



NETHERLANDS

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: **Netherlands**

Reporting Year: **2005**

Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
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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 Netherlands 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

Only if different than current reporting year								
Animal species	Category of animals	Livestock numbers (live animals)	Number of slaughtered animals		Number of herds or flocks		Number of holdings	
			Year*	Year*	Year*	Year*	Year*	Year*
Cattle (bovine animals)	dairy cows and heifers	1433202					23527	
	meat production animals	382455						
	calves (under 1 year)	533715					3329	
	in total	3798804		1969233			57361	
	Ducks	meat production flocks	1030867					
	in total	654629					59	
Gallus gallus (fowl)	elite breeding flocks, unspecified - in total	356159					22	
	grandparent breeding flocks, unspecified - in total	647591					53	
	parent breeding flocks, unspecified - in total	3420852					220	
	parent breeding flocks for egg production line	361052					20	
	parent breeding flocks for meat production line	3059800					200	
	grandparent breeding flocks for egg production line	144540					10	
	grandparent breeding flocks for meat production line	503051					43	
	laying hens	29932149					1245	
	broilers	42679183					740	
	elite breeding flocks for egg production line	82965					5	
	elite breeding flocks for meat production line	273194					17	
	in total	91850912		741007869			2697	
Goats	milk goats	172159						
	in total	292232					10104	
Pigs	breeding animals	1244272					3987	
	fattening pigs	5504295		14127352			8602	
	in total	11311558		14376801			6083	
Sheep	mixed herds (1)						12341	
	animals under 1 year (lambs)	685646						
	in total	1362523		633869			28997	
Solipeds, domestic	horses - in total	133321		2135			17691	
Turkeys	in total	967614					68	

(1): sheep + goats

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

2.1.2. Salmonella in foodstuffs

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'								
pasteurised milk	VWA	A	25ml	41	0			
Cheeses made from cows' milk								
soft and semi-soft								
made from raw or low heat-treated milk	VWA	A	25g	5	0			
made from pasteurized milk	VWA	A	25g	27	0			
Cheeses made from goats' milk								
soft and semi-soft								
made from pasteurized milk	VWA	A	25g	5	0			
Dairy products (excluding cheeses)								
ice-cream	VWA	A	25g	37	0			

Footnote

ad A: samples taken at retail, consumerpackaging

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	monitoring VWA	A	25g	356	8		6	2
minced meat								
intended to be eaten cooked	monitoring VWA	A	25g	47	0			
Meat from bovine animals								
fresh	monitoring VWA	A	25g	484	1		1	
minced meat								
intended to be eaten cooked	monitoring VWA	A	25g	485	10	3	1	6
Meat from sheep								
fresh	monitoring VWA	A	25g	120	0			
minced meat	monitoring VWA	A	25g	9	0			

Footnote

ad A: samples taken at retail, consumerpackaging

2.1.3. Salmonella in animals

A. Salmonella spp. in Gallus gallus - breeding flocks for egg production and flocks of laying hens

Monitoring system

Frequency of the sampling

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

max 3 weeks prior to moving

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

Other: from 24 weeks every 4 weeks

Laying hens: Rearing period

Other: Max 21 days before transfer

Laying hens: Production period

Other: Max 9 weeks before slaughter

Type of specimen taken

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

Faeces

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

Faeces

Laying hens: Rearing period

Blood

Laying hens: Production period

Blood

Methods of sampling (description of sampling techniques)

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

faeces samples, 6 x 25 swabs

Breeding flocks: Production period

faeces samples, 6 x 25 swabs

Laying hens: Rearing period

blood samples, 1/2% of the stable with a minimum of 24 and a maximum of 60 samples per stable.

Laying hens: Production period

blood samples, 1/2% of the stable with a minimum of 24 and a maximum of 60 samples per stable.

Measures in case of the positive findings or single cases

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

At suspicion: verification examination within 24 hours.

Verification: 60 bloodsamples pooled to 10x6

150 faecessamples pooled to 6 x 25

Infection:

S.e/S.t: destruction

Other Salmonella spp.: antimicrobial treatment. Diagnose free: 150 faeces samples, 6 x 150

Stable: examination of swabs and hygiene investigation.

Laying hens flocks

Se/St infected eggs can't go to the foodindustry.

All next couples will be vaccinate until the farm have only vaccinated couples.

Examination of swabs and hygiene investigation.

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

Monitoring system

Frequency of the sampling

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

max 3 weeks prior to moving

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

Other: from 24 weeks every 2 weeks

Broiler flocks: Rearing period

max 3 weeks prior to moving

Broiler flocks: At slaughter (flock based approach)

Other: final product control: 1 sample per unbroken section

Type of specimen taken

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

Other: leaflets (40) and cloacaswabs (2x30)

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

Faeces

Broiler flocks: Day-old chicks

Other:

Broiler flocks: Rearing period

Other: leaflets (40), cloaca swabs (2x30)

Broiler flocks: Before slaughter at farm

Other: leaflets (40)

Broiler flocks: At slaughter (flock based approach)

Other: caecum faeces (30)

Measures in case of the positive findings or single cases

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

At suspicion: verification examination within 24 hours.

Verification: 60 bloodsamples, pooled 10x6

150 faecessamples, pooled 6x25

Infection:

Se/St destruction

Other Salmonella spp.: antimicrobial treatment. Diagnose free of infection: 150 faecessamples, 6x25

Stable: examination of swabs and hygieneinvestigation

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

At suspicion: verification examination within 24 hours.

Verification: 60 bloodsamples, pooled 10x6

150 faecessamples, pooled 6x25

Infection:

Se/St destruction

Other Salmonella spp.: antimicrobial treatment. Diagnose free of infection: 150 faecessamples, 6x25

Stable: examination of swabs and hygieneinvestigation

Broiler flocks: Rearing period

At suspicion: verification examination within 24 hours.

Verification: 60 bloodsamples, pooled 10x6

150 faecessamples, pooled 6x25

Infection:

Se/St destruction

Other Salmonella spp.: antimicrobial treatment. Diagnose free of infection: 150 faecessamples, 6x25

Stable: examination of swabs and hygieneinvestigation

Broiler flocks: Before slaughter at farm

Salmonella infection: logistic slaughter

examination of swabs taken in the stable

hygiene investigation of the stable

C. Salmonella spp. in pigs

Monitoring system

Frequency of the sampling

Fattening herds at farm

Sampling distributed evenly throughout the year

Type of specimen taken

Fattening herds at farm

Faeces

Diagnostic/analytical methods used

Fattening herds at farm

Bacteriological method: ISO 6579:2002

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)							
elite breeding flocks for egg production line	GD	flock	14	0			
parent breeding flocks for egg production line	GD	flock	405	0			
elite breeding flocks for meat production line	GD	flock	2	2			2
parent breeding flocks for meat production line							
during rearing period	GD		295	17		1	16
during production period	GD		295	20	3	4	13
grandparent breeding flocks, unspecified	GD	flock	150	0			

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl)							
laying hens							
during rearing period	PVE	flock	1691	2	2		
during production period	PVE	flock	1952	67	64	3	
(Sampling in the framework of the laying hen baseline study)	GD	flock	474	76	33	7	36
broilers							
day-old chicks	PVE	flock	28858	409	57		352
during rearing period	PVE	flock	29777	1228	50	39	1139
Turkeys	PVE	flock	437	47			47

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. group B	S. group C	S. group D
Pigs										
fattening pigs										
- at farm - Monitoring (January-June 2005)	VWA/RIVM	Herd	97	25						
- at farm - Monitoring (July-december 2005, only 3 regions (data other 2 region is missing))	VWA/RIVM	Herd	46	13						
Solipeds, domestic										
horses	VMDC	Animal	211	5				4		1
Dogs	VMDC	Animal	453	5				2	2	1
Reptiles	VMDC	Animal	6	0						
Birds	VMDC	Animal	103	3				3		

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								
meat and bone meal	PDV	A	25g	24	7			
greaves	PDV	A	25g	31	7			
poultry offal meal	PDV	A	25g	38	0			
animal fat	PDV	A	25g	1	0			
Feed material of marine animal origin								
fish meal	PDV	A	25g	508	4			
fish oil	PDV	A	25g	15	0			

Footnote

ad A: not applicable; feed and raw feed materials of worldwide origin are investigated. Analysis: NEN-EN-ISO 6579:2002

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
Feed material of cereal grain origin								
barley derived	PDV	A	25g	208	0			
wheat derived	PDV	A	25g	1608	2			
maize	PDV	A	25g	463	1			
derived	PDV	A	25g	253	4			
Feed material of oil seed or fruit origin								
rape seed derived	PDV	A	25g	4401	296			
palm kernel derived	PDV	A	25g	154	1			
soya (bean) derived	PDV	A	25g	7392	270			
cotton seed derived	PDV	A	25g	2	0			
sunflower seed derived	PDV	A	25g	1452	51			
linseed derived	PDV	A	25g	81	5			

Footnote

ad A: not applicable, feed and raw feed materials of worldwide origin are investigated. Analysis: NEN-EN-ISO 6579:2002

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Anatum	S. Agona	S. Senftenberg	S. Havana	S. Newport	S. Livingstone	S. Mbandaka
Compound feedingstuffs for cattle	PDV	A	25g	2467	12				1		3	1			1
Compound feedingstuffs for pigs	PDV	A	25g	3301	14					1		1			1
Compound feedingstuffs for poultry -breeders	PDV	A	25g	1960	1							1			
Compound feedingstuffs for poultry - laying hens	PDV	A	25g	3357	26		1				4		1	4	4
Compound feedingstuffs for poultry - broilers	PDV	A	25g	2939	5				1		2			1	1
Compound feedingstuffs for turkeys	PDV	A	25g	208	0										

Footnote

ad A: not applicable; feed and raw feed materials of worldwide origin are investigated. Analysis: NEN-EN-ISO 6579;2002

2.1.5. Salmonella serovars and phagetype distribution

Table Salmonella serovars in animals

Serovars		Gallus gallus (fowl) - laying hens		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Gallus gallus (fowl) - broilers	
		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Sources of isolates		N=											
Number of isolates in the laboratory		410		0	91	255		765				172	
Number of isolates serotyped		410		0	91	255		765				172	
Number of isolates per type													
S. Agona		15				1		25				2	
S. Braenderup		12						12					
S. Brandenburg		3				8		4					
S. Bredeney		4				1		11					
S. Derby		4				48		6				1	
S. Dublin					68			2					
S. Enteritidis		177		1				230				19	
S. Hadar		4						13				3	
S. Infantis		20		1		5		85				50	
S. Kentucky		14						20				5	
S. Livingstone		12				7		16				3	
S. Mbandaka		24		3				32				5	
S. Rissen		3				8		3					

[illegible]

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella serovars in food

Serovars		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin		Meat from turkey	
Sources of isolates	N=	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=												
Number of isolates serotyped	N=	17		9		130						72	
Number of isolates per type													
S. Agona	1					1						10	
S. Anatum						1							
S. Banana												1	
S. Blockley						1						8	
S. Bovismorbificans			1										
S. Brandenburg												1	
S. Bredeney						2						5	
S. Cerro	1												
S. Corvallis						5							
S. Cubana												1	
S. Derby												2	
S. Enteritidis	2					9						5	
S. Goldcoast				1									

20

(*) M : Monitoring, C : Clinical

Table S. Enteritidis phagetypes in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Gallus gallus (fowl) - broilers		Gallus gallus (fowl) - laying hens		All animals		
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	
	Sources of isolates														
	Number of isolates in the laboratory		N=										4		
Number of isolates phagetyped		N=		1		230				19		177		4	
				1		230				19		177		4	
Number of isolates per type															
PT 1						20			3		11				
PT 4						69			2		57			1	
PT 6						17					13				
PT 8				1	29				2		19				
PT 14b					3				1		2				
PT 21					26				10		16			1	
PT 6a					9						8				
PT 6b					1						1				
PT 23					2						2				
PT 7					21						17				
Other					21						20			1	
PT 25					5						5				
PT 5a					3						3				

[illegible]

Footnote

(*) M : Monitoring, C : Clinical

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 turkey	
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Sources of isolates												
Number of isolates in the laboratory	N= 2		0		9						5	
Number of isolates phagetyped	N= 18		9		133						73	
Number of isolates per type												
PT 1					1						2	
PT 4					1							
PT 8					4						1	
PT 14b					1							
PT 21					1							
Not typable	2											
PT 6a											1	
PT 7											1	
PT 5b					1							
Total of typed <i>Salmonella</i> isolates												

Footnote

(*) M : Monitoring, C : Clinical
Number of isolates serotyped: total number of salmonella isolates serotyped.
Number of isolates in the laboratory: total number of S. enteritidis isolates serotyped

Table Salmonella Typhimurium phage types in animals

Phagetype	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Gallus gallus (fowl) - broilers		Gallus gallus (fowl) - laying hens		Birds		All animals	
	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=		78				20		36		13		17	
Number of isolates phagetyped		N=		78				20		36		13		17		
Number of isolates per type																
DT 104	4	55	30		8	13										
FT 507	6	40	16		10	4							3			
FT 150			2													
other	6	65	25		2	15							6	4		
FT 506													1	6		
FT 3													2	1		
FT 80		3														
FT 2			2													
FT 508		1	1													
FT 510	1	1														
FT 301			2													
FT 60		5														
FT 655		1													1	

[illegible]

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Typhimurium Phagetypes in food

Phagetype	Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin		Meat from turkey	
	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Sources of isolates												
Number of isolates in the laboratory	N=	6		6		5			5		4	
Number of isolates phagetyped	N=	18		9		133			22		73	
Number of isolates per type												
FT 507			4		1							
FT 150					1						2	
Not typable	1		2		1							
other									3			
FT 506	3				2				1		2	
FT 508									1			
FT 510	1											
FT 401	1											
Total of typed Salmonella isolates												

Footnote

(*) M : Monitoring, C : Clinical
Number of isolates serotyped: total number of salmonella isolates serotyped.
Number of isolates in the laboratory: total number of S. enteritidis isolates serotyped

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.

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Frequency of the sampling

Annually a randomised selection of farms is visited and sampled for the purpose of detection of salmonella and determination of the prevalence in cattle.

Type of specimen taken

The specimen taken is faeces.

Procedures for the selection of isolates for antimicrobial testing

Clinical isolates sent to RIVM for sero/phagotyping are all included in antimicrobial resistance testing.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Amoxycillin, Cefotaxime, Ceftazimidine, Gentamycine, Neomycin, Tetracyclin, Trimetoprim/sulpha, Ciprofloxacin, Nalidixic acid, Chloramphenicol, Florfenicol

B. Antimicrobial resistance in Salmonella in pigs

Sampling strategy used in monitoring

Frequency of the sampling

Annually a randomised selection of farms is visited and sampled for the purpose of detection of salmonella and determination of the prevalence in pigs.

Type of specimen taken

The type of specimen taken is faeces.

Procedures for the selection of isolates for antimicrobial testing

One strain of unique sero and phagetypes from each farm/flock is tested of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Cefotaxime, Ceftazimidine, Gentamycin, Neomycin, Tetracyclin, Trimetoprim/sulpha, Ciprofloxacin, Nalidixic acid, Chloramphenicol, Florfenicol.

Preventive measures in place

Veterinary antibiotics policy and guidelines for therapy (formularia)

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Frequency of the sampling

Annually a randomised selection of farms is visited and sampled for the purpose of detection of salmonella and determination of the prevalence in poultry.

Type of specimen taken

The type of specimen taken is faeces. Also other specimen like feedstuffs are taken.

Procedures for the selection of isolates for antimicrobial testing

From other isolates from poultry sent to RIVM for sero/phage typing a selection (randomised for the most prevalent sero/phagetypes) and one unique sero/phagetype is tested for antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Cefotaxime, Ceftazidine, Gentamycin, Neomycin, Tetracyclin, Trimethoprim/sulpha, Ciprofloxacin, Nalidixic acid, Chloramphenicol, Florfenicol.

Table Antimicrobial susceptibility testing of S. Enteritidis in Poultry, unspecified - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																							
S. Enteritidis																							
Poultry, unspecified - Monitoring																							
Isolates out of a monitoring programme		yes																					
Number of isolates available in the laboratory		43																					
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		43	0	0	0	0	0	0	2	41	0	0	0	0	0	0	0	0	0	0	0	0.5	64
Amphenicols		43	0	0	0	0	0	0	0	0	1	39	3	0	0	0	0	0	0	0	4	128	
Chloramphenicol		43	0	0	0	0	0	0	0	0	28	14	1	0	0	0	0	0	0	0	2	128	
Florfenicol		43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cephalosporins		43	0	0	0	42	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.125	16	
Cefotaxim		17	0	0	0	5	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0.125	16	
Ceftazidim																							
Fluoroquinolones		43	0	0	15	5	7	16	0	0	0	0	0	0	0	0	0	0	0	0	0.06	8	
Ciprofloxacin																							
Quinolones		43	22	0	0	0	0	0	0	0	15	0	6	0	0	0	0	22	0	0	2	128	
Nalidixic acid		43	0	0	0	0	0	40	3	0	0	0	0	0	0	0	0	0	0	0	0.5	64	
Trimethoprim																							
Sulfonamides		43	0	0	0	0	0	0	0	0	0	11	32	0	0	0	0	0	0	0	8	1024	
Sulfonamide																							
Aminoglycosides		43	0	0	0	0	20	19	4	0	0	0	0	0	0	0	0	0	0	0	0.25	32	
Gentamicin		43	0	0	0	0	0	0	43	0	0	0	0	0	0	0	0	0	0	0	1	128	
Neomycin																							
Penicillins		43	0	0	0	0	0	6	36	1	0	0	0	0	0	0	0	0	0	0	0.5	64	
Ampicillin																							

Table Antimicrobial susceptibility testing of S. Enteritidis in animals

n = Number of resistant isolates

	S. Enteritidis									
	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Gallus gallus (fowl) - laying hens		Turkeys	
Isolates out of a monitoring programme							yes			
Number of isolates available in the laboratory							43			
Antimicrobials:	N	n	N	n	N	n	N	n	N	n
Tetracyclines										
Tetracyclin							43	0		
Amphenicols										
Chloramphenicol							43	0		
Florfenicol							43	0		
Cephalosporins										
Cefotaxim							43	0		
Ceftazidim							17	0		
Fluoroquinolones										
Ciprofloxacin							43	0		
Quinolones										
Nalidixic acid							43	22		
Trimethoprim							43	0		
Sulfonamides										
Sulfonamide							43	0		
Aminoglycosides										
Gentamicin							43	0		
Neomycin							43	0		
Penicillins										
Ampicillin							43	0		
Fully sensitive							43	21		
Resistant to 1 antimicrobial							43	22		

Table Antimicrobial susceptibility testing of S.Typhimurium in animals

n = Number of resistant isolates

	S. Typhimurium							
	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys	
Isolates out of a monitoring programme	yes		yes		yes			
Number of isolates available in the laboratory	12		85		23			
Antimicrobials:	N	n	N	n	N	n	N	n
Tetracyclines								
Tetracyclin	12	7	85	60	23	17		
Amphenicols								
Chloramphenicol	12	4	85	34	23	12		
Florfenicol	12	3	85	32	23	11		
Cephalosporins								
Cefotaxim	12	0	85	0	23	0		
Ceftazidim	10	0	40	0	20	0		
Fluoroquinolones								
Ciprofloxacin	12	0	85	0	23	0		
Quinolones								
Nalidixic acid	12	1	85	0	23	1		
Trimethoprim	12	4	85	27	23	2		
Sulfonamides								
Sulfonamide	12	9	85	54	23	16		
Aminoglycosides								
Gentamicin	10	0	64	0	23	0		
Neomycin	10	0	64	0	23	1		
Penicillins								
Ampicillin	12	9	85	51	23	17		
Fully sensitive	12	3	85	19	23	4		
Resistant to 1 antimicrobial	12	0	85	11	23	3		
Resistant to 2 antimicrobials	12	1	85	4	23	0		
Resistant to 3 antimicrobials	12	1	85	11	23	2		
Resistant to 4 antimicrobials	12	5	85	26	23	13		
Resistant to >4 antimicrobials	12	2	85	14	23	1		
Number of multiresistant S. Typhimurium DT104								
with penta resistance	12	4	85	31	23	12		
resistant to other antimicrobials	12	1						

Table Antimicrobial susceptibility testing of Salmonella in animals

n = Number of resistant isolates								
	Salmonella spp.							
	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys	
Isolates out of a monitoring programme	no		yes		yes		no	
Number of isolates available in the laboratory	90		120		237		10	
Antimicrobials:	N	n	N	n	N	n	N	n
Tetracyclines								
Tetracyclin	90	11	120	73	237	37	10	1
Amphenicols								
Chloramphenicol	90	7	120	36	237	8	10	1
Florfenicol	90	3	120	25	237	14	10	1
Cephalosporins								
Cefotaxim	90	0	120	0	237	5	10	0
Ceftazidim	72	0	59	0	145	4	9	0
Fluoroquinolones								
Ciprofloxacin	90	0	120	0	237	0	10	0
Quinolones								
Nalidixic acid	90	4	120	0	237	53	10	4
Trimethoprim	90	5	120	38	237	27	10	0
Sulfonamides								
Sulfonamide	90	17	120	66	237	42	10	5
Aminoglycosides								
Gentamicin	90	0	120	0	237	2	10	2
Neomycin	90	1	120	1	237	2	10	0
Penicillins								
Ampicillin	90	13	120	57	237	43	10	5
Fully sensitive	90	70	120	40	237	144	10	5
Resistant to 1 antimicrobial	90	3	120	13	237	48	10	0
Resistant to 2 antimicrobials	90	5	120	6	237	3	10	0
Resistant to 3 antimicrobials	90	5	120	16	237	11	10	2
Resistant to 4 antimicrobials	90	5	120	29	237	22	10	3
Resistant to >4 antimicrobials	90	2	120	16	237	9	10	0

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	CLSI	8		8	0.5	64				
Amphenicols										
Chloramphenicol	CLSI	16		16	4	128				
Florfenicol	CIDC	16		16	2	128				
Fluoroquinolones										
Ciprofloxacin	CLSI	2		2	0.06	8				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI	8		8	2	128				
Trimethoprim	CLSI	8		8	0.5	64				
Sulfonamides										
Sulfonamide	CLSI	256		256	8	1024				
Aminoglycosides										
Streptomycin										
Gentamicin	CLSI	8		8	0.25	32				
Neomycin	CLSI	16		16	1	128				
Kanamycin										
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim	CLSI(ESBL)	1		1	0.125	16				
Ceftazidim	CLSI(ESBL)	1		1	0.125	16				
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI	16		16	0.5	64				

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	CLSI	8		8	0.5	64				
Amphenicols										
Chloramphenicol	CLSI	16		16	4	128				
Florfenicol	CIDC	16		16	2	128				
Fluoroquinolones										
Ciprofloxacin	CLSI	2		2	0.06	8				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI	8		8	2	128				
Trimethoprim	CLSI	8		8	0.5	64				
Sulfonamides										
Sulfonamide	CLSI	256		256	8	1024				
Aminoglycosides										
Streptomycin										
Gentamicin	CLSI	8		8	0.25	32				
Neomycin	CLSI	16		16	1	128				
Kanamycin										
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim	CLSI(ESBL)	1		1	0.125	16				
Ceftazidim	CLSI(ESBL)	1		1	0.125	16				
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI	16		16	0.5	64				

Table Breakpoints for antibiotic resistance testing of Salmonella in Feedingstuff**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	CLSI	8		8	0.5	64				
Amphenicols										
Chloramphenicol	CLSI	16		16	4	128				
Florfenicol	CIDC	16		16	2	128				
Fluoroquinolones										
Ciprofloxacin	CLSI	2		2	0.06	8				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI	8		8	2	128				
Trimethoprim	CLSI	8		8	0.5	64				
Sulfonamides										
Sulfonamide	CLSI	256		256	8	1024				
Aminoglycosides										
Streptomycin										
Gentamicin	CLSI	8		8	0.25	32				
Neomycin	CLSI	16		16	1	128				
Kanamycin										
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim	CLSI(ESBL)	1		1	0.125	16				
Ceftazidim	CLSI(ESBL)	1		1	0.125	16				
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI	16		16	0.5	64				

2.2. CAMPYLOBACTERIOSIS

2.2.1. General evaluation of the national situation

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)										
fresh	monitoring VWA	A	25g	1605	377					
Meat from turkey										
fresh	monitoring VWA	A	25g	911	232					
Meat from duck	monitoring VWA	A	25g	107	31					
Meat from geese	monitoring VWA	A	25g	8	1					
Other food										
- Monitoring (guinea fowl)	VWA	A	25g	33	16					
- Monitoring (patridge)	VWA	A	25g	13	2					
- Monitoring (Ostrich)	VWA	A	25g	15	1					
- Monitoring (Quail)	VWA	A	25g	18	11					
- Monitoring (Pheasant)	VWA	A	25g	42	3					

Footnote

ad A: samples taken at retail, consumerpackaging

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	VWA	A	25g	389	0					
minced meat										
intended to be eaten raw	VWA	A	25g	41	0					
Meat from bovine animals										
fresh	VWA	A	25g	463	5					
minced meat										
intended to be eaten cooked	VWA	A	25g	473	2					
Meat from sheep										
fresh	VWA	A	25g	106	5					
minced meat										
intended to be eaten cooked	VWA	A	25g	9	0					
Milk, cows'										
raw milk for manufacture										
intended for manufacture of raw or low heat-treated products	VWA	A	25g	41	0					

Footnote

ad A: samples taken at retail, consumerpackaging

2.2.3. Campylobacter, thermophilic 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
Solipeds, domestic									
horses	VMDC	Animal	211	0					
Dogs	VMDC	Animal	133	39					
Cats	VMDC	Animal	238	4					
Reptiles	VMDC	Animal	6	0					
Birds	VMDC	Animal	103	0					

2.2.4. Antimicrobial resistance in Campylobacter, thermophilic isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in pigs

Sampling strategy used in monitoring

Frequency of the sampling

20 weeks at 6 randomly selected slaughterhouses once daily from one healthy animal the caeca are collected.

Type of specimen taken

The specimen taken is the caeca.

Methods of sampling (description of sampling techniques)

During slaughter daily caeca are collected, stored at 4 degrees Celsius and once a week sent to CIDC for antimicrobial resistance testing.

Procedures for the selection of isolates for antimicrobial testing

All isolates identified as C. coli or C. jejuni.

Laboratory methodology used for identification of the microbial isolates

Direct isolation on CCDA-agar+ Cefoperazone and Amphotericin. Identification by PCR.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Amoxicillin, Gentamycin, Neomycin, Streptomycin, Tetracycline, Trimetoprim/sulpha, Ciprofloxacin, Nalidixic acid, Erythromycin, Metronidazole, Chloramphenicol.

B. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Sampling strategy used in monitoring

Frequency of the sampling

Daily from one healthy animal the caeca is collected, for 20 weeks at 6 randomly selected slaughterhouses

Type of specimen taken

The caeca is collected

Methods of sampling (description of sampling techniques)

During slaughter daily caeca are collected. They are stored at 4 degree Celsius and once a week sent to CIDC for antimicrobial resistance investigation.

Procedures for the selection of isolates for antimicrobial testing

All isolates identified as *C. jejuni* or *C. coli*.

Laboratory methodology used for identification of the microbial isolates

Direct isolation on CCDA-agar+ cefoperazone and ampicillin. Identification by PCR.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, amoxycillin, neomycin, streptomycin, tetracycline, trimethoprim/sulfa, ciprofloxacin, nalidixic acid, erythromycin, metronidazole and chloramphenicol.

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

Sampling strategy used in monitoring

Frequency of the sampling

Started in 2005. Randomised, stratified sample of farms for prevalence of salmonella, pooled faeces samples examined for campylobacter

Type of specimen taken

The type of specimen taken was faeces.

Procedures for the selection of isolates for antimicrobial testing

One *C. jejuni* or *C. coli* per farm.

Laboratory methodology used for identification of the microbial isolates

Direct isolation on CCDA agar and PCR identification

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Amoxycillin, Neomycin, Streptomycin, Tetracycline, Trimethoprim/Sulfa, Ciprofloxacin, Nalidixic acid, Erythromycin, Metronidazole, Chloramphenicol

Table Antimicrobial susceptibility testing of C. coli - qualitative data

n = Number of resistant isolates				
	C. coli			
	Pigs		Cattle (bovine animals) - calves (under 1 year) - veal calves	
Isolates out of a monitoring programme	yes		yes	
Number of isolates available in the laboratory	153		59	
Antimicrobials:	N	n	N	n
Amphenicols				
Chloramphenicol	153	0	59	0
Fluoroquinolones				
Ciprofloxacin	153	7	59	48
Quinolones				
Nalidixic acid	153	7	59	48
Sulfonamides				
Sulfamethoxazol	153	84	59	18
Aminoglycosides				
Streptomycin	153	132	59	38
Gentamicin	153	0	59	2
Neomycin	153	1	59	17
Macrolides				
Erythromycin	153	14	59	3
Trimethoprim + sulfonamides				
Trimethoprim + Sulfamethoxazol	153	90	59	21
Nitroimidazoles and Nitrofurans				
Metronidazole	153	50	59	34
Penicillins				
Amoxicillin	153	26	59	2

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

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																						
C. coli																						
Gallus gallus (fowl) - broilers - Monitoring																						
Isolates out of a monitoring programme	yes																					
	5																					
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																						
Tetracyclin	5	3	0	0	0	0	1	1	0	0	0	0	0	2	1	0	0	0	0	0	0.125	16
Amphenicols																						
Chloramphenicol	5	0	0	0	0	0	0	0	1	3	0	1	0	0	0	0	0	0	0	0	2	256
Fluoroquinolones																						
Ciprofloxacin	5	3	0	0	2	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0.125	16
Quinolones																						
Nalidixic acid	5	3	0	0	0	0	0	0	2	0	0	0	0	1	1	1	0	0	0	0	2	256
Sulfonamides																						
Sulfamethoxazol	5	0	0	0	0	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	8	1024
Aminoglycosides																						
Streptomycin	5	1	0	0	0	0	0	2	2	0	0	0	1	0	0	0	0	0	0	0	1	128
Gentamicin	5	0	0	0	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	32
Neomycin	5	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0.5	64
Macrolides																						
Erythromycin	5	0	0	0	0	0	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0.5	64
Trimethoprim + sulfonamides																						
Trimethoprim + Sulfamethoxazol	5	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	0	0	1	128
Nitroimidazoles and Nitrofurans																						
Metronidazole	5	3	0	0	0	0	1	1	0	0	2	0	1	0	0	0	0	0	0	0	0.5	64
Penicillins																						
Amoxicillin	5	1	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	0	0	0	1	128

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

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																										
C. coli																										
Pigs - Monitoring																										
Isolates out of a monitoring programme		yes																								
Number of isolates available in the laboratory		153																								
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		153	132	0	0	0	0	15	3	3	0	2	4	15	52	59	0	0	0	0	0	0.125	16			
Tetracyclin																										
Amphenicols		153	0	0	0	0	0	0	0	27	82	38	6	0	0	0	0	0	0	0	0	2	256			
Chloramphenicol																										
Fluoroquinolones		153	7	0	0	86	49	11	0	0	0	2	5	0	0	0	0	0	0	0	0	0.125	16			
Ciprofloxacin																										
Quinolones		153	7	0	0	0	0	0	1	24	79	40	2	0	2	4	1	0	0	0	0	2	256			
Nalidixic acid																										
Sulfonamides		153	84	0	0	0	0	0	0	0	0	21	29	10	3	0	6	69	15	0	8	1024				
Sulfamethoxazol																										
Aminoglycosides		153	132	0	0	0	0	0	1	16	3	1	1	70	37	1	23	0	0	0	0	1	128			
Streptomycin																										
Gentamicin		153	0	0	0	0	99	53	1	0	0	0	0	0	0	0	0	0	0	0	0.25	32				
Neomycin		153	1	0	0	0	0	57	93	2	0	0	1	0	0	0	0	0	0	0	0.5	64				
Macrolides		153	14	0	0	0	0	5	8	15	68	34	9	1	1	12	0	0	0	0	0.5	64				
Erythromycin																										
Penicillins		153	26	0	0	0	6	9	24	32	47	9	0	13	0	13	0	0	0	0	1	128				
Amoxicillin																										

Table Antimicrobial susceptibility testing of C. coli in calves (under 1 year) - Cattle (bovine animals) - veal calves - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																						
C. coli																						
Cattle (bovine animals) - calves (under 1 year) - veal calves - Monitoring																						
Isolates out of a monitoring programme	yes																					
	59																					
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																						
Tetracyclin	59	58	0	0	1	0	0	0	0	1	2	27	28	0	0	0	0	0	0	0	0.125	16
Amphenicols																						
Chloramphenicol	59	0	0	0	0	0	0	0	1	14	39	5	0	0	0	0	0	0	0	0	2	256
Fluoroquinolones																						
Ciprofloxacin	59	48	0	0	3	8	0	0	0	0	1	28	19	0	0	0	0	0	0	0	0.125	16
Quinolones																						
Nalidixic acid	59	48	0	0	0	0	0	0	0	5	6	0	0	1	38	9	0	0	0	0	2	256
Sulfonamides																						
Sulfamethoxazol	59	18	0	0	0	0	0	0	0	0	1	3	8	24	1	4	14	4	0	0	8	1024
Aminoglycosides																						
Streptomycin	59	38	0	0	0	0	0	16	4	1	0	1	20	9	3	5	0	0	0	0	1	128
Gentamicin	59	2	0	0	0	41	14	2	0	0	0	0	0	2	0	0	0	0	0	0	0.25	32
Neomycin	59	17	0	0	0	0	15	26	1	0	0	0	4	5	8	0	0	0	0	0	0.5	64
Macrolides																						
Erythromycin	59	3	0	0	0	0	1	1	3	24	22	5	0	0	3	0	0	0	0	0	0.5	64
Trimethoprim + sulfonamides																						
Trimethoprim + Sulfamethoxazol	59	21	0	0	0	1	0	5	19	11	2	6	14	1	0	0	0	0	0	0	1	128
Nitroimidazoles and Nitrofurans																						
Metronidazole	59	34	0	0	0	0	5	6	8	6	5	16	10	3	0	0	0	0	0	0	0.5	64
Penicillins																						
Amoxicillin	59	2	0	0	0	0	3	5	10	24	15	0	0	2	0	0	0	0	0	0	1	128

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

n = Number of resistant isolates						
	<i>C. jejuni</i>					
	Cattle (bovine animals) - dairy cows		Gallus gallus (fowl) - broilers		Cattle (bovine animals) - calves (under 1 year) - veal calves	
Isolates out of a monitoring programme	yes		yes		yes	
Number of isolates available in the laboratory	14		78		30	
Antimicrobials:	N	n	N	n	N	n
Amphenicols						
Chloramphenicol	14	0	78	1	30	1
Fluoroquinolones						
Ciprofloxacin	14	0	78	34	30	15
Quinolones						
Nalidixic acid	14	0	78	33	30	15
Sulfonamides						
Sulfamethoxazol	14	0	78	2	30	0
Aminoglycosides						
Streptomycin	14	0	78	0	30	4
Gentamicin	14	0	78	0	30	1
Neomycin	14	0	78	0	30	6
Macrolides						
Erythromycin	14	0	78	0	30	0
Trimethoprim + sulfonamides						
Trimethoprim + Sulfamethoxazol	14	1	78	2	30	2
Nitroimidazoles and Nitrofurans						
Metronidazole	14	4	78	60	30	13
Penicillins						
Amoxicillin	14	1	78	34	30	4

Table Antimicrobial susceptibility testing of C. jejuni in Cattle (bovine animals) - dairy cows - 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																							
Cattle (bovine animals) - dairy cows																							
Isolates out of a monitoring programme	yes																						
	14																						
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																							
Tetracyclin	14	1	0	0	13	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.125	16
Amphenicols																							
Chloramphenicol	14	0	0	0	0	0	0	0	13	1	0	0	0	0	0	0	0	0	0	0	2	256	
Fluoroquinolones																							
Ciprofloxacin	14	0	0	0	13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.125	16	
Quinolones																							
Nalidixic acid	14	0	0	0	0	0	0	0	9	4	1	0	0	0	0	0	0	0	0	0	2	256	
Sulfonamides																							
Sulfamethoxazol	14	0	0	0	0	0	0	0	0	0	0	2	6	5	0	1	0	0	0	0	8	1024	
Aminoglycosides																							
Streptomycin	14	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	1	128	
Gentamicin	14	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	32	
Neomycin	14	0	0	0	0	0	11	3	0	0	0	0	0	0	0	0	0	0	0	0	0.5	64	
Macrolides																							
Erythromycin	14	0	0	0	0	0	0	1	10	3	0	0	0	0	0	0	0	0	0	0	0.5	64	
Trimethoprim + sulfonamides																							
Trimethoprim + Sulfamethoxazol	14	1	0	0	0	0	0	2	9	2	0	1	0	0	0	0	0	0	0	0	1	128	
Nitroimidazoles and Nitrofurans																							
Metronidazole	14	4	0	0	0	0	2	3	4	1	1	0	2	1	0	0	0	0	0	0	0.5	64	
Penicillins																							
Amoxicillin	14	1	0	0	0	0	0	1	3	7	2	0	0	0	1	0	0	0	0	0	1	128	

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

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																						
C. jejuni																						
Gallus gallus (fowl) - broilers - Monitoring																						
Isolates out of a monitoring programme	yes																					
	78																					
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																						
Tetracyclin	78	33	0	0	0	0	42	2	1	0	1	3	4	8	17	0	0	0	0	0	0.125	16
Amphenicols																						
Chloramphenicol	78	1	0	0	0	0	0	0	43	15	11	8	1	0	0	0	0	0	0	0	2	256
Fluoroquinolones																						
Ciprofloxacin	78	34	0	0	30	6	6	2	0	0	8	11	15	0	0	0	0	0	0	0	0.125	16
Quinolones																						
Nalidixic acid	78	33	0	0	0	0	0	1	28	8	6	2	0	2	19	12	0	0	0	0	2	256
Sulfonamides																						
Sulfamethoxazol	78	2	0	0	0	0	0	0	0	0	3	4	27	38	4	0	2	0	0	0	8	1024
Aminoglycosides																						
Streptomycin	78	0	0	0	0	0	0	77	1	0	0	0	0	0	0	0	0	0	0	0	1	128
Gentamicin	78	0	0	0	0	75	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	32
Neomycin	78	0	0	0	0	0	73	5	0	0	0	0	0	0	0	0	0	0	0	0	0.5	64
Macrolides																						
Erythromycin	78	0	0	0	0	0	9	27	26	16	0	0	0	0	0	0	0	0	0	0	0.5	64
Trimethoprim + sulfonamides																						
Trimethoprim + Sulfamethoxazol	78	2	0	0	0	0	4	13	32	25	2	1	1	0	0	0	0	0	0	0	1	128
Nitroimidazoles and Nitrofurans																						
Metronidazole	78	60	0	0	0	0	5	7	4	2	2	7	19	22	10	0	0	0	0	0	0.5	64
Penicillins																						
Amoxicillin	78	34	0	0	0	0	1	6	7	22	8	2	11	0	21	0	0	0	0	0	1	128

Table Antimicrobial susceptibility testing of *C. jejuni* in calves (under 1 year) - Cattle (bovine animals) - veal calves - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																							
C. jejuni																							
Cattle (bovine animals) - calves (under 1 year) - veal calves - Monitoring																							
Isolates out of a monitoring programme		yes																					
Number of isolates available in the laboratory		30																					
Antimicrobials:		N	n	≤0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Tetracyclines																							
Tetracyclin		30	27	0	0	3	0	0	0	0	4	7	11	5	0	0	0	0	0	0	0	0.125	16
Amphenicols																							
Chloramphenicol		30	1	0	0	0	0	0	0	16	8	3	2	1	0	0	0	0	0	0	0	2	256
Fluoroquinolones																							
Ciprofloxacin		30	15	0	0	10	4	0	1	0	0	1	9	5	0	0	0	0	0	0	0	0.125	16
Quinolones																							
Nalidixic acid		30	15	0	0	0	0	0	0	5	9	1	0	0	0	11	4	0	0	0	0	2	256
Sulfonamides																							
Sulfamethoxazol		30	0	0	0	0	0	0	0	0	0	0	0	10	17	3	0	0	0	0	0	8	1024
Aminoglycosides																							
Streptomycin		30	4	0	0	0	0	0	26	0	0	0	0	2	0	0	2	0	0	0	0	1	128
Gentamicin		30	1	0	0	0	27	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0.25	32
Neomycin		30	6	0	0	0	0	20	4	0	0	0	2	3	1	0	0	0	0	0	0	0.5	64
Macrolides																							
Erythromycin		30	0	0	0	0	0	0	8	9	10	3	0	0	0	0	0	0	0	0	0	0.5	64
Trimethoprim + sulfonamides																							
Trimethoprim + Sulfamethoxazol		30	2	0	0	0	0	0	0	11	16	1	0	0	2	0	0	0	0	0	0	1	128
Nitroimidazoles and Nitrofurans																							
Metronidazole		30	13	0	0	0	0	2	6	7	2	2	0	2	7	2	0	0	0	0	0	0.5	64

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

Campylobacter, thermophilic	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible ≤	Intermediate	Resistant >	lowest	highest		microg	Susceptible ≥	Intermediate
Tetracyclines										
Tetracyclin		2		2						
Amphenicols										
Chloramphenicol		16		16						
Florfenicol										
Fluoroquinolones										
Ciprofloxacin		2		2						
Enrofloxacin										
Quinolones										
Nalidixic acid		16		16						
Trimethoprim										
Sulfonamides										
Sulfonamide										
Sulfamethoxazol		256		256						
Aminoglycosides										
Streptomycin		8		8						
Gentamicin		8		8						
Neomycin		8		8						
Kanamycin										
Macrolides										
Erythromycin		16		16						
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins										
Nitroimidazoles and Nitrofurans										
Metronidazole		4		4						
Penicillins										
Ampicillin		16		16						

Table Breakpoints used for antimicrobial susceptibility testing of Campylobacter in Food

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

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										
Tetracyclin		2		2						
Amphenicols										
Chloramphenicol		16		16						
Florfenicol										
Fluoroquinolones										
Ciprofloxacin		2		2						
Enrofloxacin										
Quinolones										
Nalidixic acid		16		16						
Trimethoprim										
Sulfonamides										
Sulfonamide										
Sulfamethoxazol		256		256						
Aminoglycosides										
Streptomycin		8		8						
Gentamicin		8		8						
Neomycin		8		8						
Kanamycin										
Macrolides										
Erythromycin		16		16						
Trimethoprim + sulfonamides										
Trimethoprim + Sulfamethoxazol										
Cephalosporins										
3rd generation cephalosporins										
Nitroimidazoles and Nitrofurans										
Metronidazole		4		4						
Penicillins										
Ampicillin		16		16						

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
Cheeses made from cows' milk									
soft and semi-soft									
made from raw or low heat-treated milk	VWA	A	25g		23	23	0	0	0
made from pasteurized milk	VWA	A	25g		52	52	0	0	0
hard									
made from pasteurized milk	VWA	A	25g		24	23	1	1	0
Cheeses made from goats' milk									
soft and semi-soft									
made from pasteurized milk	VWA	A	25g		10	10	0	0	0

Footnote

ad A: samples taken at retail, consumerpackaging

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)										
meat products										
cooked, ready-to-eat	VWA	A			62	6	0	0	0	
Meat from pig										
meat products										
cooked, ready-to-eat	VWA	A			566	566	0	16	16	
Meat from bovine animals										
meat products										
cooked, ready-to-eat	VWA	A			61	59	0	1	1	
Fish										
smoked	VWA	A			568	547	20	147	141	

Footnote

ad A: samples taken at retail, consumerpackaging

All samples are investigated by detection and counting-method.

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
Solipeds, domestic						
horses	VMDC			1	1	

2.4. E. COLI INFECTIONS

2.4.1. General evaluation of the national situation

2.4.2. Escherichia coli, pathogenic in foodstuffs

Table VT E.coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Escherichia coli, pathogenic	E. coli spp., unspecified	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC O157:H7
Meat from pig								
fresh	monitoring VWA	A	25g	401	1			1
Meat from bovine animals								
fresh	monitoring VWA	A	25g	964	0			
Meat from sheep								
fresh	monitoring VWA	A	25g	129	0			

Footnote

ad A: samples taken at retail, consumerpackaging

2.4.3. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Frequency of the sampling

Animals at farm

Sampling distributed evenly throughout the year

Type of specimen taken

Animals at farm

Faeces

Diagnostic/analytical methods used

Animals at farm

Bacteriological method: ISO 6579:2002

Notification system in place

Verocytotoxic Escherichia coli is not notifiable for bovine animals.

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

Trend of positive dairy cows investigated in the surveillance programme of the VWA/RIVM:

2004: 153 herds investigated - 13 herds positive

2003: 27 herds investigated - 1 herds positive

2002: 149 herds investigated - 21 herds positive

2001: 103 herds investigated - 11 herds positive

2000: 158 herds investigated - 14 herds positive

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)							
calves (under 1 year)							
veal calves							
- at farm - Monitoring (January-June 2005)	VWA/RIVM	Herd	84	5		5	
- at farm - Monitoring (July-December 2005, data of 3 regions (data other 2 regions is missing))	VWA/RIVM	Herd	53	2			
dairy cows							
- at farm - Monitoring (January-June 2005)	VWA/RIVM	Herd	70	4		4	
- at farm - Monitoring (July-December 2005, data of 3 regions (data other 2 regions is missing))	VWA/RIVM	Herd	51	4			

2.5. TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1. General evaluation of the national situation

2.5.2. Mycobacterium in animals

A. Mycobacterium bovis in Bovine Animals

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

The Dutch cattle population is officially free from tuberculosis. This recognition has been ratified by Decision 99/467/EC from August 1999 and amended by Decision 03/467/EC.

Control program/mechanisms

The control program/strategies in place

All slaughtered animals are subject to ante mortem and post mortem investigation. Routinely all cattle at AI-stations are subject of tuberculation. Cattle destined for export to some third countries are tuberculated.

Notification system in place

Tuberculosis (*Mycobacterium bovis*) is notifiable for bovine animals in the Netherlands.

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Zoo animals, all (1)	VWA		6	2	2	0	0

(1) : incl wild and pet animals, 1 onager, 1Hyrax

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
NEDERLAND	57361		57361		0				4	0	
Total	57361	0	57361	0	0	0	0	0	4	0	

Footnote

Interval between routine tuberculin tests:a

Number of tuberculin tests carried out before the introduction.....a

2.6. BRUCELLOSIS

2.6.1. General evaluation of the national situation

2.6.2. Brucella in foodstuffs

2.6.3. Brucella in animals

A. Brucella abortus in Bovine Animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

The Dutch cattle has been officially free from bovine brucellosis since 1996. This recognition has been ratified by Decision 99/466/EC from August 1999 and amended by Decision 03/467/EC.

B. Brucella melitensis in Sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Brucellosis caused by *Brucella melitensis* has never been diagnosed in the Netherlands in sheep or goats. The Netherlands has the official EU free of *B. melitensis* status which confirmed in the Order 93/52/EC.

Notification system in place

Brucellosis is notifiable for sheep.

C. Brucella melitensis in Goat

Status as officially free of caprine brucellosis during the reporting year

The entire country free

Brucellosis caused by *Brucella melitensis* has never been diagnosed in the Netherlands in sheep and goats. The Netherlands has the official EU "free of *B. melitensis* status" which is confirmed in the Order 93/52/EC.

Notification system in place

Brucellosis is notifiable for 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
Reindeers	VWA	Animal	2	0				

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases					
							Serological tests			Examination of bulk milk samples			Information about abortions					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals	Number of animals
NEDERLAND	57361		57361	100	0		749	13558	0	0	12018	0	0	4176	0	65	27	0
	57361	0	57361	100	0	0	749	13558	0	0	12018	0	0	4176	0	65	27	0
Total																		27

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

Region	Total number of existing ovine / caprine		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases					
	Herds	Animals	Number of herds	%	Number of animals	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbiologically	Number of animals positive microbiologically	Number of suspended herds	
NEDERLAND	51442		51442	100	0		1902	18595	0	3	2	0	0	2	
Total	51442	0	51442	100	0	0	1902	18595	0	3	2	0	0	2	

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

2.7.2. Yersinia in foodstuffs

2.7.3. Yersinia in animals

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						
(free ranging pigs; serology (ELISA))	RIVM	Animal	178	0		
(Organic pigs; seology (ELISA))	RIVM	Animal	402	1		
(Industrialized pigs; serology (ELISA))	RIVM	Animal	265	0		
Wild boars						
(serology (ELISA))	RIVM	Animal	366	1		

2.9. ECHINOCOCCOSIS

2.9.1. General evaluation of the national situation

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
Foxes	RIVM	Animal	45	3		3	

2.10. TOXOPLASMOSIS

2.10.1. General evaluation of the national situation

2.10.2. Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma
Pigs				
(free ranging pigs; serology (ELISA))	RIVM	Animal	178	10
(Organic pigs; serology (ELISA))	RIVM	Animal	402	11
(INDustrialized pigs; serology (ELISA))	RIVM	Animal	265	1

2.11. RABIES

2.11.1. General evaluation of the national situation

A. Rabies General evaluation

History of the disease and/or infection in the country

Rabies is only found in bats (EBL-virus). In the Netherlands a VWA-protocol is used for direct and indirect contact of humans and animals with bats. In these cases bats are euthanised and tested for rabies at the CIDC in Lelystad.

The number of rabies positive bats in the Netherlands in the last 5 years:

2004: 91 bats investigated - 14 bats found positive

2003: 130 bats investigated - 7 bats found positive

2002: 113 bats investigated - 3 bats found positive

2001: 131 bats investigated - 9 bats found positive

2000: 89 bats investigated - 3 bats found positive

2.11.2. Lyssavirus (rabies) in animals

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	unspecified lyssavirus
Dogs	CIDC	Animal	4	0	
Cats	CIDC	Animal	5	0	
Bats					
wild	CIDC	Animal	94	4	
Foxes					
wild	CIDC	Animal	2	0	
Ferrets	CIDC	Animal	1	0	
Muskrats	CIDC	Animal	1	0	
Polecats	CIDC	Animal	1	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 Cattle (bovine animals) - dairy cows - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																							
E. coli																							
Cattle (bovine animals) - dairy cows - Monitoring																							
Isolates out of a monitoring programme		yes																					
Number of isolates available in the laboratory		139																					
Antimicrobials:		N	n	≤0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Tetracyclines																							
Tetracyclin		139	1	0	0	0	0	0	23	92	23	0	0	0	0	1	0	0	0	0	0	0.5	64
Amphenicols																							
Chloramphenicol		139	0	0	0	0	0	0	0	0	6	125	8	0	0	0	0	0	0	0	0	4	128
Florfenicol		139	0	0	0	0	0	0	0	0	16	118	5	0	0	0	0	0	0	0	0	4	128
Cephalosporins																							
Cefotaxim		139	0	0	0	137	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.125	16
Ceftazidim		139	0	0	0	106	31	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.125	16
Fluoroquinolones																							
Ciprofloxacin		139	0	0	139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	8
Quinolones																							
Nalidixic acid		139	0	0	0	0	0	0	0	97	41	1	0	0	0	0	0	0	0	0	0	2	128
Trimethoprim		139	1	0	0	0	0	137	1	0	0	0	0	0	0	1	0	0	0	0	0	0.5	64
Sulfonamides																							
Sulfamethoxazol		139	1	0	0	0	0	0	0	0	0	137	1	0	0	0	0	0	0	1	0	8	1024
Aminoglycosides																							
Gentamicin		139	0	0	0	0	6	109	18	5	1	0	0	0	0	0	0	0	0	0	0	0.25	32
Neomycin		139	0	0	0	0	0	0	120	16	3	0	0	0	0	0	0	0	0	0	0	1	128
Penicillins																							
Ampicillin		139	0	0	0	0	0	0	4	12	83	40	0	0	0	0	0	0	0	0	0	1	64

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

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																						
E. coli																						
Gallus gallus (fowl) - broilers - Monitoring																						
Isolates out of a monitoring programme	yes																					
	304																					
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																						
Tetracyclin	304	185	0	0	0	0	0	17	68	34	0	0	4	89	92	0	0	0	0	0	0.5	64
Amphenicols																						
Chloramphenicol	304	55	0	0	0	0	0	0	0	7	198	44	0	3	2	50	0	0	0	0	4	128
Florfenicol	304	3	0	0	0	0	0	0	0	46	216	39	2	1	0	0	0	0	0	0	4	128
Cephalosporins																						
Cefotaxim	304	43	0	0	260	1	0	0	2	2	4	8	27	0	0	0	0	0	0	0	0.125	16
Ceftazidim	244	28	0	0	129	71	8	8	7	11	5	4	1	0	0	0	0	0	0	0	0.125	16
Fluoroquinolones																						
Ciprofloxacin	303	8	0	149	30	68	41	6	1	3	5	0	0	0	0	0	0	0	0	0	0.06	8
Quinolones																						
Nalidixic acid	304	158	0	0	0	0	0	0	111	35	0	0	7	21	57	73	0	0	0	0	2	128
Trimethoprim	304	192	0	0	0	0	105	7	0	0	0	0	0	0	192	0	0	0	0	0	0.5	64
Sulfonamides																						
Sulfamethoxazol	303	217	0	0	0	0	0	0	0	0	86	0	0	0	0	0	0	0	217	0	8	1024
Aminoglycosides																						
Gentamicin	304	10	0	0	0	21	211	54	6	0	2	5	4	1	0	0	0	0	0	0	0.25	32
Neomycin	304	32	0	0	0	0	0	211	52	6	1	2	15	7	8	2	0	0	0	0	1	128

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

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																						
E. coli																						
Pigs - Monitoring																						
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	299																					
Antimicrobials:	N	n	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Tetracyclines																						
Tetracyclin	299	186	0	0	0	0	0	28	72	13	1	3	8	84	90	0	0	0	0	0	0.5	64
Amphenicols																						
Chloramphenicol	299	26	0	0	0	0	0	0	0	19	233	21	5	13	1	7	0	0	0	0	4	128
Florfenicol	299	0	0	0	0	0	0	0	4	45	226	24	0	0	0	0	0	0	0	0	4	128
Cephalosporins																						
Cefotaxim	299	1	0	0	292	5	1	0	1	0	0	0	0	0	0	0	0	0	0	0.125	16	
Fluoroquinolones																						
Ciprofloxacin	299	0	0	299	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	8	
Quinolones																						
Nalidixic acid	299	0	0	0	0	0	0	0	212	84	3	0	0	0	0	0	0	0	0	2	128	
Trimethoprim	299	124	0	0	0	0	168	6	1	0	0	0	0	0	124	0	0	0	0	0.5	64	
Sulfonamides																						
Sulfamethoxazol	299	153	0	0	0	0	0	0	0	0	144	1	1	0	0	0	0	2	151	8	1024	
Penicillins																						
Ampicillin	299	91	0	0	0	0	1	8	23	130	46	0	1	0	90	0	0	0	0	1	64	

Table Antimicrobial susceptibility testing of E. coli in animals

n = Number of resistant isolates										
	E. coli									
	Cattle (bovine animals)	Pigs		Gallus gallus (fowl)		Turkeys		Cattle (bovine animals) - calves (under 1 year) - veal calves		
Isolates out of a monitoring programme	yes	yes		yes				yes		
Number of isolates available in the laboratory	139	299		304				165		
Antimicrobials:	N	n	N	n	N	n	N	n	N	n
Tetracyclines										
Tetracyclin	139	1	299	186	304	185			165	152
Amphenicols										
Chloramphenicol	139	0	299	26	304	55			165	55
Florfenicol	139	0	299	0	304	3			165	30
Cephalosporins										
Cefotaxim	139	0	299	1	304	43			165	2
Ceftazidim	139	0	238	1	244	28			165	1
Fluoroquinolones										
Ciprofloxacin	139	0	299	0	303	8			165	17
Quinolones										
Nalidixic acid	139	0	299	0	304	158			165	43
Trimethoprim	139	1	299	124	304	192			165	73
Sulfonamides										
Sulfamethoxazol	139	1	299	153	303	217			165	90
Aminoglycosides										
Gentamicin	139	0	299	1	304	10			165	18
Neomycin	139	0	299	13	304	32			165	44
Penicillins										
Ampicillin	139	0	299	91	304	192			165	80
Fully sensitive	139	138	299	84	304	37			165	29
Resistant to 1 antimicrobial			299	51	304	26			165	31
Resistant to 2 antimicrobials			299	41	304	26			165	14
Resistant to 3 antimicrobials	139	1	299	51	304	44			165	14
Resistant to 4 antimicrobials			299	54	304	53			165	22
Resistant to >4 antimicrobials			299	18	304	118			165	56

Table Antimicrobial susceptibility testing of E. coli in calves (under 1 year) - Cattle (bovine animals) - veal calves - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration (µl/ml) or zone (mm) of inhibition equal to																						
E. coli																						
Cattle (bovine animals) - calves (under 1 year) - veal calves - Monitoring																						
Isolates out of a monitoring programme		yes																				
Number of isolates available in the laboratory		165																				

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

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										
Tetracyclin		8		8						
Amphenicols										
Chloramphenicol		16		16						
Florfenicol		16		16						
Fluoroquinolones										
Ciprofloxacin		2		2						
Enrofloxacin										
Quinolones										
Nalidixic acid		16		16						
Trimethoprim		8		8						
Sulfonamides										
Sulfonamide		256		256						
Aminoglycosides										
Streptomycin										
Gentamicin		8		8						
Neomycin		16		16						
Kanamycin										
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim		1		1						
Ceftazidim		1		1						
3rd generation cephalosporins										
Penicillins										
Ampicillin		16		16						

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	
Histamine	1	0	7	0	7	fish(1)	0	1	restaurant(1)	
Unknown	16	0	182	0	0	pork(1), meat(1), pie(1), chinese food(3), buffet(1), poultry(1), meat/fish salad(1), barbecue(1), unknown(6)	16	0	restaurant(8), cafe(1), bakery(1), party(1), wedding(1), catering(2), festival(1), unknown(1)	
Campylobacter, thermophilic	2	1	8	0	1	beef(1), chicken(1), cheese made of raw milk(1)	3	0	restaurant(2), household(1)	
Salmonella - S. Enteritidis	2	3	23	0	2	egg(2), beef(1), foods at cooking shop(1), unknown(1)	5	0	hotel(1), cooking workshop(1), household(2), unknown(1)	
Campylobacter, thermophilic - C. jejuni(1)	1	0	19	0	0	buffet(1)	1	0	restaurant(1)	
Campylobacter, thermophilic - C. jejuni	3	3	21	0	1	poultry(3), chinese food(1), egg(1), barbecue(1)	6	0	restaurant(3), household(3)	
Food borne viruses - calicivirus (including norovirus)	3	0	21	0	0	unknown(3)	3	0	restaurant(1), party(1), cafe(1)	
Salmonella - S. Stourbridge	1	0	5	0	0	French goat cheese(1)	1	0	restaurant(1)	
Salmonella - S. group B	0	2	4	0	0	poultry(1), barbecue(1)	2	0	household(2)	
Salmonella - S. group C	1	0	2	0	0	egg(1)	1	0	hotel(1)	
Salmonella - S. group D	2	1	24	0	1	egg(1)	3	0	household(1), market(1), unknown(1)	
Salmonella - S. Typhimurium	0	1	3	0	0	egg(1)	1	0	household(1)	
Salmonella - S. group E	0	1	2	0	0	egg(1)	1	0	household(1)	

(1) : + Salmonella group C