringens	1	0	16	0	0	mayonnaise salad	0	1	laboratory confirmed.	school/ kindergarten	inadequate hot holding
Clostridium - C. perfringens	1	0	82	0	0	meat	0	1	laboratory confirmed.	school/ kindergarten	inadequate cooking
Food borne viruses - calicivirus (including norovirus)	1	0	10	0	0	meat product	1	0	epidemiological e.	mass catering for spec. group	contaminated/ infected person
Food borne viruses - calicivirus (including norovirus)	1	0	11	0	0	fancy cake	1	0	epidemiological e.	home	unknown
Food borne viruses - calicivirus (including norovirus)	1	0	11	0	5	unknown	1	0	epidemiological e.	camping	unknown
Food borne viruses - calicivirus (including norovirus)	1	0	14	0	11	unknown	1	0	epidemiological e.	restaurant	unknown
Food borne viruses - calicivirus (including norovirus)	1	0	19	0	0	other	1	0	epidemiological e.	restaurant	unknown
Food borne viruses - calicivirus (including norovirus)	1	0	22	0	0	other	1	2	epidemiological e.	restaurant	inadequate hot holding
Food borne viruses - calicivirus (including norovirus)	1	0	35	0	15	drinking water	0	1	laboratory confirmed.	camping	unknown
Food borne viruses - calicivirus (including norovirus)	1	0	90	0	19	other	1	0	epidemiological e.	mass catering for spec. group	unknown
Food borne viruses - calicivirus (including norovirus)	1	0	816	0	4	other	1	0	epidemiological e.	school/ kindergarten	unknown
Food borne viruses - calicivirus (including norovirus)	1	0	3673	0	161	drinking water	1	0	epidemiological e.	other	unknown
Salmonella	0	1	1	0	1	egg	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella	0	1	1	0	1	meat product	1	0	epidemiological e.	marketplace	unknown
Salmonella	0	1	2	0	1	meat product	1	0	epidemiological e.	marketplace	inadequate refrigeration
Salmonella	0	1	2	0	2	meat product	0	1	laboratory confirmed.	marketplace	unknown
Salmonella	0	1	4	0	0	meat	1	0	epidemiological e.	home	contaminated equipment
Salmonella	1	0	33	0	0	fancy cake	1	0	epidemiological e.	home	inadequate refrigeration
Salmonella - S. Brandenburg	1	0	7	0	1	meat product	1	0	epidemiological e.	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	1	0	0	egg	1	0	epidemiological e.	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	1	0	0	egg	1	0	epidemiological e.	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	1	0	0	egg	1	0	epidemiological e.	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	1	0	0	egg	1	0	epidemiological e.	home	inadequate cooking

Salmonella - S. Enteritidis	0	1	1	0	1	egg	1	0	epidemiological	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	1	0	1	egg	1	0	epidemiological	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	1	0	1	egg	1	0	epidemiological	home	inadequate hot holding
Salmonella - S. Enteritidis	0	1	2	0	0	egg	1	0	epidemiological	home	using contaminated ingredient
Salmonella - S. Enteritidis	0	1	2	0	1	egg	1	0	epidemiological	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	2	0	1	egg	1	0	epidemiological	home	inadequate refrigeration
Salmonella - S. Enteritidis	0	1	2	0	2	egg	1	0	epidemiological	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	2	0	2	egg	1	0	epidemiological	home	using contaminated ingredient
Salmonella - S. Enteritidis	0	1	2	0	2	egg	1	0	epidemiological	home	using contaminated ingredient
Salmonella - S. Enteritidis	0	1	2	0	2	egg	1	0	epidemiological	home	using contaminated ingredient
Salmonella - S. Enteritidis	0	1	2	0	2	fancy cake	1	0	epidemiological	home	unknown
Salmonella - S. Enteritidis	0	1	2	0	2	fancy cake	1	0	epidemiological	home	using contaminated ingredient
Salmonella - S. Enteritidis	0	1	2	0	2	other	1	0	epidemiological	home	using contaminated ingredient
Salmonella - S. Enteritidis	0	1	3	0	0	fancy cake	1	0	epidemiological	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	3	0	3	egg	1	0	epidemiological	home	using contaminated ingredient
Salmonella - S. Enteritidis	0	1	3	0	3	other	1	0	epidemiological	restaurant	improper food preparation
Salmonella - S. Enteritidis	0	1	4	0	0	egg	0	1	laboratory confirmed.	home	using contaminated ingredient
Salmonella - S. Enteritidis	0	1	4	0	0	fancy cake	1	0	epidemiological	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	4	0	0	fancy cake	1	0	epidemiological	home	using contaminated ingredient
Salmonella - S. Enteritidis	0	1	4	0	0	other	1	0	epidemiological	home	inadequate cooking
Salmonella - S. Enteritidis	0	1	4	0	1	egg	1	0	epidemiological	home	using contaminated ingredient

Salmonella - S. Enteritidis		0	1	4	0	2	chitterlings	1	0	epidemiological e.	home	inadequate cooking
Salmonella - S. Enteritidis		0	1	4	0	4	other	1	0	epidemiological e.	home	unknown
Salmonella - S. Enteritidis		1	0	5	0	0	egg	1	0	epidemiological e.	home	inadequate hot holding
Salmonella - S. Enteritidis		1	0	5	0	0	fancy cake	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	5	0	0	fancy cake	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	5	0	0	fancy cake	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	5	0	1	egg	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	5	0	1	fancy cake	0	1	laboratory confirmed.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	5	0	2	egg	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	5	0	2	egg	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	5	0	3	fancy cake	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	5	0	4	egg	1	0	epidemiological e.	home	inadequate cooking
Salmonella - S. Enteritidis		1	0	5	0	5	egg	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	5	0	5	fancy cake	1	0	epidemiological e.	restaurant	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	6	0	1	mayonnaise salad	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	6	0	3	egg	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	6	0	3	fancy cake	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1	0	6	0	6	other	1	0	epidemiological e.	home	unknown
Salmonella - S. Enteritidis		1	0	7	0	0	fancy cake	0	1	laboratory confirmed.	restaurant	inadequate refrigeration

Salmonella - S. Enteritidis		1		0	7	0	4	egg	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1		0	7	0	4	fancy cake	0	1	laboratory confirmed	home	using contaminated ingredient
Salmonella - S. Enteritidis		1		0	8	0	2	other	0	1	laboratory confirmed.	restaurant	inadequate cooking
Salmonella - S. Enteritidis		1		0	8	0	2	other	0	1	laboratory confirmed.	restaurant	unknown
Salmonella - S. Enteritidis		1		0	9	0	1	egg	1	0	epidemiological e.	restaurant	using contaminated ingredient
Salmonella - S. Enteritidis		1		0	9	0	2	fancy cake	0	1	laboratory confirmed.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1		0	9	0	3	fancy cake	0	1	laboratory confirmed.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1		0	9	0	3	fancy cake	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1		0	9	0	6	other	0	1	laboratory confirmed.	restaurant	inadequate cooking
Salmonella - S. Enteritidis		1		0	9	0	8	fancy cake	0	1	laboratory confirmed	home	using contaminated ingredient
Salmonella - S. Enteritidis		1		0	10	0	0	egg	1	0	epidemiological e.	canteen	inadequate hot holding
Salmonella - S. Enteritidis		1		0	10	0	0	fancy cake	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1		0	11	0	2	other	1	0	epidemiological e.	restaurant	unknown
Salmonella - S. Enteritidis		1		0	12	0	0	egg	1	0	epidemiological e.	restaurant	inadequate cooking
Salmonella - S. Enteritidis		1		0	12	0	1	meat	1	0	epidemiological e.	home	inadequate cooking
Salmonella - S. Enteritidis		1		0	12	0	1	unknown	1	0	epidemiological e.	canteen	unknown
Salmonella - S. Enteritidis		1		0	13	0	0	meat	1	0	epidemiological e.	school/ kindergarten	inadequate cooking
Salmonella - S. Enteritidis		1		0	13	0	0	other	1	0	epidemiological e.	restaurant	inadequate cooking
Salmonella - S. Enteritidis		1		0	13	0	0	other	1	0	epidemiological e.	restaurant	inadequate cooking
Salmonella - S. Enteritidis		1		0	14	0	1	fancy cake	1	0	epidemiological e.	home	using contaminated ingredient
Salmonella - S. Enteritidis		1		0	15	0	0	fancy cake	1	0	epidemiological e.	restaurant	using contaminated ingredient

Salmonella - S. Enteritidis		1		0	15	0	0	other	1	0	epidemiological e.	canteen	unknown
Salmonella - S. Enteritidis		1		0	15	0	1	other	0	1	laboratory confirmed.	mass catering for spec. group	improper food preparation
Salmonella - S. Enteritidis		1		0	17	0	0	other	1	0	epidemiological e.	home	improper storage
Salmonella - S. Enteritidis		1		0	19	0	3	other	0	1	laboratory confirmed.	restaurant	contaminated/ infected person
Salmonella - S. Enteritidis		1		0	21	0	0	fancy cake	1	0	epidemiological e.	restaurant	unknown
Salmonella - S. Enteritidis		1		0	25	0	2	meat	1	0	epidemiological e.	restaurant	contaminated equipment
Salmonella - S. Enteritidis		1		0	28	0	0	other	0	1	laboratory confirmed.	medical care	inadequate cooking
Salmonella - S. Enteritidis		1		0	32	0	6	other	0	1	laboratory confirmed.	restaurant	unknown
Salmonella - S. Enteritidis		1		0	38	0	15	other	1	0	epidemiological e.	restaurant	contaminated/ infected person
Salmonella - S. Enteritidis		1		0	47	0	0	mayonnaise salad	1	0	epidemiological e.	restaurant	inadequate refrigeration
Salmonella - S. Enteritidis		1		0	51	0	2	fancy cake	1	0	epidemiological e.	restaurant	inadequate refrigeration
Salmonella - S. Enteritidis		1		0	59	0	39	egg	0	1	laboratory confirmed.	canteen	inadequate cooking
Salmonella - S. Enteritidis		1		0	74	0	56	other	0	1	laboratory confirmed.	other	inadequate refrigeration
Salmonella - S. Enteritidis		1		0	87	0	7	other	0	1	laboratory confirmed.	restaurant	unknown
Salmonella - S. Enteritidis		1		0	117	0	10	other	1	0	epidemiological e.	restaurant	contaminated/ infected person
Salmonella - S. Enteritidis		1		0	197	0	23	other	0	1	laboratory confirmed.	restaurant	inadequate hot holding
Salmonella - S. Enteritidis		1		0	418	4	103	fancy cake	0	1	laboratory confirmed.	restaurant	unknown
Salmonella - S. Goldcoast		1		0	6	0	1	meat product	1	0	epidemiological e.	home	inadequate cooking
Salmonella - S. Saintpaul		1		0	8	0	0	other	1	0	epidemiological e.	restaurant	unknown
Salmonella - S. Schwarzengrund		1		0	23	0	1	other	1	0	epidemiological e.	restaurant	contaminated equipment
Salmonella - S. Typhimurium		1		0	21	0	6	fancy cake	0	1	laboratory confirmed.	home	using contaminated ingredient
Staphylococcus - S. aureus		1		0	16	0	0	other	1	0	epidemiological e.	canteen	unknown
Toxins - mushroom toxins		0		1	1	0	1	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins		0		1	1	0	1	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins		0		1	1	0	1	mushroom	0	1	laboratory confirmed.	home	using toxic ingredientusing toxic ingredient

Toxins - mushroom toxins	0	1	1	0	1	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	1	0	1	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	1	0	1	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	1	0	1	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	1	0	1	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	1	0	1	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	1	0	1	mushroom	1	0	epidemiological e.	marketplace	using toxic ingredient
Toxins - mushroom toxins	0	1	1	0	1	mushroom	1	0	epidemiological e.	school/ kindergarten	using toxic ingredient
Toxins - mushroom toxins	0	1	1	1	1	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	1	1	1	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	0	1	laboratory confirmed.	school/ kindergarten	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	0	11	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	2	0	2	mushroom	1	0	epidemiological e.	other	using toxic ingredient
Toxins - mushroom toxins	0	1	3	0	1	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	3	0	3	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	3	0	3	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	3	0	3	mushroom	1	0	epidemiological e.	home	using toxic ingredient

Toxins - mushroom toxins	0	1	4	0	4	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Toxins - mushroom toxins	0	1	5	0	5	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins	1	0	5	0	1	mushroom	0	1	laboratory confirmed.	home	using toxic ingredient
Toxins - mushroom toxins	1	0	7	0	7	mushroom	1	0	epidemiological e.	home	using toxic ingredient
Unknown	0	1	1	0	0	mayonnaise salad	1	0	epidemiological e.	marketplace	unknown
Unknown	0	1	1	0	0	other	1	0	epidemiological e.	restaurant	unknown
Unknown	0	1	1	0	1	mushroom	1	0	epidemiological e.	home	unknown
Unknown	0	1	2	0	0	fancy cake	1	0	epidemiological e.	restaurant	unknown
Unknown	0	1	2	0	0	other	1	0	epidemiological e.	restaurant	unknown
Unknown	0	1	2	0	0	sausages	1	0	epidemiological e.	marketplace	using contaminated ingredient
Unknown	0	1	2	0	2	other	1	0	epidemiological e.	home	inadequate refrigeration
Unknown	0	1	4	0	0	fancy cake	1	0	epidemiological e.	home	unknown
Unknown	0	1	4	0	0	meat	1	0	epidemiological e.	home	improper storage
Unknown	0	1	4	0	0	seafood	1	0	epidemiological e.	home	unknown
Unknown	0	1	4	0	1	egg	1	0	epidemiological e.	home	using contaminated ingredient
Unknown	0	1	4	0	2	fancy cake	1	0	epidemiological e.	home	using contaminated ingredient
Unknown	0	1	4	0	2	other	1	0	epidemiological e.	home	unknown
Unknown	1	0	5	0	0	other	1	0	epidemiological e.	restaurant	unknown
Unknown	1	0	10	0	10	other	1	0	epidemiological e.	restaurant	unknown
Unknown	1	0	19	0	1	other	1	0	epidemiological e.	restaurant	unknown
Unknown	1	0	21	0	3	unknown	1	0	epidemiological e.	mass catering for spec. group	unknown
Unknown	1	0	50	0	0	other	1	0	epidemiological e.	restaurant	unknown