



ITALY

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

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

including information on foodborne outbreaks and
antimicrobial resistance in zoonotic agents

IN 2005

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Italy**

Reporting Year: **2005**

Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
IZSBS	Istituto Zooprofilattico Sperimentale della Lombardia ed Emilia	
IZSPA	Istituto Zooprofilattico Sperimentale della Sicilia	
NRC-EPID	National reference center for epidemiology	
IZSPD	Istituto Zooprofilattico Sperimentale delle Venezie	
IZSPG	Istituto Zooprofilattico Sperimentale dell'Umbria e Marche	
IZSSS	Istituto Zooprofilattico Sperimentale della Sardegna	
NRC-SALM	National reference center for salmonellosis	
NRC-ANTI	National reference center for antimicrobial susceptibility	
IZSTO	Istituto Zooprofilattico Sperimentale del Piemonte, Liguria e Valle d'Aosta	
IZSRM	Istituto Zooprofilattico Sperimentale del Lazio e Toscana	
IZSTE	Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise	
IZSNA	Istituto Zooprofilattico Sperimentale del Mezzogiorno	
IZSFG	Istituto Zooprofilattico Sperimentale della Puglia e Basilicata	
NRC-BRUC	National reference center for animal brucellosis	

PREFACE

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/EC¹. 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 Italy during the year 2005. 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.

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.

Table Susceptible animal populations

* Only if different than current reporting year

Animal species	Category of animals	Number of herds or flocks		Number of holdings		Livestock numbers (live animals)		Number of slaughtered animals	
			Year*		Year*		Year*		Year*
Cattle (bovine animals)	mixed herds	26063							
	dairy cows and heifers	52435				3918010		609995	
	meat production animals	96982						1631996	
	calves (under 1 year)					1913952		942180	
	in total	179561		171971		6203212		3245982	
Gallus gallus (fowl)	laying hens			479729	2000	44781166	2000		
	broilers			300747	2000	96708718	2000		
	in total			521539	2000	171343324	2000		
	in total			31263	2000	356887	2000		
Geese	in total								
Pigs	in total	195325	2000			8614016	2000	12920000	2000
Solipeds, domestic	horses - in total	48661	2000			184731	2000	235000	2000
Turkeys	in total	35132	2000			12937490	2000		
Sheep and goats	in total	113108	2004			8119093	2004	6719000	2004

Footnote

Data sources: Cattle - bovine national database (bovine identification and registration system, Reg. EC 1760/2000). For slaughtered animals data refer to cattle bred in Italy only (animal coming from other countries are not included). Sheep and goats - brucellosis eradication programme and animal identification system (Directive 91/68/EEC and Directive 92/102/EEC). Other animal and slaughtered sheep and goats - National Institute of Statistics. For slaughtered animals, data include animals coming from other countries.

2. INFORMATION ON SPECIFIC ZONOSSES 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

Salmonella in foodstuffs

Surveillance of *Salmonella* spp. contamination in foodstuffs in Italy is carried out by official veterinarians, which have the task of supervising or performing inspections in plants and sampling. All samples taken within the activity of the National Health Service, which is organised in Local Health Units (LHU), are examined by the laboratories of Istituti Zooprofilattici Sperimentali (IZS), that periodically transmit their result to the Regional Governments, which produce the reports for the Ministry of Health.

Salmonella in *Gallus gallus* breeding flocks

The control of *Salmonella* Enteritidis and Typhimurium in breeding flocks of *Gallus gallus* is performed according to Directive 92/117, transposed into national legislation with DPR 497/1998 and DM 339/2000.

Salmonella in turkey, geese, ducks, pigs, cattle

There is not a national control programme in place.

Salmonella serovars and phagetypes distribution

In Italy the official control in the veterinary field (animals, food of animal origin) is carried out by IZS, which are part of the National Health system, and are present on all the national territory with 10 central centers and numerous peripheral laboratories at provincial level. The peripheral centers take care of the isolation of salmonellae from various matrices, while the typing of the isolates is performed by the central laboratories, that annually participate in a quality control study of salmonella serotyping organized by the National Reference Laboratory. The phage typing of *S. Enteritidis* and *S. Typhimurium* is executed from the National Reference Laboratory, that regularly participates in collaborative studies organized by CRL- Salmonella in Bilthoven.

Since the beginning of 2002 a structure parallel to the Enter-net system has been activated at national level, that regards the data collection on *Salmonella* spp. isolations from samples of veterinary origin, and is called Enter-Vet. The nodes of the Enter-Vet net are IZS, coordinated by the National Reference Laboratory for Salmonella. The Institutes send to the Reference Laboratory data concerning *Salmonella* typing through a computerized system, together with some strains (*Enteritidis* and *Typhimurium* in particular) for the phage typing. All the data are sent from the NRL to the Italian coordination of the Enter-net, at Istituto Superiore di Sanità in Rome.

Antimicrobial resistance in *Salmonella* isolates

The previously described Enter-Vet system collects also data concerning antimicrobial resistance in *Salmonella*. All or a selection of the strains serotyped by the central laboratories of IZS are submitted to antimicrobial susceptibility test, by agar diffusion, following NCCLS recommendations, and with a panel of 16 molecules (CL: Colistin (10 mcg); SXT: Sulphamethoxazole/Trimethoprim (23,15 + 1,75 mcg); K: Kanamycin (30 mcg); GM: Gentamicin (10 mcg); N: Neomicin (30 mcg); CTX: Cefotaxime (30 mcg); AMC: Amoxicillin/Clavulanic Acid (20 + 10 mcg); NA: Nalidixic Acid (30 mcg); TE: Tetracycline

(30 mcg); AM: Ampicillin (10 mcg); S: Streptomycin (10 mcg); S-3: Triple Sulfa (0,25 mg) C: Chloramphenicol (30 mcg); CF: Cephalothin (30 mcg); ENR: Enrofloxacin (5 mcg); CIP: Ciprofloxacin (5 mcg); G: Sulfisoxazole (250 mcg); SPC: Spectinomycin (100 mcg); CZ: Cefazolin (30 mcg); AK: Amikacin (30 mg); SP: Spiramycin (100 mcg); TIL: Tilimicosin (15 mcg); E: Erythromycin (15 mcg); RA: Rifampin (5 mcg); P: Penicillin (10 UI); S-300: Streptomycin (300 mcg); TEC: Teicoplanin (30 mcg); VA: Vancomycin (30 mcg); GM-120: Gentamicin (120 mcg)).

Additional information

The disease is notifiable in humans and animals.

There is a national surveillance programme on compound feedingstuffs and on raw material for feed of vegetable origin (National Plan on Animal Feed). The Ministerial Decree of 20.4.78 provides the sampling procedure. The methods of analysis are: ISO 6579:2002 or other validated method foreseeing one phase of preenrichment of 16-20 hours at 37° of a sample of 50 g taken from the previewed final champion (Ministry of Health Decree of 10.3.97) All isolate of salmonella must be subjected to sierologic types in compliance with the Kauffman/White scheme and to antibiogramme by the standard NCCLS.

A baseline study was carried out in accordance with the new Zoonoses legislation (EC/2160/2003) in order to estimate the prevalence of Salmonella spp. in laying hens. The objectives, the sampling frame, the diagnostic testing methods as well as the collection of data, evaluation and reporting and timelines of this baseline study are specified in Commission Decision 2004/665/EC. The results are reported in the "Table Salmonella in other poultry".

In 2005 a baseline study has begun in accordance with the new Zoonoses legislation (EC/2160/2003) in order to estimate the prevalence of Salmonella spp. in broiler flock of Gallus gallus. The objectives, the sampling frame, the diagnostic testing methods as well as the collection of data, evaluation and reporting and timelines of this baseline study are specified in Commission Decision 2005/636/EC.

2.1.2. Salmonella in foodstuffs

A. Salmonella spp. in food

Control program/mechanisms

The control program/strategies in place

Surveillance of *Salmonella* spp. contamination in foodstuffs in Italy is carried out by official veterinarians, which have the task of supervising or performing inspections in plants and sampling. All samples taken within the activity of the National Health Service, which is organised in Local Health Units (LHU), are examined by the laboratories of Istituti Zooprofilattici Sperimentali, that periodically transmit their result to the Regional Governments, which produce the reports for the Ministry of Health.

The sampling scheme can vary in different LHUs; all samples are examined in laboratories accredited according to ISO 17025, following the method prescribed by ISO 6579:2002 or modifications of this method, that have been fully validated and proven to give equivalent results.

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from broilers (Gallus gallus)								
fresh		single	25g	1392	56	1	3	52
minced meat								
intended to be eaten cooked		single	25g	48	9	0	0	9
meat preparation								
intended to be eaten cooked		single	25g	164	4	0	0	4
meat products								
raw but intended to be eaten cooked		single	25g	462	13	0	0	13
cooked, ready-to-eat		single	25g	100	0	0	0	0
mechanically separated meat (MSM)		single	25g	1	0	0	0	0
Meat from turkey								
fresh		single	25g	206	12	0	0	12
minced meat								
intended to be eaten cooked		single	25g	12	5	0	0	5
meat preparation								
intended to be eaten cooked		single	25g	65	4	0	0	4
meat products								
raw but intended to be eaten cooked		single	25g	17	0	0	0	0
cooked, ready-to-eat		single	25g	76	0	0	0	0
mechanically separated meat (MSM)				0	0	0	0	0
Meat from duck		single	25g	40	6	0	2	4
Meat from geese		single	25g	11	2	0	0	2
Meat from poultry, unspecified		single	25g	24	1	0	0	1
Meat from other poultry species								

(quail)		single	25g	1	0	0	0	0
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Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

Table Salmonella spp. in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Milk, cows'								
raw		single	25g	815	0	0	0	0
intended for direct human consumption		single	25g	79	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	2005	0	0	0	0
raw milk for manufacture								
intended for manufacture of raw or low heat-treated products		single	25g	251	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	9	0	0	0	0
intended for manufacture of pasteurised/UHT products		single	25g	57	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	13	0	0	0	0
pasteurised milk		single	25g	938	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	369	0	0	0	0
Milk, goats'								
raw		single	25g	6	0	0	0	0
intended for direct human consumption		single	25g	3	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	2	0	0	0	0
raw milk for manufacture								
intended for manufacture of raw or low heat-treated products		single	25g	1	0	0	0	0
intended for manufacture of pasteurised/UHT products		single	25g	5	0	0	0	0

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pasteurised - Surveillance - HACCP or own checks by industry		single	25g	3	0	0	0	0
		single	25g	1	0	0	0	0
Milk, sheep's								
raw - Surveillance - HACCP or own checks by industry		single	25g	72	0	0	0	0
		single	25g	32	0	0	0	0
raw milk for manufacture								
intended for manufacture of raw or low heat-treated products		single	25g	7	0	0	0	0
				0	0	0	0	0
intended for manufacture of pasteurised/UHT products								
pasteurised		single	25g	8	0	0	0	0
Cheeses made from cows' milk		single	25g	2591	0	0	0	0
soft and semi-soft made from raw or low heat-treated milk		single	25g	1433	0	0	0	0
		single	25g	1041	1	0	0	1
- Surveillance - HACCP or own checks by industry		single	25g	374	0	0	0	0
made from pasteurized milk		single	25g	675	0	0	0	0
		single	25g	145	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	5134	0	0	0	0
Cheeses made from goats' milk		single	25g	96	0	0	0	0
soft and semi-soft made from raw or low heat-treated milk		single	25g	19	0	0	0	0
		single	25g	51	0	0	0	0
made from pasteurized milk		single	25g	8	0	0	0	0
unspecified								
- Surveillance - HACCP or own checks by industry		single	25g	32	0	0	0	0
Cheeses made from sheep's milk		single	25g	781	10	0	0	10
soft and semi-soft made from raw or low heat-treated milk		single	25g	279	1	0	0	1
		single	25g	61	2	0	0	2
made from pasteurized milk		single	25g	259	0	0	0	0

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- Surveillance - HACCP or own checks by industry	single	25g	32	0	0	0	0
unspecified							
- Surveillance - HACCP or own checks by industry	single	25g	54	0	0	0	0
Dairy products (excluding cheeses)							
butter							
made from raw or low heat-treated milk	single	25g	536	0	0	0	0
- Surveillance - HACCP or own checks by industry	single	25g	69	0	0	0	0
cream							
made from raw or low heat-treated milk	single	25g	102	0	0	0	0
- Surveillance - HACCP or own checks by industry	single	25g	15	0	0	0	0
milk powder and whey powder	single	25g	38	0	0	0	0
ice-cream	single	25g	1392	0	0	0	0
- Surveillance - HACCP or own checks by industry	single	25g	4	0	0	0	0
dairy desserts	single	25g	4	0	0	0	0
(Yogurt)	single	25g	61	0	0	0	0
- Surveillance - HACCP or own checks by industry (yogurt)	single	25g	12	0	0	0	0
(bovine rennet)	single	25g	109	0	0	0	0
(ovine rennet)	single	25g	4	0	0	0	0
(caprine rennet)	single	25g	3	0	0	0	0
Milk from other animal species or unspecified							
raw							
(buffalo)	single	25 g	127	0	0	0	0
- Surveillance - HACCP or own checks by industry (buffalo)	single	25 g	1494	0	0	0	0
Cheeses, made from mixed milk from cows, sheep and/or goats							
unspecified	single	25g	37	0	0	0	0
Cheeses, made from unspecified milk or other animal milk							
unspecified							
(buffalo)	single	25g	164	0	0	0	0

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from pig								
fresh		single	25g	2010	52	1	10	41
- Surveillance - HACCP or own checks by industry		single	25g	1362	3	0	2	1
minced meat								
intended to be eaten raw		single	25g	451	12	0	1	11
intended to be eaten cooked		single	25g	339	28	1	0	27
- Surveillance - HACCP or own checks by industry		single	25g	27	0	0	0	0
meat preparation								
intended to be eaten raw		single	25g	931	45	0	11	34
- Surveillance - HACCP or own checks by industry		single	25g	663	1	0	0	1
intended to be eaten cooked		single	25g	1167	63	0	15	48
- Surveillance - HACCP or own checks by industry		single	25g	277	5	0	4	1
meat products								
raw but intended to be eaten cooked		single	25g	1896	34	0	4	30
- Surveillance - HACCP or own checks by industry		single	25g	305	0	0	0	0
cooked, ready-to-eat		single	25g	2378	60	0	4	56
- Surveillance - HACCP or own checks by industry		single	25g	716	2	0	0	2
mechanically separated meat (MSM)		single	25g	3	0	0	0	0
(unspecified)		single	25g	47	2	0	0	2
Meat from bovine animals								
fresh		single	25g	2292	4	0	3	1

- Surveillance - HACCP or own checks by industry		single	25g	232	1	0	0	1
minced meat								
intended to be eaten raw		single	25g	56	2	0	0	2
intended to be eaten cooked		single	25g	1553	27	0	4	23
- Surveillance - HACCP or own checks by industry		single	25g	789	0	0	0	0
meat preparation								
intended to be eaten raw		single	25g	55	1	0	1	0
- Surveillance - HACCP or own checks by industry		single	25g	27	0	0	0	0
intended to be eaten cooked		single	25g	305	2	1	0	1
- Surveillance - HACCP or own checks by industry		single	25g	2	0	0	0	0
meat products								
raw but intended to be eaten cooked		single	25g	491	7	0	1	6
- Surveillance - HACCP or own checks by industry		single	25g	148	0	0	0	0
cooked, ready-to-eat		single	25g	329	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	1	0	0	0	0
mechanically separated meat (MSM)				0	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	1	0	0	0	0
(unspecified)		single	25g	19	0	0	0	0
Meat from sheep								
fresh		single	25g	206	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	1	0	0	0	0
minced meat		single	25g	2	0	0	0	0
Meat from horse								
fresh		single	25g	207	3	0	3	0
minced meat		single	25g	102	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	1	0	0	0	0
Other products of animal origin								
gelatin and collagen		single	25g	2	0	0	0	0
Meat from rabbit		single	25g	70	0	0	0	0

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- Surveillance - HACCP or own checks by industry		single	25g	3	0	0	0	0
Meat from wild boar		single	25g	3	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	2	0	0	0	0
Meat from other animal species or not specified		single	25g	290	6	0	2	4
- Surveillance - HACCP or own checks by industry		single	25g	1	0	0	0	0
meat products								
cooked, ready-to-eat		single	25g	214	4	0	0	4
Meat, mixed meat		single	25g	745	21	0	2	19
- Surveillance - HACCP or own checks by industry		single	25g	1201	6	0	3	3

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

Table Salmonella spp. in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Eggs								
table eggs								
- at packing centre		single	25g	524	33	2	0	31
- at retail		single	25g	1242	28	1	0	27
- at packing centre - Surveillance - HACCP or own checks by industry		single	25g	2	0	0	0	0
- at retail - Surveillance - HACCP or own checks by industry		single	25g	41	0	0	0	0
raw material (liquid egg) for egg products		single	25g	199	0	0	0	0
Egg products (1)		single	25g	1747	1	0	0	1
- Surveillance - HACCP or own checks by industry		single	25g	2	0	0	0	0
Fishery products		single	25g	108	2	0	0	2
Crustaceans		single	25g	37	0	0	0	0
unspecified								
cooked		single	25g	65	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	11	0	0	0	0
raw		single	25g	133	1	0	0	1
- Surveillance - HACCP or own checks by industry		single	25g	12	0	0	0	0
Molluscan shellfish		single	25g	623	4	0	0	4
cooked		single	25g	102	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g	10	0	0	0	0
raw		single	25g	1208	16	0	2	14
- Surveillance - HACCP or own checks by industry		single	25g	12	0	0	0	0
Live bivalve molluscs		single	25g	3336	17	0	4	13

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unspecified - Surveillance - HACCP or own checks by industry							
	single	25g	179	0	0	0	0
Fishery products, unspecified							
- Surveillance - HACCP or own checks by industry	single	25g	91	0	0	0	0
Fish							
unspecified	single	25g	1171	16	0	0	16
- Surveillance - HACCP or own checks by industry	single	25g	15	0	0	0	0
Other food	single	25g	392	1	0	1	0
- Surveillance - HACCP or own checks by industry	single	25g	75	0	0	0	0
Surimi	single	25g	2	0	0	0	0

(1) : 3 negative samples of mayonnaise

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.1.3. Salmonella in animals

A. Salmonella spp. in turkey - breeding flocks and meat production flocks

Control program/mechanisms

The control program/strategies in place

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

There is not a national control programme for Salmonella spp. in turkeys. In the Veneto Region, in 2005 a new monitoring campaign has begun in turkeys at slaughter. Starting from the prevalence detected in a previous monitoring campaign (49%), the scheme for 2005-2006 was designed in order to allow the detection of a bilateral variation in prevalence of 12%, with a IC of 95% and a power of 95% (225 slaughter batch to be sampled). 30 cloacal swabs are taken per batch. Samples are examined in 6 pools, using the method prescribed by the Community Reference Laboratory of Bilthoven, that requires the use of MSRV as unique selective enrichment.

B. Salmonella spp. in geese - breeding flocks and meat production flocks

Control program/mechanisms

The control program/strategies in place

Breeding flocks

There is not a national control programme in place. Data arise from routine diagnostic activity of Istituti Zooprofilattici Sperimentali.

Meat production flocks

There is not a national control programme in place. Data arise from routine diagnostic activity of Istituti Zooprofilattici Sperimentali.

C. Salmonella spp. in ducks - breeding flocks and meat production flocks

Control program/mechanisms

The control program/strategies in place

Breeding flocks

There is not a national control programme in place. Data arise from routine diagnostic activity of Istituti Zooprofilattici Sperimentali.

Meat production flocks

There is not a national control programme in place. Data arise from routine

diagnostic activity of Istituti Zooprofilattici Sperimentali.

D. Salmonella spp. in pigs

Control program/mechanisms

The control program/strategies in place

Fattening herds

There is not a national control programme for Salmonella spp. in pigs.

In the Veneto Region, in 2005 a new monitoring campaign has begun in pigs at slaughter. Starting from the prevalence detected in a previous monitoring campaign (25,43%), the scheme for 2005-2006 was designed in order to allow the detection of a bilateral variation in prevalence of 12%, with a IC of 95% and a power of 95% (171 slaughter batches to be sampled). One sample of ileocaecal lymph nodes (3-5 for each animal) are taken per animal (a total of 15 animals per batch). Samples are examined using the method prescribed by the Community Reference Laboratory of Bilthoven, that requires the use of MSRV as unique selective enrichment.

E. Salmonella spp. in bovine animals

Control program/mechanisms

The control program/strategies in place

There is not a national control programme for Salmonella spp. in cattle.

In the Veneto Region, in 2005 a new monitoring campaign has begun in cattle at slaughter. Starting from the prevalence detected in a previous monitoring campaign (1,52%) the scheme for 2005-2006 was designed in order to allow the detection of an increase in prevalence

of 4%, with a IC of 95% and a power of 95% (101 slaughter batches to be sampled). One faecal sample is taken per animal (a total of 15 animals per batch). Samples are examined using the method prescribed by the Community Reference Laboratory of Bilthoven, that requires the use of MSRV as unique selective enrichment.

F. Salmonella spp. in animal - Gallus gallus - breeding flocks, unspecified

Control program/mechanisms

The control program/strategies in place

The control of Salmonella Enteritidis and Typhimurium in breeding flocks of Gallus gallus is performed according to Directive 92/117, transposed into national legislation with DPR 497/1998 and DM 339/2000.

For the isolation of salmonella from samples collected on farms or in hatcheries the ISO method 6579:2002 has to be used or in alternative the method prescribed by the Community Reference Laboratory of Bilthoven, that requires the use of MSRV as unique selective enrichment.

Table Salmonella in breeding flocks of Gallus gallus

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl)							
grandparent breeding flocks for egg production line		flock	1	0			
parent breeding flocks for egg production line		flock	11	0			
grandparent breeding flocks for meat production line		flock	6	0			
parent breeding flocks for meat production line		flock	31	0			
parent breeding flocks, unspecified		flock	295	12			12
during rearing period		flock	26	1			1
during production period		flock	71	9	1	2	6

Footnote

Data refer to National Programme for eradication of Salmonella in breeding flocks of Gallus gallus for the year 2005 approved with Decision 2004/840/CE.

Table Salmonella in other poultry (Part A)

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Senftenberg	S. Give	S. Thompson	S. Blockley	S. Bredeney	S. Jerusalem	S. Isangi	S. Haardt	S. Corvallis	S. Braenderup	S. Livingstone	S. Hadar	S. Glostrup
Gallus gallus (fowl)	laying hens																			
	day-old chicks																			
	- Monitoring - official sampling	flock	2	0																
	- Monitoring - monitoring survey	holding	3	0																
	during rearing period																			
	- Monitoring - official sampling	flock	207	7		1	5	1												
	during production period																			
	- Monitoring - monitoring survey	animal	95	3	3															
	- Monitoring - official sampling (unit:flock)	flock	307	36	5	6	4		1	1		3	1	1		2	2	1	4	
	- Monitoring - official sampling (unit:sample)	flock	183	17		1	16													
sampling in the framework of the laying hen baseline study (1)		sample	1	1			1													
		flock	381	113	15	14													14	

[illegible]

22

(1) : Baseline study on the prevalence of Salmonella in laying flocks of Gallus gallus in Italy - Decision 2004/665/EC - (October 2004-October 2005)

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples. The number of serotypes is greater than the total number of positive units because in a single slaughter batch more serotypes may be present.

Table Salmonella in other poultry (Part B)

[illegible]

25

Ducks
meat production flocks - Monitoring - monitoring survey
breeding flocks, unspecified
- Monitoring - monitoring survey
unspecified
(unit:animal)
(unit:flock)
(unit:holding)
(HACPP or own checks by industry)
Geese
meat production flocks
- Monitoring - monitoring survey (unit:flock)
- Monitoring - monitoring survey (unit:holding)
breeding flocks, unspecified
- Monitoring - monitoring survey
unspecified
(unit:animal)
(unit:flock)
(unit:holding)
Turkeys
meat production flocks

(1) : Baseline study on the prevalence of *Salmonella* in laying flocks of Gallus gallus in Italy - Decision 2004/665/EC - (October 2004-October 2005)

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples. The number of serotypes is greater than the total number of positive units because in a single slaughter batch more serotypes may be present.

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Brancaster	S. enterica subsp. arizonae	S. Typhimurium var. Copenhagen	S. Agona	S. enterica subsp. diarizonae	S. Anatum	S. Kapemba	S. Blockley
Pigeons		animal	613	26	8	18	1	1		6					
(unit: flock)		flock	236	22	14	1									
- Monitoring - official sampling		sample	14	0											
- Monitoring (local programme)		animal	8	1	1										
Guinea fowl		animal	173	3		3									
(unit: flock)		flock	22	1		1									
- Monitoring - official sampling		animal	19	5		5									
Quails		animal	28	0											
(unit: sample)		sample	9	0											
(unit: flock)		flock	5	0											
Pheasants		animal	141	3		3									
(unit: flock)		flock	15	0											
Partridges		animal	13	1							1				

[illegible]

(1) : crows

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

Table Salmonella in other animals (Part A)

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Sandiego	S. Infantis	S. enterica subsp. diarizonae	S. Thompson	S. enterica subsp. arizonae	S. Meleagridis	S. Derby	S. Coeln	S. Montevideo	S. Hadar	S. Kapemba	S. Livingstone	S. Blockley
Cattle (bovine animals)	calves (under 1 year)	herd	12	0																
	adult cattle over 2 years	sample	160	5			5													
	- Monitoring - monitoring survey (unit:sample)	holding	148	1										1						
	- Monitoring - monitoring survey (unit:holding)	herd	7	0																
	- Monitoring - monitoring survey (unit:herd)	slaughter batch	30	2		1								1						
	- Monitoring (Veneto Region)	animal	565	6		2	3		1											
	unspecified	animal	351	0																
	- Monitoring (research activity)	herd	295	0																
	- Monitoring - monitoring survey	animal	169	13		1	3					4								
	Sheep																			

31

[illegible]

(1) : Ungulates

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples. The number of serotypes is a greater than the total number of positive unit because in a single slaughter batch more serotypes may be present.

Table Salmonella in other animals (Part B)

	S. Virchow	S. Litchfield	S. enterica subsp. houtenae	S. Newport	S. Muenchen	S. London	S. Bredeney	S. Anatum	S. Rissen	S. Abortusovis	S. 1,4,5,12:-:!
Cattle (bovine animals)											
calves (under 1 year)											
adult cattle over 2 years											
- Monitoring - monitoring survey (unit:sample)											
- Monitoring - monitoring survey (unit:holding)											
- Monitoring - monitoring survey (unit:herd)											
- Monitoring (Veneto Region)											
unspecified											
- Monitoring (research activity)											
- Monitoring - monitoring survey										5	
Sheep										15	
(unit:herd)											

35

[illegible]

(1): Ungulates

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples. The number of serotypes is a greater than the total number of positive unit because in a single slaughter batch more serotypes may be present.

2.1.4. 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	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of land animal origin								
dairy products (1)		batch	25gr	5	0			
(unit:single) (3)		single	25gr	8	0			
meat meal		single	25gr	272	0			
- Surveillance - HACCP or own checks by industry		single	25gr	40	2			2
meat and bone meal		batch	25gr	46	5			5
- Surveillance - HACCP or own checks by industry		batch	25gr	1445	0			
bone meal		batch	25gr	5	0			
greaves		single	25gr	5	0			
poultry offal meal								
- Surveillance - HACCP or own checks by industry		batch	25gr	69	0			
feather meal								
- Surveillance - HACCP or own checks by industry		single	25gr	1	0			
blood meal		batch	25gr	21	0			
(unit:single)		single	25gr	5	0			
animal fat		single	25-50gr	2	0			
- Surveillance - HACCP or own checks by industry (feather and blood meal)		batch	25gr	1449	0			
Feed material of marine animal origin								
fish meal		single	50gr	145	0			
(unit:batch)		batch	25gr	12	0			

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- Surveillance - HACCP or own checks by industry	batch	25gr	18	0			
fish silage	single	25-50gr	194	0			
other fish products (2)	single	25-50gr	8	0			

(1) : milk products

(2) : Crustaceans

(3) : milk products

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Anatum var. 15	S. Livingstone	S. Corvallis
Feed material of cereal grain origin											
barley derived (unit:batch)		single	25-50gr	16	0						
		batch	25gr	1	0						
wheat derived (unit:batch) - Surveillance - HACCP or own checks by industry		single	25-50gr	33	0						
		batch	25gr	6	0						
		batch	25gr	6	0						
maize derived (unit:batch) - Surveillance - HACCP or own checks by industry		single	25-50gr	50	0						
		single	25-50gr	6	0						
		batch	25gr	1	0						
		batch	25gr	5	0						
other cereal grain derived (unit:batch) - Surveillance - HACCP or own checks by industry		single	25-50gr	47	2				1		1
		batch	25gr	4	0						
		batch	25gr	4	0						
Feed material of oil seed or fruit origin											
rape seed derived		single	50gr	1	0						
soya (bean) derived (unit:batch)		single	25-50gr	50	5					5	
		batch	25gr	322	18			18			
cotton seed derived (unit:batch)		single	50gr	1	0						
		batch	25gr	1	0						
sunflower seed derived (unit:batch)		single	25-50gr	7	0						
		batch	25gr	5	0						
linseed derived		single	25gr	2	0						
other oil seeds derived		batch	25gr	1	0						
Other feed material											

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legume seeds and similar products		single	50gr	3	0						
forages and roughages		single	25gr	2	0						
other plants		single	50gr	3	0						

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	Salmonella spp., unspecified	S. Typhimurium	S. Derby	S. Montevideo	S. Mbandaka	S. Livingstone	S. Hadar	S. Havana	S. Anatum	S. Napoli	S. Cerro	S. Kedougou	S. Agona	S. Blockley
Compound feedingstuffs for cattle		single	25gr	8	0				1	1	1	1								1
	process control	single	25-50gr	295	5															
	final product	batch	25gr	46	0															
	(unit:batch) - Surveillance - HACCP or own checks by industry	batch	25gr	9	0															
Compound feedingstuffs for pigs		single	25gr	6	0															
	process control	single	25-50gr	117	2		2													
	final product	batch	25gr	56	1			1												
	(unit:batch) - Surveillance - HACCP or own checks by industry	batch	25gr	7	0															
Compound feedingstuffs for poultry (non specified)																				

[illegible]

Compound feedingstuffs for rabbits															
(unit:sample)															
(unit:batch)															
Compound feedingstuffs for sheep															
Compound feedingstuffs for fish															
Compound feedingstuffs for turkeys															
Compound feedingstuffs, not specified															
	single	25-50gr	95	2											
	batch	25gr	16	0											
	single	25-50gr	28	0											
	single	25-50gr	22	0											
	batch	25gr	51	2	2										
	single	25-50gr	55	0											

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.1.5. Salmonella serovars and phagetype distribution

Table Salmonella serovars in animals (Part A)

Serovars	Turkeys		Pigeons		Rabbits		Guinea fowl		Buffalos		Quails		Solipeds, domestic - horses		Shellfish		Other animals		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)	
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
	Sources of isolates																							
Number of isolates in the laboratory	N=	151	60	32	28	17	6	4	3	233	67	466	888											
Number of isolates serotyped	N=	151	60	32	28	17	6	4	3	233	67	466	888											
Number of isolates per type																								
S. Blockley	27	0	4	2	1	0	0	0	0	8	2	0	27											
S. Bredeney	1	0	0	2	2	0	0	0	0	11	1	18	31											
S. Derby	2	0	0	0	0	0	0	0	0	4	4	106	3											
S. Enteritidis	1	0	1	0	0	1	0	0	0	13	0	8	85											
S. Hadar	3	0	0	1	0	0	0	0	0	1	0	3	68											
S. Heidelberg	70	0	0	0	0	0	0	0	0	0	0	3	13											
S. Infantis	0	0	0	1	1	0	0	0	0	3	1	7	25											
S. Livingstone	9	0	0	7	0	0	0	0	0	7	0	6	173											
S. Mbandaka	2	0	0	1	0	0	0	0	0	0	0	5	37											
S. Thompson	1	0	0	0	1	0	0	2	0	5	0	2	27											
S. Typhimurium	2	59	26	0	4	1	1	1	0	59	36	127	48											
S. Virchow	0	0	0	3	0	0	0	0	0	3	0	0	90											
S. 4,5,12:i:-	2	0	0	1	0	0	0	0	0	6	14	62	5											
Other serotypes	31	1	1	10	8	4	1	1	3	113	9	119	256											
Total of typed Salmonella isolates																								

(*) M : Monitoring, C : Clinical
Data Source: NRC-SALM

Table *Salmonella* serovars in animals (Part B)

Serovars	Other poultry		Goats		Sheep		Ducks	
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Sources of isolates								
Number of isolates in the laboratory	N=							
Number of isolates serotyped	N=							
Number of isolates per type								
S. Blockley				0		0		0
S. Bredeney				0		0		0
S. Derby				0		1		0
S. Enteritidis				0		0		1
S. Hadar				0		0		0
S. Heidelberg				0		0		0
S. Infantis				0		0		0
S. Livingstone				0		0		1
S. Mbandaka				0		0		0
S. Thompson				0		0		0
S. Typhimurium				0		15		7
S. Virchow				0		0		0
S. 4,5,12:i:-				0		0		1
Other serotypes				2		40		8
Total of typed <i>Salmonella</i> isolates								

Footnote

(*) M : Monitoring, C : Clinical
Data Source: NRC-SALM

Table Salmonella serovars in food (Part A)

Serovars		Meat from turkey		Meat from guinea fowl		Meat from horse		Meat from wild game - birds (Quail)		Meat from rabbit		Meat from bovine animals and pig		Meat from duck		Meat from sheep		Meat from other animal species or not specified		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)	
		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Sources of isolates																									
Number of isolates in the laboratory		N=																							
Number of isolates serotyped		N=																							
Number of isolates per type																									
S. Anatum		6	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	15	1	0	0	0	0	20	
S. Blockley		9	1	0	0	0	0	1	0	0	0	3	0	0	0	0	0	10	1	0	0	0	3		
S. Bredeney		1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	25		
S. Derby		2	0	0	1	0	0	0	0	1	0	3	0	0	0	0	0	64	5	0	0	0	160		
S. Enteritidis		0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7	1	0	0	0	4		
S. Hadar		7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	0	0	2		
S. Heidelberg		33	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	17	2	0	0	0	1		
S. Infantis		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	26		
S. Livingstone		0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	15	2	0	0	0	13		

[illegible]

Footnote

(*) M : Monitoring, C : Clinical
Data Source: NRC-SALM

Table Salmonella serovars in food (Part B)

Serovars	Other poultry		Other products of animal origin		Molluscan shellfish		Meat from poultry, unspecified	
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Sources of isolates								
Number of isolates in the laboratory	N=							
Number of isolates serotyped	N=							
Number of isolates per type								
S. Anatum					2		1	
S. Blockley					0		12	
S. Bredeney					2		27	
S. Derby					2		2	
S. Enteritidis					7		74	
S. Hadar					3		18	
S. Heidelberg					0		6	
S. Infantis					1		27	
S. Livingstone					2		51	
S. London					1		2	
S. Rissen					0		0	
S. Typhimurium					12		28	
S. 4,5,12:i:-					0		9	
other serovars					27		94	

Total of typed <i>Salmonella</i> isolates									

Footnote

(*) M : Monitoring, C : Clinical
Data Source: NRC-SALM

Table S. Enteritidis phagetypes in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Ducks		Other animals		Rabbits		Turkeys	
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
	Sources of isolates															
Number of isolates in the laboratory	N=															
Number of isolates phagetyped	N=															
Number of isolates per type																
PT 1			0		23				0		2		1		0	
PT 4			0		25				0		5		0		0	
PT 8			0		0				0		2		0		1	
PT 14b			0		10				0		0		0		0	
PT 21			2		3				1		1		0		0	
Not typable			1		3				0		0		0		0	
PT 2			0		5				0		0		0		0	
PT 35			0		1				0		0		0		0	
PT 4b			3		0				0		0		0		0	
PT 6a			1		0				0		0		0		0	
PT 37			0		1				0		0		0		0	
PT 7a			0		5				0		0		0		0	
PT 27			0		1				0		0		0		0	
RDNC			0		3				0		0		0		0	
Total of typed Salmonella isolates																

Footnote

(*) M : Monitoring, C : Clinical
Data Source: NRC-SALM

Table S. Enteritidis phagetypes in food

Phagetype	Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin		Meat from other animal species or not specified		Meat from bovine animals and pig		Molluscan shellfish		Meat from poultry, unspecified	
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
	Sources of isolates																	
Number of isolates in the laboratory	N=		1		4						7		1		7		74	
Number of isolates phagetyped	N=		1		4						7		1		7		74	
Number of isolates per type																		
PT 1	1		2								0		0		0		22	
PT 4	0		0								0		0		1		15	
PT 6	0		0								0		0		0		1	
PT 8	0		0								1		0		0		3	
PT 14b	0		0								0		0		5		2	
PT 21	0		0								0		0		0		7	
Not typable	0		0								0		1		0		1	
PT 3	0		0								0		0		0		1	
PT 4b	0		0								0		0		0		2	

[illegible]

Footnote

(*) M : Monitoring, C : Clinical

The number of *S. Enteritidis* phagetyped does not always correspond to the number of isolates serotyped because only a selection of isolates has been submitted to phage typing.

Data Source: NRC-SALM.

Table Salmonella Typhimurium phage types in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Ducks		Other animals		Rabbits		Sheep		Turkeys		Buffalos		Pigeons	
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Sources of isolates	N=		96		35				7		47		20		7		1		2		34	
Number of isolates in the laboratory	N=		26		35				7		47		20		7		1		2		34	
Number of isolates phagetyped	N=		26		96				7		47		20		7		1		2		34	
Number of isolates per type																						
DT 8			0	0	2				5	2	0	0	0	0	0	0	0	0	0	0	0	0
DT 12			0	1	0				0	0	0	0	1	0	0	0	0	0	0	0	0	0
DT 104			17	9	2				0	7	6	0	0	0	0	0	0	0	0	0	0	0
DT 104b			0	3	0				0	0	0	0	0	0	0	0	0	0	0	0	0	0
DT 120			1	2	3				0	4	1	0	0	0	0	0	0	0	0	0	0	0
DT 193			0	1	1				0	0	0	0	0	0	0	0	0	0	0	0	0	0
DT 208			0	12	0				0	0	0	0	0	0	0	0	0	0	2	1	0	1
U 302			0	7	2				0	3	2	1	0	0	0	0	0	0	0	0	0	0
Not typable			4	31	4				1	9	2	0	0	0	0	0	0	0	0	0	2	2
DT 40			0	0	1				0	0	0	0	0	0	0	0	0	0	0	0	0	0
DT 41			0	0	1				0	2	0	0	0	0	0	0	0	0	0	0	0	0
DT 22			2	0	0				0	0	0	0	0	0	0	0	0	0	0	0	0	0
DT 160			0	0	1				0	1	0	0	0	0	0	0	0	0	0	0	0	0
DT 194			0	1	0				0	3	0	0	0	0	0	0	1	0	0	0	3	3
DT 195			0	2	0				0	0	4	7	0	0	0	0	0	0	0	0	2	2
DT 30			0	0	1				0	0	0	0	3	0	0	3	0	0	0	0	0	0

[illegible]

Footnote

(*) M : Monitoring, C : Clinical
Data Source: NRC-SALM

Table Salmonella Typhimurium Phagetypes in food (Part A)

[illegible]

Footnote

The number of *S. Typhimurium* phagetyped does not always correspond to the number of isolates serotyped because only a selection of isolates has been submitted to phage typing.

Data Source: NRC-SALM.

Table Salmonella Typhimurium Phage types in food (Part B)

Phagetype	Meat from bovine animals and pig		Meat from duck		Meat from wild game - birds (Quail)		Meat from turkey			
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)		
	Sources of isolates									
Number of isolates in the laboratory	N=		27		6		5		78	
Number of isolates phagetyped	N=		27		6		5		78	
Number of isolates per type										
DT 7		0		0		0		0		0
DT 9		0		0		0		0		0
DT 12		0		0		0		0		0
DT 46		0		0		0		0		0
DT 104		1		0		0		0		0
DT 104b		0		0		0		0		0
DT 120		1		0		0		0		0
DT 193		0		0		0		0		0
DT 208		1		0		0		0		0
U 302		2		1		0		0		0
Not typable		1		0		0		2		0
DT 22		0		0		0		0		0
DT 124		0		0		0		0		0

DT 194	0	0	0	0	0	0	0	0	0	0
DT 195	0	0	0	0	0	0	0	0	0	0
DT 30	0	0	0	0	0	0	0	0	0	0
DT 46a	0	0	0	0	0	0	0	0	1	0
7 var.	0	0	0	0	0	0	0	0	0	0
DT 99	0	0	0	0	0	0	0	0	0	0
DT 20a	0	0	0	0	0	0	0	0	0	0
DT 104a	0	0	0	0	0	0	0	0	0	0
DT 110	0	0	0	0	0	0	0	0	0	0
DT 3	0	0	0	0	0	0	0	0	0	0
DT 2	0	0	0	0	0	0	0	0	0	0
DT 63	0	0	0	0	0	0	0	0	0	0
DT 56	0	0	0	0	0	0	0	0	0	0
DT 185	0	0	0	0	0	0	0	0	0	0
DT 138	0	0	0	0	0	0	0	0	0	0
DT 126a	0	0	0	0	0	0	0	0	0	0
RDNC	3	1	0	0	0	0	0	0	0	0
Total of typed <i>Salmonella</i> isolates										

Footnote

(*) M : Monitoring, C : Clinical

The number of *S. Typhimurium* phagetyped does not always correspond to the number of isolates serotyped because only a selection of isolates has been submitted to phage typing.

Data Source: NRC-SALM.

2.1.6. Antimicrobial resistance in Salmonella isolates

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 Antimicrobial susceptibility testing of S. Enteritidis in animals

n = Number of resistant isolates																
S. Enteritidis																
	Cattle (bovine animals)	Pigs	Gallus gallus (fowl)	Ducks	Turkeys	Quails	Other animals	Rabbits								
Isolates out of a monitoring programme	no	no	no	no	no	no	no	no								
Number of isolates available in the laboratory	8	85	1	1	1	1	13	1								
Antimicrobials:																
Tetracyclines	N	n	N	n	N	n	N	n	N	n	N	n	N	n	N	n
	6	1	67	7	1	0	0	0	1	0	10	0	1	0	1	0
Amphenicols																
Chloramphenicol	6	0	67	0	1	0	0	0	1	0	10	0	1	0	1	0
Cephalosporins																
Cephalothin	6	1	67	2	1	0	0	0	1	0	10	0	1	0	1	0
Cefotaxim	6	0	67	0	1	0	0	0	1	0	10	0	1	0	1	0
Ceftazidim	6	0	51	0	1	0	0	0	0	0	6	0	1	0	1	0
Fluoroquinolones																
Ciprofloxacin	6	0	67	0	1	0	0	0	1	0	10	0	1	0	1	0
Enrofloxacin	6	0	67	0	1	0	0	0	1	0	10	0	1	0	1	0
Quinolones																
Nalidixic acid	6	0	67	23	1	0	0	0	1	0	10	1	1	1	1	1
Trimethoprim	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
Sulfonamides																
Sulfonamide	6	1	66	5	1	0	0	0	1	0	10	2	1	0	1	0
Aminoglycosides																
Streptomycin	6	0	67	0	1	0	0	0	1	0	10	0	1	0	1	0
Gentamicin	6	0	67	0	1	0	0	0	1	0	10	0	1	0	1	0
Neomycin	0	0	17	0	0	0	0	0	1	0	4	0	0	0	0	0
Kanamycin	6	0	67	0	1	0	0	0	1	0	10	0	1	0	1	0
Trimethoprim + sulfonamides	6	1	65	1	1	0	0	0	1	0	10	3	1	0	1	0
Penicillins																
Ampicillin	6	0	67	4	1	0	0	0	1	0	10	0	1	0	1	0

Fully sensitive			6	5	64	40	1	1	0	0	0	1	1	0	9	6	1	0
Resistant to 1 antimicrobial			6	0	64	13	1	0	0	0	1	1	0	0	9	1	1	1
Resistant to 2 antimicrobials			6	0	64	8	1	0	0	0	1	1	0	0	9	2	1	0
Resistant to 3 antimicrobials			6	0	64	1	1	0	0	0	1	1	0	0	9	0	1	0
Resistant to 4 antimicrobials			6	1	64	1	1	0	0	0	1	1	0	0	9	0	1	0
Resistant to >4 antimicrobials			6	0	64	1	1	0	0	0	1	1	0	0	9	0	1	0

Footnote

Data Source: NRC-SALM

Table Antimicrobial susceptibility testing of *S. Typhimurium* in animals (Part A)

n = Number of resistant isolates																		
S. Typhimurium																		
	Cattle (bovine animals)	Pigs	Sheep	Solipeds, domestic - horses	Gallus gallus (fowl)	Ducks	Turkeys	Quails	Pigeons	Other animals								
Isolates out of a monitoring programme	no	no	no	no	no	no	no	no	no	no								
Number of isolates available in the laboratory	36	127	15	1	48	7	2	1	59	59								
Antimicrobials:																		
Tetracyclines	N 35	n 54	N 14	n 9	N 37	n 9	N 5	n 0	N 2	n 1	N 0	n 0	N 37	n 1	N 41	n 17		
Amphenicols																		
Chloramphenicol	35	21	54	21	14	1	0	0	37	3	5	0	2	0	37	0	41	9
Cephalosporins																		
Cephalothin	35	3	53	3	14	0	0	0	37	1	5	0	2	0	37	0	41	1
Cefotaxim	35	2	55	3	14	0	0	0	37	0	5	0	2	0	37	0	41	3
Ceftazidim	15	0	4	0	0	0	0	0	26	0	3	0	1	0	13	0	16	0
Fluroquinolones																		
Ciprofloxacin	35	0	54	0	14	0	0	0	37	0	5	0	2	0	37	0	41	0
Enrofloxacin	35	0	55	0	14	0	0	0	37	0	5	0	2	0	36	0	40	0
Quinolones																		
Nalidixic acid	35	9	5	2	14	0	0	0	37	2	5	0	2	0	37	0	41	6
Trimethoprim	0	0	11	8	1	0	0	0	1	1	0	0	0	0	2	0	1	0
Sulfonamides																		
Sulfonamide	35	29	55	45	14	3	0	0	36	8	5	1	2	0	37	2	41	19
Aminoglycosides																		
Streptomycin	35	26	55	39	14	2	0	0	37	6	5	0	2	0	37	3	41	17
Gentamicin	35	0	55	6	14	0	0	0	37	1	5	0	2	0	37	0	41	0
Neomycin	19	16	11	0	14	0	0	0	11	0	2	0	0	0	24	0	25	0
Kanamycin	35	9	55	4	14	0	0	0	37	0	5	0	2	0	37	1	41	0
Trimethoprim + sulfonamides	35	2	42	17	13	0	0	0	36	1	5	0	2	0	35	2	40	6
Penicillins																		

Ampicillin	35	31	54	40	14	2	0	0	0	0	0	0	0	0	0	0	0	37	0	41	13
Fully sensitive	35	0	38	1	13	4	0	0	0	0	0	0	0	0	0	0	0	34	30	37	17
Resistant to 1 antimicrobial	35	1	38	2	13	7	0	0	0	0	0	0	0	0	0	0	0	34	1	37	3
Resistant to 2 antimicrobials	35	2	38	1	13	0	0	0	0	0	0	0	0	0	0	0	0	34	2	37	0
Resistant to 3 antimicrobials	35	8	38	11	13	0	0	0	0	0	0	0	0	0	0	0	0	34	0	37	3
Resistant to 4 antimicrobials	35	5	38	12	13	1	0	0	0	0	0	0	0	0	0	0	0	34	1	37	2
Resistant to >4 antimicrobials	35	19	38	11	13	1	0	0	0	0	0	0	0	0	0	0	0	34	0	37	12
Number of multiresistant S. Typhimurium DT104																					
with penta resistance	17	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3
resistant to other antimicrobials	17	15	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1

Footnote

Data Source: NRC-SALM

Table Antimicrobial susceptibility testing of *S. Typhimurium* in animals (Part B)

n = Number of resistant isolates					
<i>S. Typhimurium</i>					
Isolates out of a monitoring programme	Rabbits		Buffalos		
	no	no	no	no	no
Number of isolates available in the laboratory	26		4		
Antimicrobials:	N	n	N	n	n
Tetracyclines	17	11	3		3
Amphenicols					
Chloramphenicol	17	7	3		1
Cephalosporins					
Cephalothin	17	0	3		0
Cefotaxim	17	2	3		0
Ceftazidim	15	0	3		1
Fluoroquinolones					
Ciprofloxacin	17	0	3		0
Enrofloxacin	17	0	3		0
Quinolones					
Nalidixic acid	17	1	3		0
Trimethoprim	3	1	0		0
Sulfonamides					
Sulfonamide	17	11	3		3
Aminoglycosides					
Streptomycin	17	10	3		3
Gentamicin	17	4	3		1
Neomycin	2	0	0		0
Kanamycin	17	0	3		0
Trimethoprim + sulfonamides	14	0	3		3
Penicillins					
Ampicillin	17	7	3		3

Fully sensitive	14	3	2	0
Resistant to 1 antimicrobial	14	0	2	0
Resistant to 2 antimicrobials	14	0	2	0
Resistant to 3 antimicrobials	14	1	2	0
Resistant to 4 antimicrobials	14	4	2	0
Resistant to >4 antimicrobials	14	6	2	2
Number of multiresistant S. Typhimurium DT104				
with penta resistance	5	3	0	0
resistant to other antimicrobials	5	2	0	0

Footnote

Data Source: NRC-SALM

Table Antimicrobial susceptibility testing of Salmonella in animals (Part A)

n = Number of resistant isolates																				
Salmonella spp.																				
	Cattle (bovine animals)	Pigs	Sheep	Goats	Solipeds, domestic - horses	Gallus gallus (fowl)	Ducks	Turkeys	Guinea fowl	Quails										
Isolates out of a monitoring programme	no	no	no	no	no	no	no	no	no	no										
Number of isolates available in the laboratory	67	466	56	2	4	888	18	151	28	6										
Antimicrobials:																				
Tetracyclines	62	54	268	192	50	13	1	0	1	0	480	123	11	5	86	77	10	6	1	0
Amphenicols																				
Chloramphenicol	62	30	266	41	50	1	1	0	1	0	478	5	11	0	86	1	10	0	1	0
Cephalosporins																				
Cephalothin	62	3	266	9	50	0	1	0	1	0	480	35	11	2	86	6	10	2	1	0
Cefotaxim	62	2	268	4	50	0	1	0	1	0	480	2	11	0	86	1	10	0	1	0
Ceftazidim	24	0	205	0	1	0	0	0	0	0	400	0	7	0	83	0	7	0	0	0
Fluoroquinolones																				
Ciprofloxacin	62	0	266	0	50	0	1	0	1	0	479	1	11	0	86	0	10	0	1	0
Enrofloxacin	62	0	268	0	50	0	1	0	1	0	475	4	11	0	86	1	10	1	1	0
Quinolones																				
Nalidixic acid	62	11	268	31	50	0	1	0	1	0	480	128	11	1	86	72	10	6	1	0
Trimethoprim	2	0	26	9	5	1	0	0	0	0	9	1	0	0	1	0	0	0	0	0
Sulfonamides																				
Sulfonamide	61	50	269	146	50	4	1	0	1	0	478	76	11	3	86	8	10	8	1	0
Aminoglycosides																				
Streptomycin	62	48	269	131	50	6	1	1	1	1	479	107	11	2	86	58	10	5	1	0
Gentamicin	62	1	269	22	50	0	1	0	1	0	479	13	11	0	86	4	10	0	1	0
Neomycin	37	22	63	13	49	0	1	0	1	0	81	6	4	0	3	1	3	0	1	0
Kanamycin	62	16	268	30	50	0	1	0	1	0	480	30	11	0	86	30	10	3	1	0
Trimethoprim + sulfonamides	60	9	234	49	45	0	1	0	1	0	465	33	11	4	85	3	10	3	1	0
Penicillins																				

Ampicillin	62	45	268	84	50	2	1	0	1	0	479	96	11	5	86	52	10	5	1	0
Fully sensitive	59	1	228	54	45	29	1	0	1	0	453	265	11	5	85	4	10	0	1	1
Resistant to 1 antimicrobial	59	2	228	28	45	13	1	1	1	1	453	48	11	1	85	4	10	1	1	0
Resistant to 2 antimicrobials	59	4	228	8	45	0	1	0	1	0	453	31	11	0	85	1	10	4	1	0
Resistant to 3 antimicrobials	59	11	228	49	45	1	1	0	1	0	453	11	11	1	85	17	10	1	1	0
Resistant to 4 antimicrobials	59	15	228	43	45	1	1	0	1	0	453	44	11	2	85	49	10	0	1	0
Resistant to >4 antimicrobials	59	26	228	46	45	1	1	0	1	0	453	54	11	2	85	10	10	4	1	0

Footnote

Data Source: NRC-SALM

Table Antimicrobial susceptibility testing of Salmonella in animals (Part B)

n = Number of resistant isolates												
Salmonella spp.												
	Pigeons		Other animals		Shellfish		Rabbits		Buffalos			
Isolates out of a monitoring programme	no		no		no		no		no		no	
Number of isolates available in the laboratory	60		233		3		32		17			

Fully sensitive	34	30	169	82	2	1	20	3	13	2
Resistant to 1 antimicrobial	34	1	169	16	2	0	20	1	13	2
Resistant to 2 antimicrobials	34	2	169	12	2	0	20	0	13	2
Resistant to 3 antimicrobials	34	0	169	12	2	0	20	2	13	0
Resistant to 4 antimicrobials	34	1	169	14	2	0	20	5	13	0
Resistant to >4 antimicrobials	34	0	169	33	2	1	20	9	13	7

Footnote

Data Source: NRC-SALM

Table Antimicrobial susceptibility testing of *Salmonella* spp. in food (Part A)

n = Number of resistant isolates												
Salmonella spp.												
	Meat from broilers (Gallus gallus)	Meat from turkey	Meat from duck	Meat from other poultry species	Meat from pig	Meat from bovine animals	Meat from sheep	Meat from horse	Meat from wild game - birds (Quail)	Meat from rabbit		
Isolates out of a monitoring programme	no		no		no	no	no	no	no	no		
Number of isolates available in the laboratory	78	6			715	59	3	3	5	3		

[illegible]

Footnote

Data Source: NRC-SALM

Table Antimicrobial susceptibility testing of *Salmonella* spp. in food (Part B)

n = Number of resistant isolates												
Salmonella spp.												
		Molluscan shellfish	Meat from other animal species or not specified		Meat from poultry, unspecified		Meat from bovine animals and pig		Meat from guinea fowl			
		no		no		no		no		no		
Isolates out of a monitoring programme												
Number of isolates available in the laboratory	59	411		351		27		7				
Antimicrobials:												
Tetracyclines	51	7	153	71	307	115	27	19	7	7		
Amphenicols												
Chloramphenicol	51	0	151	10	310	14	27	6	7	1		
Cephalosporins												
Cephalothin	51	0	152	4	308	9	27	0	7	1		
Cefotaxim	0	0	153	3	310	10	27	1	7	1		
Ceftazidim	38	1	114	0	215	1	26	0	5	0		
Fluoroquinolones												
Ciprofloxacin	51	0	153	0	310	2	27	0	7	0		
Enrofloxacin	47	0	146	0	308	4	27	0	7	1		
Quinolones												
Nalidixic acid	51	2	153	39	310	91	27	6	7	4		
Trimethoprim	0	0	4	1	41	1	0	0	0	0		
Sulfonamides												
Sulfonamide	51	13	150	47	294	93	27	13	7	4		
Aminoglycosides												
Streptomycin	51	9	153	59	309	95	27	15	7	6		
Gentamicin	51	1	153	1	310	6	27	0	7	0		
Neomycin	13	0	42	6	111	8	1	0	2	1		
Kanamycin	50	1	153	13	310	41	27	4	7	4		
Trimethoprim + sulfonamides	50	5	146	28	267	52	27	9	7	3		
Penicillins												
Ampicillin	51	6	153	39	310	67	27	11	7	4		

Fully sensitive	45	34	136	53	239	95	27	6	7	0
Resistant to 1 antimicrobial	45	1	136	10	239	24	27	2	7	0
Resistant to 2 antimicrobials	45	2	136	9	239	15	27	0	7	0
Resistant to 3 antimicrobials	45	3	136	18	239	22	27	6	7	0
Resistant to 4 antimicrobials	45	2	136	30	239	38	27	7	7	4
Resistant to >4 antimicrobials	45	3	136	16	239	45	27	6	7	3

Footnote

Data Source: NRC-SALM

Table Breakpoints for antibiotic resistance testing of Salmonella 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 microg	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest		Susceptible >=	Intermediate	Resistant <=
Tetracyclines	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol										
Cephalosporins										
Cephalothin	NCCLS						30	18		14
Cefotaxim	NCCLS						30	23		14
Ceftazidim	NCCLS						30	14		18
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin	NCCLS						5	23		16
Quinolones										
Nalidixic acid	NCCLS						30	19		13
Trimethoprim										
Sulfonamides										
Sulfonamide	NCCLS						250	17		12
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin	BD BBL						30	17		12
Kanamycin	NCCLS						30	18		13
Trimethoprim + sulfonamides	NCCLS						25.5	16		10
Penicillins										
Ampicillin	NCCLS						10	17		13

Footnote

Data Source: NRC-SALM
 Sulfonamide/TMP=25.5
 Sulfonamide=23.75
 TMP=1.75

Table Breakpoints for antibiotic resistance testing of Salmonella 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 microg	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest		Susceptible >=	Intermediate	Resistant <=
Tetracyclines	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol										
Cephalosporins										
Cephalothin	NCCLS						30	18		14
Cefotaxim	NCCLS						30	23		14
Ceftazidim	NCCLS						30	14		18
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin	NCCLS						5	23		16
Quinolones										
Nalidixic acid	NCCLS						30	19		13
Trimethoprim										
Sulfonamides										
Sulfonamide	NCCLS						250	17		12
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin	BD BBL						30	17		12
Kanamycin	NCCLS						30	18		13
Trimethoprim + sulfonamides(1)	NCCLS						25.5	16		10
Penicillins										
Ampicillin	NCCLS						10	17		13

(1) : Sulfonamide = 23.75
TMP = 1.75

Footnote

Data Source: NRC-SALM
Sulfonamide/TMP=25.5
Sulfonamide=23.75
TMP=1.75

2.2. CAMPYLOBACTERIOSIS

2.2.1. General evaluation of the national situation

A. Thermophilic Campylobacter General evaluation

Additional information

The disease is notifiable in humans.

The disease is not notifiable in animals.

2.2.2. Campylobacter, thermophilic in foodstuffs

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)		single	25g	39	13	1	0	8	4	0
fresh		single	25g	226	33	2	0	14	0	17
minced meat										
intended to be eaten cooked		single	25g	7	0	0	0	0	0	0
meat preparation										
intended to be eaten cooked		single	25g	59	1	0	0	1	0	0
meat products										
raw but intended to be eaten cooked		single	25g	374	52	8	0	25	0	19
cooked, ready-to-eat		single	25g	42	0	0	0	0	0	0
mechanically separated meat (MSM)				0	0	0	0	0	0	0
Meat from turkey										
fresh		single	25g	26	1	0	0	0	0	1
minced meat										
intended to be eaten cooked		single	25g	2	0	0	0	0	0	0
meat preparation										
intended to be eaten cooked		single	25g	1	0	0	0	0	0	0
meat products										
raw but intended to be eaten cooked		single	25g	28	2	0	0	2	0	0

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cooked, ready-to-eat	single	25g	4	0	0	0	0	0	
mechanically separated meat (MSM)			0	0	0	0	0	0	
Meat from duck	single	25g	10	0	0	0	0	0	
Meat from geese	single	25g	2	0	0	0	0	0	
Meat from other poultry species	single	25g	18	4	0	0	0	0	4

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

Table Campylobacter in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. upsaliensis	C. lari	thermophilic Campylobacter spp., unspecified
Meat from pig		single	25g	39	1	1	0	0	0	0
fresh		single	25g	207	1	0	0	0	0	1
minced meat										
intended to be eaten raw		single	25g	255	0	0	0	0	0	0
meat products		single	25g	100	0	0	0	0	0	0
Meat from bovine animals		single	25g	4	0	0	0	0	0	0
fresh		single	25g	394	2	2	0	0	0	0
minced meat										
intended to be eaten raw		single	25g	185	0	0	0	0	0	0
Meat from sheep										
fresh		single	25g	109	0	0	0	0	0	0
Meat from other animal species or not specified		single	25g	39	0	0	0	0	0	0
Milk, cows'										
raw		single	25g	325	1	0	0	0	0	1
intended for direct human consumption				0	0	0	0	0	0	0
raw milk for manufacture										
intended for manufacture of raw or low heat-treated products		single	25g	181	0	0	0	0	0	0
pasteurised milk		single	25g	338	2	0	0	0	0	2
Milk, goats'										
raw		single	25g	1	0	0	0	0	0	0
intended for direct human consumption		single	25g	4	0	0	0	0	0	0
raw milk for manufacture										

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intended for manufacture of raw or low heat-treated products	single	25g	15	0	0	0	0	0	0
Live bivalve molluscs	single	25g	15	0	0	0	0	0	0
Meat from rabbit	single	25g	3	0	0	0	0	0	0
Meat from horse	single	25g	13	0	0	0	0	0	0
Milk from other animal species or unspecified	single	25g	8	0	0	0	0	0	0
Milk, sheep's									
raw	single	25g	17	1	0	0	0	0	1
pasteurised	single	25g	7	0	0	0	0	0	0
Cheeses, made from unspecified milk or other animal milk									
unspecified	single	25g	617	3	0	0	0	0	3
Dairy products (excluding cheeses)									
dairy products, not specified	single	25g	19	0	0	0	0	0	0
Fishery products, unspecified	single	25g	16	0	0	0	0	0	0
Eggs	single	25g	16	0	0	0	0	0	0
Other food	single	25g	27	0	0	0	0	0	0

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.2.3. Campylobacter, thermophilic in animals

A. Campylobacter spp. in animal

Control program/mechanisms

The control program/strategies in place

There is not a national control programme in place. In the Veneto Region, in 2005 a monitoring programme for Campylobacter spp. in broiler chickens and turkeys has begun. The sampling is performed at the slaughterhouse, on 214 broilers and 225 turkeys slaughter batches. 10 cloacal swabs are sampled per batch and analysed in one pool, using the method prescribed by the Community Reference Laboratory of Bilthoven, that requires the use of MSRV as unique selective enrichment.

Additional information

The disease is not notifiable in animals

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for Campylobacter, thermophilic	C. jejuni	C. coli	C. lari	C. upsaliensis	thermophilic Campylobacter spp., unspecified
Cattle (bovine animals)									
dairy cows									
- Monitoring - monitoring survey		sample	35	1	1				
calves (under 1 year)									
- Monitoring (research activity)		animal	89	3	1				2
adult cattle over 2 years									
- Monitoring (Veneto Region)		slaughter batch	28	20	4				16
unspecified									
(unit:animal)		animal	1278	4		1			3
(unit:holding)		holding	176	10	2				8
- Monitoring (research activity)		animal	262	45	37				8
- Monitoring - monitoring survey		herd	119	30	28				2
Sheep									
- Monitoring - monitoring survey (unit:sample)		holding	120	5					5
- Monitoring - monitoring survey (unit:herd)		sample	268	0					
Goats									
(unit:holding)		herd	68	19	10	9			
- Monitoring - monitoring survey (unit:sample)		animal	2	0					
- Monitoring - monitoring survey (unit:herd)		holding	38	0					
Pigs									
		sample	39	0					
		herd	4	0					
		animal	97	14					14

(unit:sample)	sample	7	0					
- Monitoring - monitoring survey (unit:holding)	holding	38	2					2
- Monitoring - monitoring survey (unit:herd)	herd	46	19	1	14			5
Solipeds, domestic	sample	9	0					
- Monitoring - monitoring survey (unit:holding)	holding	7	1					1
Gallus gallus (fowl)								
broilers								
- at farm	animal	9	0					
- at farm (unit:holding)	holding	1	0					
- at slaughterhouse - Monitoring - monitoring survey	flock	48	22	8	11			3
- at slaughterhouse - Monitoring (Veneto Region)	slaughter batch	51	44	22	21			1
unspecified								
(unit:animal)	animal	3	2	1				1
(unit:flock)	flock	22	4	1				3
(unit:sample)	sample	2137	1140	919	20		1	200
- Monitoring - monitoring survey (unit:sample)	sample	2	0					
parent breeding flocks, unspecified								
- Monitoring - monitoring survey	flock	1	1		1			
laying hens								
- Monitoring - monitoring survey	flock	12	6	3	1			2
Turkeys								
- Monitoring (Veneto Region)	slaughter batch	13	1					1
Ducks								
- Monitoring - monitoring survey (unit:flock)	flock	4	0					
- Monitoring - monitoring survey (unit:animal)	animal	1	0					
Geese								
- Monitoring - monitoring survey	animal	1	0					
Dogs	animal	204	7					7
(unit:sample)	sample	7	2	2				
Cats	animal	19	0					
(unit:sample)	sample	1	0					
Buffalos	holding	41	0					
Guinea fowl								

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- Monitoring - monitoring survey	flock	10	3	1	1			1
Birds								
wild								
- Monitoring - monitoring survey (unit:sample)	sample	38	1	1				
- Monitoring - monitoring survey (unit:animal)	animal	58	4	3	1			
Pigeons	animal	187	17	17				
(unit:sample)	sample	9	0					
Turtles	animal	17	0					
Other animals	animal	14	0					
Other poultry	holding	3	1					1
Water buffalos								
- Monitoring - monitoring survey	herd	14	4	4				

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples. The number of serotypes is greater than the total number of positive units because in a single slaughter batch more serotypes may be present.

2.2.4. Antimicrobial resistance in Campylobacter, thermophilic isolates

Table Antimicrobial susceptibility testing of *C. coli* in *Gallus gallus* (fowl) - 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																			
<i>C. coli</i>																			
<i>Gallus gallus</i> (fowl)																			
Isolates out of a monitoring programme		yes																	
Number of isolates available in the laboratory		57																	
Antimicrobials:		N	n	≤0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024
Tetracyclines(1)		57	54		1	1	1						3						
Fluoroquinolones																			
Ciprofloxacin(2)		57	49	1	1	2	5				2	4	37						
Quinolones																			
Nalidixic acid(3)		57	49								5	2	1	11					
Aminoglycosides																			
Gentamicin		57	0			3	22	32											
Macrolides																			
Erythromycin(4)		57	41			1	3	5	6	1									
Penicillins																			
Ampicillin(5)		57	25						3	3	7	16	3	1					

(1) : Other values: >16: 51 isolates

(2) : Other values: >16: 6 isolates

(3) : Other values: >32: 38 isolates

(4) : Other values: >16: 41 isolates

(5) : Other values: >32: 24 isolates

Table Antimicrobial susceptibility testing of C. coli - qualitative data

n = Number of resistant isolates								
	C. coli							
	Pigs		Sheep		Gallus gallus (fowl)		Turkeys	
Isolates out of a monitoring programme	yes		yes		yes		yes	
Number of isolates available in the laboratory	40		18		57		9	
Antimicrobials:	N	n	N	n	N	n	N	n
Tetracyclines	40	35	18	9	57	54	9	9
Fluoroquinolones								
Ciprofloxacin	40	14	18	8	57	49	9	8
Quinolones								
Nalidixic acid	40	15	18	8	57	49	9	8
Aminoglycosides								
Gentamicin	40	1	18	0	57	0	9	0
Macrolides								
Erythromycin	40	15	18	0	57	41	9	5
Penicillins								
Ampicillin	40	23	18	0	57	25	9	2
Fully sensitive	40	2	18	6	57	0	9	0
Resistant to 1 antimicrobial	40	8	18	4	57	7	9	0
Resistant to 2 antimicrobials	40	11	18	3	57	2	9	1
Resistant to 3 antimicrobials	40	9	18	5	57	4	9	3
Resistant to 4 antimicrobials	40	4	18	0	57	25	9	3
Resistant to >4 antimicrobials	40	6	18	0	57	19	9	2

Table Antimicrobial susceptibility testing of *C. coli* 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																							
C. coli																							
Pigs																							
Isolates out of a monitoring programme	yes																						
	40																						
Number of isolates available in the laboratory																							
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(1)	40	35	1	1	1					1	1	1											
Fluoroquinolones																							
Ciprofloxacin(2)	40	14	1	5	10	9	1			1	5	7											
Quinolones																							
Nalidixic acid(3)	40	15							3	14	7	1	2										
Aminoglycosides																							
Gentamicin	40	1	1		1	3	32	2				1											
Macrolides																							
Erythromycin(4)	40	15		1		3	5	11	5														
Penicillins																							
Ampicillin(5)	40	23					1	1	2	3	7	1	1										

(1) : Other values: >16: 34 isolates

(2) : Other values: >16: 1 isolate

(3) : Other values: >32: 13 isolates

(4) : Other values: >16: 15 isolates

(5) : Other values: 0.015: 2 isolates; >32: 22 isolates

Table Antimicrobial susceptibility testing of C. coli in Sheep - 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																						
C. coli																						
Sheep																						
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	18																					
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(1)	18	9	5	1	3																	
Fluoroquinolones																						
Ciprofloxacin	18	8	3	5	2						5	3										
Quinolones																						
Nalidixic acid(2)	18	8							1	9												
Aminoglycosides																						
Gentamicin	18	0	1	4	3	9	1															
Macrolides																						
Erythromycin	18	0		4	4	2	3	5														
Penicillins																						
Ampicillin	18	0				1		6	7	3	1											

(1) : Other values: >16: 9 isolates

(2) : Other values: >32: 8 isolates

Table Antimicrobial susceptibility testing of *C. coli* in Turkey - 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																							
C. coli																							
Turkey																							
Isolates out of a monitoring programme		yes																					
Number of isolates available in the laboratory		9																					
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(1)		9	9																				
Fluoroquinolones		9	8		1							2	6										
Ciprofloxacin		9	8		1							2	6										
Quinolones		9	8								1			3									
Nalidixic acid(2)		9	8								1			3									
Aminoglycosides		9	0		4	5																	
Gentamicin		9	0		4	5																	
Macrolides		9	5				2	2															
Erythromycin(3)		9	5				2	2															
Penicillins		9	2								2	5		1									
Ampicillin(4)		9	2								2	5		1									

(1) : Other values: >16: 9 isolates

(2) : Other values: >32: 5 isolates

(3) : Other values: >16: 5 isolates

(4) : Other values: >32: 1 isolate

Table Antimicrobial susceptibility testing of *C. jejuni* in *Gallus gallus* (fowl) - 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																						
C. jejuni																						
Gallus gallus (fowl)																						
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	36																					
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(1)	36	19			3	5	4	1	2		2	2										
Fluoroquinolones																						
Ciprofloxacin(2)	36	24			5	6	1				3	9										
Quinolones																						
Nalidixic acid(3)	36	24								7	4	1										
Aminoglycosides																						
Gentamicin	36	0			12	17	7															
Macrolides																						
Erythromycin	36	0		4	8	15	9															
Penicillins																						
Ampicillin(4)	36	16						2	5	9	2	2	2									

(1) : Other values: >16: 17 isolates

(2) : Other values: >16: 12 isolates

(3) : Other values: >32: 24 isolates

(4) : Other values: >32: 14 isolates

Table Antimicrobial susceptibility testing of *C. jejuni* - qualitative data

n = Number of resistant isolates

	C. jejuni							
	Cattle (bovine animals)		Sheep		Gallus gallus (fowl)		Turkeys	
Isolates out of a monitoring programme	yes		yes		yes		yes	
Number of isolates available in the laboratory	54		9		36		13	
Antimicrobials:	N	n	N	n	N	n	N	n
Tetracyclines	54	12	9	2	36	19	13	13
Fluoroquinolones								
Ciprofloxacin	54	7	9	5	36	24	13	11
Quinolones								
Nalidixic acid	54	8	9	5	36	24	13	10
Aminoglycosides								
Gentamicin	54	0	9	0	36	0	13	0
Macrolides								
Erythromycin	54	0	9	0	36	0	13	1
Penicillins								
Ampicillin	54	2	9	0	36	16	13	8
Fully sensitive	54	39	9	4	36	8	13	0
Resistant to 1 antimicrobial	54	8	9	0	36	1	13	1
Resistant to 2 antimicrobials	54	2	9	3	36	6	13	2
Resistant to 3 antimicrobials	54	3	9	2	36	14	13	2
Resistant to 4 antimicrobials	54	2	9	0	36	7	13	7
Resistant to >4 antimicrobials	54	0	9	0	36	0	13	1

Table Antimicrobial susceptibility testing of *C. jejuni* in Sheep - 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																				
<i>C. jejuni</i>																				
Sheep																				
Isolates out of a monitoring programme		yes																		
Number of isolates available in the laboratory		9																		
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
Tetracyclines(1)		9	2		5	1	1													
Fluoroquinolones																				
Ciprofloxacin		9	5	1	3						5									
Quinolones																				
Nalidixic acid(2)		9	5						1	3										
Aminoglycosides																				
Gentamicin		9	0	1	5	3														
Macrolides																				
Erythromycin		9	0		4	4	1													
Penicillins																				
Ampicillin		9	0				1			4	3	1								

(1) : Other values: >16: 2 isolates

(2) : Other values: >32: 5 isolates

Table Antimicrobial susceptibility testing of *C. jejuni* in Turkey - 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																			
<i>C. jejuni</i>																			
Turkey																			
Isolates out of a monitoring programme		yes																	
Number of isolates available in the laboratory		13																	
Antimicrobials:		N	n	≤0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024
Tetracyclines(1)		13	13										1						
Fluoroquinolones		13	11	1								4	5						
Ciprofloxacin(2)		13	11	1															
Quinolones		13	10						1	1			1	1					
Nalidixic acid(3)		13	10																
Aminoglycosides		13	0			8	5												
Gentamicin		13	0																
Macrolides		13	1				3	5	4										
Erythromycin(4)		13	1																
Penicillins		13	8						1	1	1		2	2					
Ampicillin(5)		13	8																

(1) : Other values: >16: 12 isolates

(2) : Other values: >16: 2 isolates

(3) : Other values: >32: 9 isolates

(4) : Other values: >16: 1 isolate

(5) : Other values: >32: 6 isolates

Table Antimicrobial susceptibility testing of *C. jejuni* in Cattle (bovine animals) - 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																				
<i>C. jejuni</i>																				
Cattle (bovine animals)																				
Isolates out of a monitoring programme		yes																		
Number of isolates available in the laboratory		54																		
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
Tetracyclines(1)	54	12	4	12	14	8	1			1	2	2								
Fluoroquinolones																				
Ciprofloxacin	54	7	1	12	29	5					4	3								
Quinolones																				
Nalidixic acid(2)	54	8					2	11	32	1	2									
Aminoglycosides																				
Gentamicin	54	0	3	3	12	33	6													
Macrolides																				
Erythromycin	54	0			3	27	18	6												
Penicillins																				
Ampicillin	54	2				2	3	4	18	18	5	2	2							

(1) : Other values: >16: 10 isolates

(2) : Other values: >32: 6 isolates

Table Breakpoints used for antimicrobial susceptibility testing of Campylobacter in Animals

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

ARBAO-2

Campylobacter, thermophilic	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content microg	breakpoint Zone diameter (mm)		
		Susceptible ≤	Intermediate	Resistant >	lowest	highest		Susceptible ≥	Intermediate	Resistant ≤
Tetracyclines				8						
Amphenicols										
Chloramphenicol										
Florfenicol										
Fluoroquinolones										
Ciprofloxacin				2						
Enrofloxacin										
Quinolones										
Nalidixic acid				16						
Trimethoprim										
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin										
Gentamicin				8						
Neomycin										
Kanamycin										
Macrolides										
Erythromycin				16						
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins										
Penicillins										
Ampicillin				16						

Footnote

Standards used for testing: consensus standards of ARBAO-2 EU financed concerted action.

2.3. LISTERIOSIS**2.3.1. General evaluation of the national situation****2.3.2. Listeria in foodstuffs****Table Listeria monocytogenes in milk and dairy products**

	Source of information	Sampling unit	Sample weight	Definition used	Units tested	≤100 cfu/g	>100 cfu/g	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g
Milk, cows'									
raw		single	25g		855	0	0	8	0
intended for direct human consumption		single	25g		145	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g		1	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g		2008	0	0	0	0
raw milk for manufacture									
intended for manufacture of raw or low heat-treated products		single	25g		125	0	0	4	0
- Surveillance - HACCP or own checks by industry		single	25g		3	0	0	0	0
pasteurised milk		single	25g		947	0	0	0	0
- Surveillance - HACCP or own checks by industry		single	25g		355	0	0	0	0
Milk, sheep's									
raw milk for manufacture									
intended for manufacture of raw or low heat-treated products					0	0	0	0	0
pasteurised		single	25g		8	0	0	0	0
Milk, goats'									

raw	single	25g	6	0	0	0	0
intended for direct human consumption			0	0	0	0	0
raw milk for manufacture							
intended for manufacture of raw or low heat-treated products			0	0	0	0	0
- Surveillance - HACCP or own checks by industry	single	25g	1	0	0	0	0
pasteurised	single	25g	3	0	0	0	0
Cheeses made from cows' milk							
soft and semi-soft	single	25g	513	0	0	0	0
made from raw or low heat-treated milk	single	25g	605	0	0	9	1
- Surveillance - HACCP or own checks by industry	single	25g	4826	0	0	0	0
made from pasteurized milk	single	25g	2854	0	0	12	0
- Surveillance - HACCP or own checks by industry	single	25g	299	0	0	0	0
- Surveillance - HACCP or own checks by industry	single	25g	110	0	0	0	0
hard	single	25g	111	0	0	0	0
made from raw or low heat-treated milk	single	25g	209	0	0	0	0
- Surveillance - HACCP or own checks by industry	single	25g	349	0	0	0	0
made from pasteurized milk	single	25g	540	0	0	0	0
- Surveillance - HACCP or own checks by industry	single	25g	11	0	0	0	0
- Surveillance - HACCP or own checks by industry	single	25g	18	0	0	0	0
unspecified	single	25g	838	0	0	0	0
Cheeses made from goats' milk							
soft and semi-soft	single	25g	5	0	0	0	0
made from raw or low heat-treated milk	single	25g	33	0	0	0	0
made from pasteurized milk	single	25g	49	0	0	0	0
- Surveillance - HACCP or own checks by industry	single	25g	50	0	0	0	0
hard	single	25g	35	0	0	0	0

made from raw or low heat-treated milk made from pasteurized milk - Surveillance - HACCP or own checks by industry unspecified	single	25g		1	0	0	0	0
	single	25g		62	0	0	0	0
	single	25g		79	0	0	0	0
	single	25g		62	0	0	0	0
Cheeses made from sheep's milk								
soft and semi-soft made from raw or low heat-treated milk made from pasteurized milk - Surveillance - HACCP or own checks by industry	single	25g		40	0	0	0	0
	single	25g		230	0	0	3	3
	single	25g		233	0	0	1	0
	single	25g		2	0	0	0	0
hard made from raw or low heat-treated milk made from pasteurized milk unspecified - Surveillance - HACCP or own checks by industry	single	25g		38	0	0	0	0
	single	25g		8	0	0	0	0
	single	25g		70	0	0	0	0
	single	25g		665	0	0	8	0
- Surveillance - HACCP or own checks by industry	single	25g		16	0	0	0	0
Dairy products (excluding cheeses)								
butter	single	25g		460	0	0	0	0
	single	25g		63	0	0	0	0
cream	single	25g		101	0	0	0	0
	single	25g		37	0	0	0	0
ice-cream	single	25g		485	0	0	1	1
	single	25g		4	0	0	0	0
(yogurt)	single	25g		45	0	0	0	0
dairy products, not specified	single	25g		21	0	0	0	0
Milk from other animal species or unspecified								
- Surveillance - HACCP or own checks by industry (buffalo)	single	25g		7	0	0	0	0
				1494			0	

Cheeses, made from unspecified milk or other animal milk										
	unspecified	single	25g		982	0	0	0	0	

Footnote

Milk, sheep's, raw: 27 units (official controls) and 12 units (Surveillance - HACCP or own checks by industry) tested with negative results. Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Definition used	Units tested	≤100 cfu/g	>100 cfu/g	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g
Meat from broilers (Gallus gallus)		single	25g		81	0	0	0	0
fresh		single	25g		359	4	1	6	4
meat products									
cooked, ready-to-eat		single	25g		436	6	0	1	1
Meat from pig		single	25g		62	3	0	4	0
fresh		single	25g		916	88	0	52	41
meat products									
cooked, ready-to-eat		single	25g		2826	128	0	93	77
minced meat		single	25g		937	0	0	0	26
meat preparation		single	25g		87	0	0	5	3
Meat from bovine animals									
fresh		single	25g		698	47	0	27	13
meat products									
cooked, ready-to-eat		single	25g		294	56	0	9	8
minced meat		single	25g		391	2	0	9	0
Fish									
smoked		single	25g		263	61	3	25	12
Crustaceans									
unspecified									
cooked		single	25g		71	0	0	0	0
Molluscan shellfish									
cooked		single	25g		80	0	0	0	0
Infant formula		single	25g		12	0	0	0	0
Foodstuffs intended for special nutritional uses (1)		single	25g		2	0	0	0	0
Meat from other animal species or not specified		single	25g		70	0	0	4	0
Meat from sheep									
fresh		single	25g		35	0	0	0	0
meat products									

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cooked, ready-to-eat	single	25g	48	0	0	0	0
Fishery products, unspecified	single	25g	548	0	0	8	0
Other food							
(ready to eat)	single	25g	196	0	0	0	0
Eggs	single	25g	1	0	0	0	0

(1) : for special medical purposes

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.3.3. Listeria in animals

Table Listeria spp. in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria	L. monocytogenes	Listeria spp., unspecified	L. innocua
Cattle (bovine animals)							
dairy cows							
- Monitoring - monitoring survey (unit:sample)		sample	186	0			
- Monitoring - monitoring survey (unit:herd)		herd	8	0			
unspecified (unit:holding)		animal	148	22	1	21	
- Monitoring - monitoring survey		holding	31	1			1
		herd	2	0			
Sheep		animal	24	0			
(unit:holding)		holding	88	1			1
(unit:herd)		herd	15	0			
- Monitoring - monitoring survey		sample	298	1		1	
Goats		animal	74	0			
(unit:holding)		holding	28	0			
(unit:herd)		herd	3	0			
Pigs							
- Monitoring - monitoring survey (unit:holding)		holding	2	0			
- Monitoring - monitoring survey (unit:animal)		animal	89	0			
Gallus gallus (fowl)		animal	7	0			
Buffalos		animal	37	0			
Other animals		animal	69	1		1	
Solipeds, domestic							
horses		sample	8	0			
(unit:herd)		herd	2	0			
- Monitoring - official sampling		sample	41	0			
Dogs		sample	1	0			

Rabbits	sample	1	0			
Pigeons						
- Monitoring - monitoring survey	animal	29	0			
Water buffalos	herd	1	0			

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.4. E. COLI INFECTIONS

2.4.1. General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

Additional information

The disease is notifiable in humans.

The disease is not notifiable in animals.

2.4.2. *Escherichia coli*, pathogenic in foodstuffsTable VT *E.coli* in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for <i>Escherichia coli</i> , pathogenic	<i>E. coli</i> spp., unspecified	Verotoxigenic <i>E. coli</i> (VTEC) - VTEC O157	Verotoxigenic <i>E. coli</i> (VTEC) - VTEC O157:H7
Meat from broilers (<i>Gallus gallus</i>)				0	0	0	0	0
fresh		single	25g	531	0	0	0	0
Meat from turkey				0	0	0	0	0
fresh		single	25g	48	2	2	0	0
Meat from pig		single	25g	30	0	0	0	0
fresh		single	25g	449	0	0	0	0
minced meat								
intended to be eaten raw		single	25g	383	0	0	0	0
meat preparation		single	25g	97	1	0	1	0
meat products		single	25g	13	0	0	0	0
cooked, ready-to-eat		single	25g	9	0	0	0	0
Meat from bovine animals		single	25g	131	0	0	0	0
fresh		single	25g	747	3	0	3	0
minced meat								
intended to be eaten raw		single	25g	404	0	0	0	0
Meat from sheep		single	25g	39	0	0	0	0
fresh		single	25g	95	0	0	0	0
Milk, cows'								
raw		single	25g	115	0	0	0	0
intended for direct human consumption		single	25g	32	0	0	0	0
raw milk for manufacture								
intended for manufacture of raw or low heat-treated products		single	25g	95	0	0	0	0

Milk, goats'							
raw			0	0	0	0	0
intended for direct human consumption	single	25g	204	0	0	0	0
raw milk for manufacture							
intended for manufacture of raw or low heat-treated products	single	25g	32	0	0	0	0
Milk from other animal species or unspecified	single	25g	1038	0	0	0	0
Milk, sheep's	single	25g	10	0	0	0	0
Cheeses made from cows' milk							
unspecified	single	25g	220	1	0	0	1
Cheeses made from goats' milk							
unspecified	single	25g	959	0	0	0	0
Cheeses made from sheep's milk							
unspecified	single	25g	16	0	0	0	0
Cheeses, made from mixed milk from cows, sheep and/or goats							
unspecified	single	25g	456	1	1	0	0
Fishery products, unspecified	single	25g	655	2	2	0	0
Eggs	single	25g	1	0	0	0	0
Other food	single	25g	406	18	18	0	0

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.4.3. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Control program/mechanisms

The control program/strategies in place

The disease in animals is not notifiable and no control programs are in place at national level.

Table VT E.coli in animals

	Source of information	Sampling unit	Units tested	Total units positive for Escherichia coli, pathogenic	E. coli spp., unspecified	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC O157:H7
Cattle (bovine animals)		sample	97	5	5		
calves (under 1 year)		animal	1	0			
(unit:herd)		herd	27	1			1
dairy cows		herd	12	6			6
unspecified		animal	178	16	16		
(unit:holding)		holding	49	0			
Sheep		holding	46	0			
(unit:sample)		sample	272	15	15		
(unit:herd)		herd	17	0			
Goats		animal	20	0			
(unit:holding)		holding	10	0			
(unit:herd)		herd	1	0			
Pigs		holding	63	2	2		
(unit:herd)		herd	1	0			
- Monitoring (research activity)		animal	443	2	2		
Solipeds, domestic		herd	1	0			
(unit:sample)		sample	22	0			
Poultry, unspecified		flock	1	0			
(unit:sample)		sample	46	6	6		
Dogs		animal	31	0			
Cats		animal	6	0			
Rabbits		animal	62	9	9		
Birds							
wild		animal	2	0			
Other animals		animal	10	0			

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.5. TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1. General evaluation of the national situation

A. Tuberculosis General evaluation

Additional information

The disease is notifiable in humans

2.5.2. Mycobacterium in animals

A. Mycobacterium bovis in Bovine Animals

Status as officially free of bovine tuberculosis during the reporting year

Free regions

Those recognized by the European Commission according to community legislation (i.e. Dir. 97/12/EC)

Monitoring system

Sampling strategy

None

Vaccination policy

None

Control program/mechanisms

The control program/strategies in place

All cattle over 6 weeks of age is tested once a year in all the herds officially free; 2 negative testing at a distance of 6 months in order to gain the qualification.

Official post mortem examination is performed in all slaughtered bovine animals with obligatory report to the ASL responsible for the area of provenience of the slaughtered animal, which will take care of an epidemiological investigation at a local level.

Measures in case of the positive findings or single cases

All the positives have to be slaughtered within 30 days, with 2 negative testing at a distance of 42 days one from the other in order to repopulate. No animal movement from and to the holding is allowed until all the animals has resulted negative to the 2 testing above mentioned, with the only exception of the animals going to a slaughter house.

Notification system in place

Each IZS (Istituto Zooprofilattico Sperimentale) is collecting the epidemiological investigation reported by the ASL in case of any positivity in a holding. The format of the investigation is standard and is the same for the whole country.

Results of the investigation

Some of the results of the investigations mentioned above are summarized in Annex VI of Decision 2002/677/EC.

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

The situation appears to be therefore stable with most of the central and northern regions almost

ready for the community qualification as officially free, while the southern regions with some problems in the implementation of the programme at a regional level.

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

Some of the infection in human beings appear to be related to the contact with infected cattle (e.g. people working inside dairy farms).

B. Mycobacterium bovis in farmed deer

Monitoring system

Sampling strategy

None

Vaccination policy

None

Control program/mechanisms

The control program/strategies in place

None

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Goats		animal	2	1	1		
- Monitoring (local programme)		animal	216	0			
(diagnostic activity: unit holding)		holding	1	0			
Pigs		animal	2	0			
(diagnostic activity: unit holding)		holding	3	0			
Badgers		sample	19	2			2
Rabbits		holding	1	0			
Cats		sample	3	0			
Dogs		animal	7	1			1
Wild boars							
- Monitoring (research activity)		animal	11	1			1
- Monitoring (regional plan)		animal	35	11	3		8
(diagnostic activity: unit sample)		sample	37	17			17
(diagnostic activity: unit animal)		animal	51	11			11
Wild animals							
(diagnostic activity: unit sample)		sample	13	1			1
(diagnostic activity: unit animal)		animal	3	1	1		
Other animals		animal	1	0			

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

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

Region	Total number of herds	Total number of herds under the programme	Number of herds checked	Number of positive herds	Number of new positive herds	Number of herds depopulated	% positive herds depopulated	Indicators		
								% herd coverage	% positive herds period prevalence	% new positive herds - herd incidence
Abruzzo	4926	2301	2301	3	3	0	0	100	0.13	0.13
Basilicata	3387	3362	3318	30	25	1	3.333	98.691	0.904	0.753
Provincia Autonoma Bolzano/Bozen (1)	0	0	0	0	0	0	0	0	0	0
Calabria	10438	8419	6640	19	16	0	0	81.245	0.278	0.234
Campania	15877	13037	11432	66	44	10	15.152	87.689	0.577	0.385
Emilia-Romagna	10985	8755	5092	4	4	0	0	58.161	0.079	0.079
Friuli-Venezia Giulia	3281	2335	45	0	0	0	0	1.927	0	0
Lazio	9493	9063	9058	53	23	9	16.981	99.945	0.585	0.254
Liguria	543	336	336	0	0	0	0	100	0	0
Lombardia	23138	8443	5299	4	3	1	25	62.762	0.075	0.057
Marche	5375	2369	2369	2	0	1	50	100	0.084	0
Molise	3533	3211	3211	3	2	0	0	100	0.093	0.062
Piemonte	18875	13669	13669	54	41	9	16.667	100	0.395	0.3
Puglia	5132	5027	4958	38	25	0	0	98.627	0.766	0.504
Sardegna	9800	581	581	4	3	0	0	100	0.688	0.516
Sicilia	12422	11235	11210	743	369	0	0	99.777	6.628	3.292
Toscana	4088	1943	1943	1	0	0	0	100	0.051	0
Provincia Autonoma Trento (2)	0	0	0	0	0	0	0	0	0	0
Umbria	4926	2301	2301	3	3	0	0	100	0.13	0.13
Valle d'Aosta/Vallée d'Aoste	1418	1418	1289	27	20	2	7.407	90.903	2.095	1.552

Veneto	20799	4969	4969	5	5	3	60	100	0.101	0.101
Total	168436	102774	90221	1059	586	36	3.399	87786	1.174	0.65
Total - 1										

(1) : O.F.
(2) : O.F.

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

Region	Total number of animals	Number of animals to be tested under the programme	Number of animals tested	Number of animals tested individually	Number of new positive animals	Slaughtering		Indicators	
						Number of animals with positive result slaughtered or culled	Total number of animals slaughtered	% coverage at animal level	% positive animals - animal prevalence
Abruzzo	70298	52338	52338	52736	1	1	1	100	0.002
Basilicata	87321	86621	86181	86181	232	138	153	99.492	0.269
Provincia Autonoma Bolzano/Bozen (1)	0	0	0	0	0	0	0	0	0
Calabria	147091	132451	116633	98396	310	286	286	88.057	0.266
Campania	222926	209936	190020	190020	578	578	917	90.513	0.304
Emilia-Romagna	610600	528170	274580	277812	23	23	23	51.987	0.008
Friuli-Venezia Giulia	102264	63729	2219	722	0	0	0	3.482	0
Lazio	271551	227507	227507	239416	404	277	340	100	0.178
Liguria	4222	3490	3342	3342	0	0	0	95.759	0
Lombardia	1587306	1158154	599505	589505	396	395	1619	50.9	0.067
Marche	59558	49598	49598	54296	21	19	76	100	0.042
Molise	47961	45571	45571	45571	14	12	12	100	0.031
Piemonte	835437	601426	590525	590525	825	726	856	98.187	0.14
Puglia	183807	182654	180423	180333	202	202	202	98.779	0.112
Sardegna	272781	52391	52391	52391	20	20	20	100	0.038
Sicilia	407619	389805	389153	389153	4675	4675	4713	99.833	1.201
Toscana	69317	44329	44329	52432	11	11	11	100	0.025
Provincia Autonoma Trento (2)	0	0	0	0	0	0	0	0	0
Umbria	70298	52338	52338	52736	1	1	1	100	0.002

Valle d'Aosta/Vallée d'Aoste	55588		55588	27550	31408	317	314	346	49561	1.151
Veneto	926907		179986	179986	179986	93	93	232	100	0.052
Total	6032852		4116082	3154189	3166961	8123	7771	9808	76.631	0.258
Total - 1										

(1) : O.F.

(2) : O.F.

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

Region		Status of herds and animals under the programme													
		Total number of herds and animals under the programme		Unknown		Not free or not officially free				Free or officially free suspended		Free		Officially free	
						Last check positive		Last check negative							
		Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals
Abruzzo		2301	52338	0	0	1	27	1	15	1	60			2298	52236
Basilicata		3362	86657	13	210	11	345	47	712	0	0			3291	85390
Provincia Autonoma Bolzano/Bozen (1)		0	0	0	0	0	0	0	0	0	0			0	0
Calabria		8367	132255	1327	13876	15	432	1601	21249	0	0			5424	96698
Campania		12998	211779	1599	16388	39	726	209	4405	4	75			11147	191587
Emilia-Romagna		8755	528170	0	0	0	0	1	46	0	0			8754	528124
Friuli-Venezia Giulia		2335	63729	0	0	0	0	0	0	0	0			2335	63729
Lazio		9063	231379	5	218	16	698	24	546	0	0			9018	229917
Liguria		336	3490	0	0	0	0	0	0	0	0			336	3490
Lombardia		8443	991427	0	0	1	1607	0	0	0	0			8442	989820
Marche		2369	49598	0	0	1	76	0	0	1	47			2367	49475
Molise		3211	45571	0	0	3	134	0	0	0	0			3208	45437
Piemonte		13669	601426	0	0	17	936	6	319	9	796			13637	599375
Puglia		5027	182654	69	2231	12	690	20	1652	0	0			4926	178081
Sardegna		581	52391	0	0	3	57	0	0	0	0			578	52334
Sicilia		11235	389805	25	652	425	22767	1223	43465	39	1506			9523	321415
Toscana		1943	44329	0	0	0	0	0	0	1	2			1942	44327
Provincia Autonoma Trento (2)		0	0	0	0	0	0	0	0	0	0			0	0
Umbria		2301	52338	0	0	1	27	1	15	1	60			2298	52236

Valle d'Aosta/Vallée d'Aoste	1418	45574	129	8583	28	1006	23	268	38	1668					1163	34049
Veneto	4969	179986	0	0	0	0	3	62	0	0					4966	179924
Total	102683	3944896	3167	42158	573	29528	3159	72754	94	4214	0	0			95653	3797644
Total - 1																

(1) : O.F.
(2) : O.F.

2.6. BRUCELLOSIS

2.6.1. General evaluation of the national situation

A. Brucellosis General evaluation

Additional information

The disease is notifiable in humans.

2.6.2. Brucella in foodstuffs

Table Brucella in food

	Source of information	Sampling unit	Units tested	Total units positive for Brucella	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Milk, cows'								
raw		single	615	0	0	0	0	0
intended for direct human consumption		single	1	0	0	0	0	0
raw milk for manufacture								
intended for manufacture of raw or low heat-treated products		single	1482	0	0	0	0	0
intended for manufacture of pasteurised/UHT products		single	8	0	0	0	0	0
pasteurised milk		single	22	0	0	0	0	0
Milk, goats'								
raw		single	8	0	0	0	0	0
intended for direct human consumption		single	0	0	0	0	0	0
raw milk for manufacture								
intended for manufacture of raw or low heat-treated products		single	5	0	0	0	0	0
intended for manufacture of pasteurised/UHT products		single	0	0	0	0	0	0
pasteurised		single	0	0	0	0	0	0
Milk, sheep's								
raw		single	309	7	0	0	0	7
raw milk for manufacture								
intended for manufacture of raw or low heat-treated products		single	0	0	0	0	0	0
intended for manufacture of pasteurised/UHT products		single	2	0	0	0	0	0
Cheeses made from cows' milk		single	36	0	0	0	0	0

Italy 2005 Report on trends and sources of zoonoses

soft and semi-soft made from raw or low heat-treated milk	single	109	0	0	0	0	0
	single	195	0	0	0	0	0
Cheeses made from goats' milk	single	1	0	0	0	0	0
soft and semi-soft made from raw or low heat-treated milk	single	0	0	0	0	0	0
	single	1	0	0	0	0	0
Cheeses made from sheep's milk	single	366	1	0	0	0	1
soft and semi-soft made from raw or low heat-treated milk	single	76	2	2	0	0	0
	single	23	0	0	0	0	0
Milk from other animal species or unspecified raw	single	932	7	0	0	0	7
(buffalo)	single	31	0	0	0	0	0
Cheeses, made from unspecified milk or other animal milk							
(buffalo) (1)	single	547	0	0	0	0	0
unspecified	single	917	11	0	0	0	11

(1) : mozzarella

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.6.3. Brucella in animals

A. Brucella abortus in Bovine Animals

Status as officially free of bovine brucellosis during the reporting year

Free regions

Those recognized by the European Commission according to community legislation (i.e. Dir. 97/12/EC).

Monitoring system

Sampling strategy

None

Vaccination policy

Vaccination policy is in place in the area of Monti Nebrodi (Messina - Sicily), with RB 51. A special plan for the eradication of bovine brucellosis has been approved just in the area above mentioned and for buffaloes only in the area of Caserta (Campania) with RB 51 and Buck 19.

Control program/mechanisms

The control program/strategies in place

All cattle over 12 months of age is tested twice a year in all the herds officially free with CFT (complement fixation test) to be executed in case of positive RBT (rose bengal test). Notification of cases of abortion is mandatory with isolation of Br. species to be performed.

Measures in case of the positive findings or single cases

All the positive cattle has to be slaughtered within 30 days, with 2 negative testing at a distance of 42 days one from the other in order to repopulate and 2 negative testing at a distance of 6 months (4-8 months) in order to re-gain the qualification of holding officially free (according to national and community legislation). No animal movement from and to the holding is allowed until all the animals has resulted negative to the 2 testing above mentioned, with the only exception of the animals going to a slaughter house.

Notification system in place

Each IZS (Istituto Zooprofilattico Sperimentale) is collecting the epidemiological investigation reported by the ASL in case of any positivity in a holding. The format of the investigation is standard and is the same for the whole country.

Results of the investigation

Some of the results of the investigations mentioned above are summarized in Annex VI of Decision 2002/677/EC.

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

The situation appears to be therefore stable with most of the central and northern regions almost ready for the community qualification as officially free, while the southern regions with some problems in the implementation of the programme at a regional level.

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

Some of the infections in human beings appear to be caused by consumption of cheese not well seasoned and contact with placenta of infected animals (e.g. veterinarians).

B. Brucella melitensis in Sheep

Status as officially free of ovine brucellosis during the reporting year

Free regions

Those recognized by the European Commission according to community legislation (i.e. Dir. 91/68/EEC).

Monitoring system

Sampling strategy

Confidence 99 % and prevalence 0,2 %, in Sardegna only as officially free according to community legislation

Frequency of the sampling

Once a year

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Each year a number of holdings is selected randomly from all those present in Sardegna in order to guarantee with a confidence of 99% that the prevalence of the disease is below 0,2% or, in other words, the number of officially free holdings is at least 99,8%. Inside each selected holding a sample of animals is tested, between all those with at least 6 months of age, so that the prevalence of the disease is below 2% with a confidence of 99%.

Case definition

All those from which Br. Melitensis has been isolated, according to Dir. 91/68/EEC

Diagnostic/analytical methods used

RBT and CFT; in case of positivity to RBT and CFT isolation of Br. melitensis.

Vaccination policy

With REV1 in Sicily, according to a special plan specifically approved.

Control program/mechanisms

The control program/strategies in place

All sheep and goats over 6 months are tested twice a year in all the herds officially free.

Measures in case of the positive findings or single cases

All the positive sheep and goats have to be slaughtered within 30 days, with 1 negative testing at a distance of 42 days in order to repopulate and another negative testing at a distance of 6 months in order to re-gain the qualification.

Notification system in place

Each IZS (Istituto Zooprofilattico Sperimentale) is collecting the epidemiological investigation reported by the ASL in case of any positivity in a holding. The format of the investigation is standard and is the same for the whole country.

Results of the investigation

Some of the results of the investigations mentioned above are summarized in Annex VI of Decision 2002/677/EC.

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

Some of the infections in human beings appear to be caused by consumption of cheese not seasoned for long and contact with placentae of infected animals (e.g. veterinarians).

C. Brucella melitensis in Goat

Status as officially free of caprine brucellosis during the reporting year

Additional information

For the information concerning Goats, please refer to brucellosis in sheep, as the program of control is the same for sheep and goats.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Pigs		animal	124	0				
- Monitoring - monitoring survey		sample	31	0				
- Monitoring - official sampling		sample	1	0				
Other animals								
- Monitoring - monitoring survey (unit holding)		holding	2	0				
- Monitoring - monitoring survey (unit animal)		animal	11	2				2
Solipeds, domestic								
horses		sample	2	0				
Dogs								
- Monitoring - monitoring survey (unit sample)		sample	193	31				31
- Monitoring - monitoring survey (unit: animal)		animal	1	0				
Wolves		sample	20	1				1
Wild boars		animal	8	0				
- Monitoring (research activity)		animal	118	3				3
(unit sample)		sample	16	3				3
Foxes		sample	7	0				
- Monitoring (research activity)		animal	1	0				
Deer		sample	12	1				1
- Monitoring (research activity)		animal	16	0				
wild roe deer								
- Monitoring (research activity)		animal	73	0				
Wild animals		sample	25	1				1
- Monitoring (research activity:steinbock)		animal	2	0				
Hares		animal	6	0				

- Monitoring - official sampling	sample	4	0					
Alpine chamois								
- Monitoring (research activity)	animal	53	0					

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

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

Region	Total number of herds	Total number of herds under the programme	Number of herds checked	Number of positive herds	Number of new positive herds	Number of herds depopulated	% positive herds depopulated	Indicators		
								% herd coverage	% positive herds period prevalence	% new positive herds - herd incidence
Abruzzo	5289	4656	4221	8	3	0	0	90.657	0.19	0.071
Basilicata	3376	3344	3309	68	42	7	10.294	98.953	2.055	1.269
Provincia Autonoma Bolzano/Bozen (1)	0	0	0	0	0	0	0	0	0	0
Calabria	10438	8411	6852	352	151	5	1.42	81.465	5.137	2.204
Campania	15877	12874	11648	198	137	8	4.04	90.477	1.7	1.176
Emilia-Romagna	0	0	0	0	0	0	0	0	0	0
Friuli-Venezia Giulia	3281	2335	2335	1	1	0	0	100	0.043	0.043
Lazio	9493	9063	9058	25	8	0	0	99.945	0.276	0.088
Liguria	543	336	336	0	0	0	0	100	0	0
Lombardia	1099	650	568	0	0	0	0	87.385	0	0
Marche	5375	2329	2329	0	0	0	0	100	0	0
Molise	3533	3121	3121	6	4	0	0	100	0.192	0.128
Piemonte	18875	13669	13662	0	0	0	0	99.949	0	0
Puglia	5132	4994	4920	131	47	8	6.107	98.518	2.663	0.955
Sardegna (2)	0	0	0	0	0	0	0	0	0	0
Sicilia	12422	11235	11213	1050	665	1	0.095	99.804	9.364	5.931
Toscana	2011	1104	1103	0	0	0	0	99.909	0	0
Provincia Autonoma Trento (3)	0	0	0	0	0	0	0	0	0	0
Umbria (4)	0	0	0	0	0	0	0	0	0	0
Valle d'Aosta/Vallée d'Aoste	1418	1418	1344	25	12	1	4	94.781	1.86	0.893

Veneto	20799	9934	9934	0	0	0	0	0	0	0	0	0
Total	118961	89473	85953	1864	1070	30	1.609	96.066	2.169		1.245	
Total - 1												

(1) : O.F.
(2) : O.F.
(3) : O.F.
(4) : O.F.

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

Region	Total number of animals	Number of animals to be tested under the programme	Number of animals tested	Number of animals tested individually	Number of new positive animals	Slaughtering		Indicators	
						Number of animals with positive result slaughtered or culled	Total number of animals slaughtered	% coverage at animal level	% positive animals - animal prevalence
Abruzzo	73940	49943	47284	48089	32	29	7	94.676	0.068
Basilicata	76513	69370	68668	68668	547	489	635	98.988	0.797
Provincia Autonoma Bolzano/Bozen (1)	0	0	0	0	0	0	0	0	0
Calabria	143347	113562	102579	102579	1683	1630	1688	90.329	1.641
Campania	222926	156857	143114	143114	981	1014	1202	91.239	0.685
Emilia-Romagna (2)	0	0	0	0	0	0	0	0	0
Friuli-Venezia Giulia	102264	63729	63729	63729	1	1	1	100	0.002
Lazio	271551	193143	192956	203144	81	81	86	99.903	0.042
Liguria	4222	2437	2437	2498	0	0	0	100	0
Lombardia	92765	67055	63817	33671	0	0	0	95.171	0
Marche	59776	34614	34614	36605	0	0	0	100	0
Molise	47961	29477	29477	29477	28	27	27	100	0.095
Piemonte	835437	451299	420797	404122	82	17	17	93.241	0.019
Puglia	183807	138344	136999	136999	684	684	773	99.028	0.499
Sardegna (3)	0	0	0	0	0	0	0	0	0
Sicilia	407619	293598	293257	293257	5370	5170	5198	99.884	1.831
Toscana	35416	18962	18949	22294	0	0	0	99.931	0
Provincia Autonoma Trento (4)	0	0	0	0	0	0	0	0	0
Umbria (5)	0	0	0	0	0	0	0	0	0

Valle d'Aosta/Vallée d'Aoste	55588	30703	30358	31507	15	15	42	98.876	0.049
Veneto	926907	279215	279215	92897	0	0	0	100	0
Total	3540039	1992303	1928250	1713050	9504	9157	9676	96.785	0.493
Total - 1									

(1) : O.F.
(2) : O.F.
(3) : O.F.
(4) : O.F.
(5) : O.F.

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

Region		Status of herds and animals under the programme													
		Total number of herds and animals under the programme		Unknown		Not free or not officially free				Free or officially free suspended		Free		Officially free	
						Last check positive		Last check negative		Herds	Animals	Herds	Animals		
Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals
Abruzzo	4656	49943	435	2659	4	81	1	15	3	140		4213		47252	
Basilicata	3344	69370	8	180	44	2740	95	5942	0	0		3197		60508	
Provincia Autonoma Bolzano/Bozen (1)	0	0	0	0	0	0	0	0	0	0		0		0	
Calabria	8411	113562	1468	12798	235	5072	2025	22965	0	0		4689		72717	
Campania	12874	156857	1225	13193	82	2848	2284	35419	5	144		9212		137268	
Emilia-Romagna (2)	0	0	0	0	0	0	0	0	0	0		0		0	
Friuli-Venezia Giulia	2335	63729	0	0	0	0	0	0	1	32		2334		63697	
Lazio	9063	193143	5	187	8	538	7	273	3	63		9039		192082	
Liguria	336	2437	0	0	0	0	0	0	0	0		336		3490	
Lombardia	650	67055	82	3238	0	0	0	0	0	0		568		63817	
Marche	2329	34614	0	0	0	0	0	0	0	0		2329		34614	
Molise	3121	29477	0	0	3	58	3	36	0	0		3115		29383	
Piemonte	13669	451299	2	30502	0	0	0	0	5	269		13664		451030	
Puglia	4994	138344	74	1345	50	3726	68	3481	2	12		4800		129780	
Sardegna (3)	0	0	0	0	0	0	0	0	0	0		0		0	
Sicilia	11235	293598	22	341	495	18553	1506	45575	4	150		9208		228979	
Toscana	1104	18962	1	13	0	0	0	0	0	0		1103		18949	
Provincia Autonoma Trento (4)	0	0	0	0	0	0	0	0	0	0		0		0	
Umbria (5)	0	0	0	0	0	0	0	0	0	0		0		0	

Valle d'Aosta/Vallée d'Aoste	1418	30703	74	345	10	505	52	858	16	689				1185	35340
Veneto	9934	279215	0	0	0	0	0	0	0	0				9934	279215
Total	89473	1992308	3396	64801	931	34121	6041	114564	39	1499	0	0	0	78926	1848121
Total - 1															

- (1) : O.F.
- (2) : O.F.
- (3) : O.F.
- (4) : O.F.
- (5) : O.F.

Table Ovine or Caprine brucellosis - data on herds - Community co-financed eradication programmes

Region	Total number of herds	Total number of herds under the programme	Number of herds checked	Number of positive herds	Number of new positive herds	Number of herds depopulated	% positive herds depopulated	Indicators		
								% herd coverage	% positive herds period prevalence	% new positive herds - herd incidence
Abruzzo	7402	7338	5739	7	2	1	14.286	78.209	0.122	0.035
Basilicata	6583	6303	5843	37	19	6	16.216	92.702	0.633	0.325
Provincia Autonoma Bolzano/Bozen (1)	0	0	0	0	0	0	0	0	0	0
Calabria	8740	8453	7494	552	143	5	0.906	88.655	7.366	1.908
Campania	8988	8899	7319	193	121	27	13.99	82.245	2.637	1.653
Emilia-Romagna	2796	2752	2594	1	1	1	100	94.259	0.039	0.039
Friuli-Venezia Giulia	332	332	332	0	0	0	0	100	0	0
Lazio	5494	5494	3994	10	1	4	40	72.697	0.25	0.025
Liguria	761	761	740	1	1	0	0	97.24	0.135	0.135
Lombardia (2)	0	0	0	0	0	0	0	0	0	0
Marche	3715	3389	3388	0	0	0	0	99.97	0	0
Molise	3266	3266	3167	1	1	0	0	96.969	0.032	0.032
Piemonte	7846	7755	7725	0	0	0	0	99.613	0	0
Puglia	4052	4033	3912	197	92	25	12.69	97	5.036	2.352
Sardegna (3)	0	0	0	0	0	0	0	0	0	0
Sicilia	9162	8927	8898	1368	527	8	0.585	99.675	15.374	5.923
Toscana (4)	0	0	0	0	0	0	0	0	0	0
Provincia Autonoma Trento (5)	0	0	0	0	0	0	0	0	0	0
Umbria (6)	0	0	0	0	0	0	0	0	0	0
Valle d'Aosta/Vallée d'Aoste	804	804	625	0	0	0	0	77.736	0	0

Veneto	1578	1578	1534	0	0	0	0	0	97212	0	0	0
Total	71519	70084	63304	2367	908	77	3253	90326	3739	1434		
Total - 1												

(1) : O.F.
(2) : O.F.
(3) : O.F.
(4) : O.F.
(5) : O.F.
(6) : O.F.

Table Ovine or Caprine brucellosis - data on animals - Community co-financed eradication programmes

Region	Total number of animals	Number of animals to be tested under the programme	Number of animals tested	Number of animals tested individually	Number of new positive animals	Slaughtering		Indicators	
						Number of animals with positive result slaughtered or culled	Total number of animals slaughtered	% coverage at animal level	% positive animals - animal prevalence
Abruzzo	267845	253249	207981	209954	498	498	173	82.125	0.239
Basilicata	401209	379751	331534	260689	362	115	745	87.303	0.109
Provincia Autonoma Bolzano/Bozen (1)	0	0	0	0	0	0	0	0	0
Calabria	509170	503972	452106	393306	13690	13447	13864	89.709	3.028
Campania	317186	285872	258586	245847	5823	5403	7886	90.455	2.252
Emilia-Romagna	85685	78365	74113	74113	195	195	290	94.574	0.263
Friuli-Venezia Giulia	11606	6849	6849	6849	0	0	0	100	0
Lazio	745317	692389	327704	196663	369	369	524	47.329	0.113
Liguria	6357	6357	5639	5686	2	0	0	88.705	0.035
Lombardia (2)	0	0	0	0	0	0	0	0	0
Marche	164813	161331	161281	163190	3	2	2	99.969	0.002
Molise	97020	96824	95481	95481	1	1	1	98.511	0.001
Piemonte	169455	153977	153795	130711	22	10	10	99.882	0.014
Puglia	415118	410685	394344	320410	6810	6807	9268	96.021	1.727
Sardegna (3)	0	0	0	0	0	0	0	0	0
Sicilia	1060611	983061	978578	978578	77342	75273	75463	99.544	7.904
Toscana (4)	0	0	0	0	0	0	0	0	0
Provincia Autonoma Trento (5)	0	0	0	0	0	0	0	0	0
Umbria (6)	0	0	0	0	0	0	0	0	0

Valle d'Aosta/Vallée d'Aoste	9838	9838	6416	6699	0	0	0	0	65.217	0
Veneto	47590	44264	43376	43376	0	0	0	0	97.994	0
Total	4308820	4066884	3497783	3131552	105117	102120	108226		86.006	3.005
Total - 1										

- (1) : O.F.
- (2) : O.F.
- (3) : O.F.
- (4) : O.F.
- (5) : O.F.
- (6) : O.F.

Table Ovine or Caprine brucellosis - data on status of herds at the end of the period - Community co-financed eradication programmes

Region		Status of herds and animals under the programme													
		Total number of herds and animals under the programme		Unknown		Not free or not officially free				Free or officially free suspended		Free		Officially free	
						Last check positive		Last check negative		Herds	Animals	Herds	Animals	Herds	Animals
		Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals	Herds	Animals
	Lombardia (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Abruzzo	8393	301565	1599	49364	4	1743	312	3274	5	1795		6473	245389	
	Basilicata	6303	379751	127	3506	22	1964	365	5257	0	0		5789	369024	
	Provincia Autonoma Bolzano/Bozen (2)	0	0	0	0	0	0	0	0	0	0		0	0	
	Calabria	8453	503638	550	49243	479	24631	1363	81483	0	0		6061	348281	
	Campania	8901	307677	1579	30423	105	14293	256	13030	0	0		6952	247789	
	Emilia-Romagna	2903	82596	158	4252	0	0	80	602	0	0		2665	77742	
	Friuli-Venezia Giulia	332	6849	0	0	0	0	0	0	0	0		332	6849	
	Lazio	5493	341187	1500	11516	1	409	3	494	0	0		3989	328768	
	Liguria	782	6395	21	28	0	0	21	28	0	0		740	6329	
	Marche	3931	161325	0	0	0	0	7	58	0	0		3384	161267	
	Molise	3266	96924	99	1443	1	27	0	0	0	0		3166	95454	
	Piemonte	7785	154159	30	182	0	0	0	0	0	0		7755	153977	
	Puglia	4033	410685	121	16341	95	21807	40	8307	4	890		3773	363340	
	Sardegna (3)	0	175	3797	175	0	0	0	0	0	0		0	0	
	Sicilia	8927	983061	29	4483	1015	151183	1219	136640	368	44324		6296	646431	
	Toscana (4)	0	0	0	0	0	0	0	0	0	0		0	0	
	Provincia Autonoma Trento (5)	0	0	0	0	0	0	0	0	0	0		0	0	
	Umbria (6)	0	0	0	0	0	0	0	0	0	0		0	0	

Valle d'Aosta/Vallée d'Aoste	650	7261	179	578	0	0	0	18	168	0	0			453	6515
Veneto	1578	44264	44	888	0	0	0	0	0		0			1534	43376
Total	71730	3787502	9833	172422	1722	216057	3684	249341	377	47009	0	0		59362	3100531
Total - 1															

- (1) : O.F.
- (2) : O.F.
- (3) : O.F.
- (4) : O.F.
- (5) : O.F.
- (6) : O.F.

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

Additional information

The disease is not notifiable in animals

The disease is notifiable in humans

2.7.2. Yersinia in foodstuffs

Table Yersinia spp. in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Yersinia	Y. enterocolitica	Yersinia unspecified	Y. enterocolitica - Y. enterocolitica O:3	Y. enterocolitica - Y. enterocolitica O:9
Meat from pig		single	25g	10	0	0	0	0	0
fresh		single	25g	250	3	3	0	0	0
minced meat		single	25g	161	0	0	0	0	0
meat products		single	25g	197	12	11	1	0	0
Meat from bovine animals									
fresh		single	25g	207	3	1	2	0	0
minced meat		single	25g	101	1	0	1	0	0
meat products		single	25g	79	0	0	0	0	0
Meat from sheep									
fresh		single	25g	17	0	0	0	0	0
		single	25g	29	0	0	0	0	0
Milk, cows'									
raw		single	25g	323	0	0	0	0	0
intended for direct human consumption		single	25g	4	0	0	0	0	0
raw milk for manufacture									
intended for manufacture of raw or low heat-treated products		single	25g	28	0	0	0	0	0
Milk, goats'									
raw		single	25g	35	0	0	0	0	0
intended for direct human consumption		single	25g	3	0	0	0	0	0
raw milk for manufacture									
intended for manufacture of raw or low heat-treated products		single	25g	35	0	0	0	0	0
Meat from other animal species or not specified		single	25g	32	2	2	0	0	0
fresh		single	25g	36	0	0	0	0	0
Meat from rabbit		single	25g	5	0	0	0	0	0

Meat from broilers (Gallus gallus)	single	25g	31	0	0	0	0	0
Meat from horse	single	25g	86	0	0	0	0	0
Dairy products (excluding cheeses)								
dairy products, not specified	single	25g	6	0	0	0	0	0
Fishery products, unspecified	single	25g	10	1	1	0	0	0
Other food			91	0				

Footnote

Data refer to official controls in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.7.3. Yersinia in animals

A. Yersinia enterocolitica in pigs

Control program/mechanisms

The control program/strategies in place

The disease in animals is not notifiable and no control programs are in place at national level.

Table Yersinia spp. in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia	Y. enterocolitica	Yersinia unspecified	Y. enterocolitica - Y. enterocolitica O:9	Y. enterocolitica - Y. enterocolitica O:3
Cattle (bovine animals)		animal	107	28	13	2	14	
- Monitoring - monitoring survey (unit:sample)		sample	32	2		2		
- Monitoring - monitoring survey (unit:holding)		holding	7	0				
- Monitoring - monitoring survey (unit:herd)		herd	30	1		1		
- Monitoring (research activity)		animal	109	18	6	4	8	
Sheep		animal	5	0				
- Monitoring - monitoring survey (unit:sample)		sample	37	20		20		
- Monitoring - monitoring survey (unit:holding)		holding	4	0				
- Monitoring - monitoring survey (unit:herd)		herd	6	0				
Goats		animal	4	0				
(unit:holding)		holding	3	0				
- Monitoring - monitoring survey		herd	3	0				
Pigs		animal	181	18	5	13		
(unit:herd)		herd	18	0				
Cats								
- Monitoring - monitoring survey		animal	1	1			1	
Other poultry								
- Monitoring - monitoring survey		holding	1	1			1	
Other animals								
- Monitoring - monitoring survey		animal	328	51	5	44	2	
Hares		animal	21	9	1	8		
Birds								

wild		sample	24	2	2			
Rabbits		holding	2	0				

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples. The number of serotypes is greater than the total number of positive units because in a single unit more serotypes may be present.

2.8. TRICHINELLOSIS**2.8.1. General evaluation of the national situation****2.8.2. Trichinella in animals****Table Trichinella in animals**

	Source of information	Sampling unit	Units tested	Total animals positive for Trichinella	T. spiralis	Trichinella spp., unspecified
Pigs		animal	555370	0	0	0
fattening pigs						
raised under controlled housing conditions in integrated production system		animal	950308	0	0	0
not raised under controlled housing conditions in integrated production system		animal	3230934	0	0	0
breeding animals						
unspecified						
sows and boars		animal	3123	1	0	1
Solipeds, domestic						
horses		animal	16444	0	0	0
donkeys		animal	1	0	0	0
Wild boars		animal	1069	0	0	0
wild		animal	18986	0	0	0
farmed		animal	432	0	0	0

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.9. ECHINOCOCCOSIS

2.9.1. General evaluation of the national situation

A. Echinococcus spp general evaluation

History of the disease and/or infection in the country

Echinococcosis is a compulsory notifiable disease. All slaughtered animals shall be inspected for evidence of hydatid cysts, according to the Directive 64/433/EEC. Specific national control planes for echinococcosis in dogs are not in place.

Additional information

The disease is notifiable in humans

2.9.2. Echinococcus in animals**Table Echinococcus spp. 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)		animal	719608	1745	0	0	1745
Sheep		animal	349529	3904	0	0	3904
Goats		animal	13284	204	0	0	204
Pigs		animal	4579728	812	0	0	812
Solipeds, domestic		animal	42232	20	0	0	20
Sheep and goats		animal	147106	2854	0	0	2854

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.10. TOXOPLASMOSIS

2.10.1. General evaluation of the national situation

A. Toxoplasmosis general evaluation

History of the disease and/or infection in the country

The disease in animals is not notifiable and no control programs are in place at national level.

Additional information

The disease is notifiable in humans

2.10.2. Toxoplasma in animals**Table Toxoplasma in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma
Cattle (bovine animals)		holding	32	0
- Monitoring - monitoring survey		animal	47	17
Sheep		holding	116	42
(unit:sample)		sample	1441	624
- Monitoring - monitoring survey		animal	2016	859
Goats		holding	22	1
(unit:sample)		sample	14	8
- Monitoring - monitoring survey		animal	531	102
Pigs				
- Monitoring - monitoring survey		animal	31	0
Dogs				
- Monitoring - monitoring survey		animal	171	76
Cats				
- Monitoring - monitoring survey		animal	72	16
Other animals				
- Monitoring - monitoring survey		animal	7	2
Hares		animal	8	1
Rabbits		animal	85	3
Buffalos		holding	2	1
Pigeons				
- Monitoring - monitoring survey		animal	311	198

Footnote

Data refer to diagnostic activity in case it is not specified differently. Sources of information are Regional Veterinary Services and Istituti Zooprofilattici Sperimentali, which are the institutes in charge of testing the official samples.

2.11. RABIES

2.11.1. General evaluation of the national situation

A. Rabies General evaluation

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

No cases of rabies have been recorded in Italy since December 1995.

Additional information

The disease is notifiable in humans

2.11.2. Lyssavirus (rabies) in animals

A. Rabies in dogs

Monitoring system

Diagnostic/analytical methods used

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

Vaccination policy

In order to control the appearing and spreading of the disease, a vaccination campaign in foxes is in force in the Region Friuli Venezia Giulia, owing to the epidemiologic situation of the neighbouring countries, Austria, Slovenia and Croatia.

Other preventive measures than vaccination in place

- a surveillance programme on wildlife and an intense reduction of fox density have been implemented;
- stray dogs are captured;
- waste sites are controlled to reduce food availability to wild and domestic stray animals.

Notification system in place

Rabies is a compulsory notifiable disease in dogs and in any other animal.

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	unspecified lyssavirus
Dogs		animal	369	0	
Cats		animal	218	0	
Bats					
wild		animal	7	0	
Foxes					
wild		animal	2857	0	
Wolves					
wild		animal	1	0	
Badgers					
wild		animal	144	0	
Marten					
wild		animal	195	0	
Wild boars					
wild		animal	4	0	
Deer					
wild					
roe deer		animal	44	0	
Rodents		animal	27	0	
Other mustelides		animal	107	0	
Other animals		animal	16	0	

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 All animals - Monitoring (Veneto Region - Cattle, Gallus gallus, 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																																						
All animals - Monitoring (Veneto Region - Cattle, Gallus gallus, Turkeys)																																						
Isolates out of a monitoring programme	yes																																					
Number of isolates available in the laboratory	124																																					
Antimicrobials:	N																																					
Tetracyclines	124	83	80	1	1										1								1	5	9	11	6	4	4	1								
Amphenicols	124	21	10	1	3	4	3															1	1	10	16	10	13	24	11	8	7	2						
Cephalosporins	124	1	1																																			
Cefazolin	124	0																	1	2	4	4	7	16	18	26	19	11	11	3	1							
Cefotaxim(3)	124																		1															1		4	8	
Fluoroquinolones	124	14	11		1										1			1																				
Enrofloxacin(1)	124																																					
Quinolones	124	47	45																																			
Nalidixic acid	124																																					
Aminoglycosides	124	41	28		2	5	2	4	2	2	3	6	4	11	16	10	14	6	8																			
Streptomycin	124	2			1									1																								
Gentamicin	124	6	6														1	3	5	15	23	33	22	10	3	2												
Kanamycin	124																																					
Trimethoprim + sulfonamides(2)	124	31	31					2	2	2	6	2		1	1	3	4		1	2	6	3	1	5	6	5	14	9	8	4	3	1						

(1) : Other values: 36: 8 isolates; 37: 9 isolates; 38: 3 isolates; 39: 4 isolates; 40: 1 isolate.

(2) : Other values: 36: 2 isolates

(3) : Other values: 36: 14 isolates; 37: 22 isolates; 38: 17 isolates; 39: 24 isolates; 40: 16 isolates; 41: 9 isolates; 42: 3 isolates; 43: 3 isolates; 44: 1 isolate.

Table Antimicrobial susceptibility testing of *E. coli* in *Gallus gallus* (fowl) - 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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Antimicrobials:	N		55	53	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1</

(1) : Other values: 36: 6 isolates; 37: 9 isolates; 38: 3 isolates; 40: 22 isolates.

(2) : Other values: 36: 3 isolates

(3) : Other values: 36: 15 isolates; 37: 11 isolates; 38: 2 isolates; 40: 9 isolates.

Footnote

Data Source: NRC-ANTI

Table Antimicrobial susceptibility testing of E. coli in Cattle (bovine animals) - 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																																							
E. coli																																							
Cattle (bovine animals) - Monitoring																																							
Isolates out of a monitoring programme		yes																																					
Number of isolates available in the laboratory		341																																					
Antimicrobials:		N	1	2	3	4	5	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		341	152	131	1	3												1			2	5	8	13	27	28	37	33	16	11	6	1	1						
Amphenicols																																							
Chloramphenicol		341	62	60								1		1		1	1						7	12	10	15	32	29	47	48	34	20	10	8	2	1	1		
Cephalosporins																																							
Cefazolin		338	2	2																	4	10	17	29	43	68	92	38	21	9	3	1	1						
Cefotaxim(4)		341	2	1								1													2	1		5	4	10	18	19	35	37	40	34	35		
Fluoroquinolones																																							
Ciprofloxacin(1)		137	1	1																									1	3	3	4	8	6	9	10	7	8	
Enrofloxacin(2)		204	7	7												8			4	4				4	1	1	6	11	11	9	18	31	18	23	22	8	8	7	
Quinolones																																							
Nalidixic acid		318	45	42										1							3	4	12	21	35	46	49	41	32	14	13	1	1	1					
Aminoglycosides																																							
Streptomycin		341	128	99							4	5	15	5	7	8	10	36	54	33	26	19	10	6	2	2													
Gentamicin		341	29	12						2		5	4	6	2	5	1	4	7	4	18	29	41	54	35	45	29	20	9	3	1	1	1	1	1	1			
Kanamycin		341	107	60								1		1	1	1	2		1	4	13	26	25	25	45	50	38	22	16	5	3	2	1						
Trimethoprim + sulfonamides(3)		341	98	98											4					3	1	2	7	7	7	12	12	16	20	28	22	31	27	24	9	9	6		
Penicillins																																							
Ampicillin		341	98	98													3		2	16	17	32	46	43	30	28	14	7	3	1		1							

(1) : Other values: 36: 14 isolates; 37: 22 isolates; 38: 15 isolates; 39: 26 isolates

(2) : Other values: 36: 3 isolates; 37: 1 isolates; 39: 2 isolates; 40: 1 isolates

(3) : Other values: 36: 2 isolates; 37: 1 isolates

(4) : Other values: 36: 41 isolates; 37: 35 isolates; 38: 6 isolates; 39: 1 isolates; 40: 15 isolates; 42: 1 isolates.

Footnote

Data source: NRC-ANTI

Footnote

Data Source: NRC-ANTI

(1) : Other values: 36: 9 isolates; 37: 12 isolates; 38: 8 isolates; 39: 1 isolate; 40: 10 isolates.

(2) : Other values: 36: 10 isolates; 37: 19 isolates; 38: 1 isolate; 40: 1 isolate.

Table Antimicrobial susceptibility testing of E. coli in animals

n = Number of resistant isolates

	E. coli									
	Cattle (bovine animals)		Pigs		Sheep		Gallus gallus (fowl)		Turkeys	
Isolates out of a monitoring programme	yes		yes		yes		yes		yes	
Number of isolates available in the laboratory	368		73		43		121		53	
Antimicrobials:	N	n	N	n	N	n	N	n	N	n
Tetracyclines	368	156	73	58	43	11	121	83	53	51
Amphenicols										
Chloramphenicol	368	89	73	23	43	0	121	26	53	17
Cephalosporins										
Cefazolin	365	2	73	1	43	1	121	6	53	0
Cefotaxim	368	2	73	0	43	0	121	0	53	0
Fluoroquinolones										
Ciprofloxacin	137	1	73	2	43	0	77	7		
Enrofloxacin	231	7					44	4	53	10
Quinolones										
Nalidixic acid	345	45	73	8	43	0	121	48	53	27
Aminoglycosides										
Streptomycin	368	131	73	39	43	6	121	43	53	23
Gentamicin	368	29	73	3	43	0	121	0	53	2
Kanamycin	368	62	72	8	43	0	121	8	53	4
Trimethoprim + sulfonamides	368	99	73	44	43	3	121	29	53	7
Penicillins										
Ampicillin	341	98	73	41	43	4	77	46		
Fully sensitive	368	165	73	12	43	32	121	25	53	2
Resistant to 1 antimicrobial	368	59	73	10	43	3	121	20	53	10
Resistant to 2 antimicrobials	368	31	73	3	43	2	121	21	53	10
Resistant to 3 antimicrobials	368	19	73	12	43	3	121	20	53	10
Resistant to 4 antimicrobials	368	21	73	20	43	1	121	14	53	11
Resistant to >4 antimicrobials	368	73	73	16	43	2	121	21	53	10

Footnote

Data Source:NRC-ANTI

Table Antimicrobial susceptibility testing of E. coli in Sheep - 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																																							
E. coli																																							
Sheep - Monitoring																																							
Isolates out of a monitoring programme		yes																																					
Number of isolates available in the laboratory		43																																					
Antimicrobials:		N	11	10	9	8	7	6	5	4	3	2	1	1	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		43	11	10										1											5	7	13	2	2	2					1				
Amphenicols		43	0																				1	1	1	1	1	7	10	6	9	3	2	1	1				
Chloramphenicol		43	0																																				
Cephalosporins		43	1	1																				4	7	16	11	2	2										
Cefazolin	43	0																												1							2	4	
Cefotaxim(3)	43	0																																					
Fluoroquinolones		43	0																															1	1	5	5	7	9
Ciprofloxacin(1)	43	0																																					
Quinolones		43	0																					1	1	6	10	10	5	4	5	1							
Nalidixic acid	43	0																																					
Aminoglycosides		43	6	2				2		1	1						3																						
Streptomycin	43	0																	1	2	1	5	3	6	12	6	4	3											
Gentamicin	43	0																																					
Kanamycin	43	0																				1	2	4	5	7	8	7	6	3									
Trimethoprim + sulfonamides(2)	43	3	3																				1	1	1		1		1			2	7	5	11	3	5		
Penicillins		43	4	4																5	1	8	9	6	5	3	1												
Ampicillin	43	4	4																																				

(1) : Other values: 36; 7 isolates; 37: 4 isolates; 38: 1 isolate; 39: 3 isolates.

(2) : Other values: 37: 2 isolates.

(3) : Other values: 36: 15 isolates; 37: 12 isolates; 38: 3 isolates; 39: 6 isolates.

Footnote

Data Source: NRC-ANTI

Table Breakpoints used for antimicrobial susceptibility testing of E. coli 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 microg	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest		Susceptible >=	Intermediate	Resistant <=
Tetracyclines	NCCLS						30	19		14
Amphenicols										
Chloramphenicol	NCCLS						30	18		12
Florfenicol										
Fluoroquinolones										
Ciprofloxacin	NCCLS						5	21		15
Enrofloxacin	NCCLS						5	23		16
Quinolones										
Nalidixic acid	NCCLS						30	19		13
Trimethoprim										
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin	NCCLS						10	15		11
Gentamicin	NCCLS						10	15		12
Neomycin										
Kanamycin	NCCLS						30	18		13
Trimethoprim + sulfonamides	NCCLS						25	16		10
Cephalosporins										
Cefazolin	NCCLS						30	18		14
Cefotaxim	NCCLS						30	23		14
3rd generation cephalosporins										
Penicillins										
Ampicillin	NCCLS						10	17		13

Footnote

Data Source: NRC-ANTI

Sulfonamide/TMP=25

Sulfonamide=23.75

TMP=1.25

4. 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.

Table 12. Foodborne outbreaks in humans

Causative agent	General outbreak	Family outbreak	Total Number in persons			Source	Type of evidence		Location of exposure	Contributing factors
			Ill	died	in hospital		Suspected	Confirmed		
1	2	3	4	5	6	7	8		9	10
Salmonella - S. Enteritidis	22		89							
Staphylococcus - S. aureus(1)	6		28							
Salmonella - S. Paratyphi A	2		7							
Salmonella - S. Paratyphi B	1		2							
Salmonella - Salmonella spp.	10		31							
Salmonella - S. group B	26		96							
Salmonella - S. group C	7		37							
Salmonella - S. group D	9		69							
Salmonella - S. Typhimurium	12		32							
Salmonella - S. group A	1		3							

(1) : Sum of S. aureus and S. aureus ent.

Footnote

Provisional Data