



NETHERLANDS

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

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

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

IN 2007

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Netherlands**

Reporting Year: **2007**

Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
VWA	Food and Consumer Product safety Authority	
RIVM	National Institute for Public Health and the Environment	
GD	Animal Health Service	
PDV	Product Board Animal Feed	
PVE	Product Boards for Livestock, Meat and Eggs	
VMDC	Veterinary Microbiological Diagnostic Centre	
CVI	Central Veterinary Institute Lelystad	antimicrobial resistance data Rabies

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 2007. 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 slaughtered animals		Livestock numbers (live animals)		Number of holdings	
			Year*		Year*		Year*		Year*
Cattle (bovine animals)	dairy cows and heifers			449797		2598252		33484	
	mixed herds							6270	
	meat production animals					55135		5318	
	calves (under 1 year)			1390750		532333		3184	
	in total			1905300		3762784		48256	
Ducks	in total					1134146		95	
Gallus gallus (fowl)	breeding flocks for egg production line - in total	85				1114842		85	
	breeding flocks, unspecified - in total	418							
	breeding flocks for meat production line - in total	333				7069284		333	
	laying hens	1550				41224835			
	broilers	753				43351898		753	
	in total	2721		677771985		92760859		2721	
Goats	animals under 1 year					113545			
	in total			26800		324014		10406	
Pigs	fattening pigs					5558828		7576	
	breeding animals - unspecified - sows and gilts					1266471		3658	
	in total			14766589		11662654		11234	
Sheep	mixed herds (1)							12351	
	animals under 1 year (lambs)					690699			
	in total			610000		1369343		29505	
Solipeds, domestic	horses - in total			2656		133524		16109	
Turkeys	in total					1232354		70	

(1): sheep and goats

2. INFORMATION ON SPECIFIC ZOOSES 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. Salmonellosis in humans****2.1.3. Salmonella in foodstuffs****Table Salmonella in poultry meat and products thereof**

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from broilers (Gallus gallus)								
fresh								
- at retail	VWA	single	25g	1418	115	1	2	112
minced meat								
intended to be eaten cooked								
- at retail	VWA	single	25g	13	4			4
meat preparation								
intended to be eaten cooked								
- at retail	VWA	single	25g	49	1			1
meat products								
raw but intended to be eaten cooked								
- at retail	VWA	single	25g	64	0			
cooked, ready-to-eat								
- at retail	VWA	single	25g	6	0			
Meat from turkey								
fresh								
- at retail	vWA	single	25g	595	34		4	30
meat preparation								
intended to be eaten cooked								
- at retail	VWA	single	25g	118	4			4
meat products								

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raw but intended to be eaten cooked - at retail								
	VWA	single	25g	1	0			
Meat from duck								
- at retail	VWA	single	25g	4	0			

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Milk, cows'								
pasteurised milk								
- at retail	VWA	single	25ml	3	0			
Cheeses made from cows' milk								
- at retail	VWA	single	25g	17	0			
soft and semi-soft								
made from pasteurised milk								
- at retail	VWA	single	25g	27	0			
Cheeses made from goats' milk								
soft and semi-soft								
made from pasteurised milk								
- at retail	VWA	single	25g	8	0			
Dairy products (excluding cheeses)								
cream								
made from pasteurised milk								
- at retail (1)	VWA	single	25g	3	0			
ice-cream								
- at retail	VWA	single	25g	28	0			
dairy desserts								
- at retail	VWA	single	25g	8	0			

(1) : whipped cream

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from pig								
fresh								
- at retail	VWA	single	25g	277	9		5	4
minced meat								
intended to be eaten cooked								
- at retail	VWA	single	25g	34	2		1	1
meat preparation								
intended to be eaten cooked								
- at retail	VWA	single	25g	37	3		2	1
Meat from bovine animals								
fresh								
- at retail	VWA	single	25g	401	1			1
minced meat								
intended to be eaten raw								
- at retail	VWA	single	25g	952	4	1		3
intended to be eaten cooked								
- at retail	VWA	single	25g	266	1			1
meat preparation								
intended to be eaten cooked								
- at retail	VWA	single	25g	25	1		1	
Meat from sheep								
fresh								
- at retail	VWA	single	25g	91	0			
minced meat								
- at retail	VWA	single	25g	6	0			
Meat from bovine animals and pig								
meat preparation								
intended to be eaten cooked								
- at retail	VWA	single	25g	15	0			

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minced meat intended to be eaten cooked - at retail								
	VWA	single	25g	12	1			1
Meat, mixed meat								
- at retail	VWA	single	25g	346	1			1

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Senftenberg	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Eggs									
table eggs									
- at retail	VWA	batch	25g	975	0				
Crustaceans									
unspecified									
cooked									
- at retail	VWA	single	25g	27	1				1
Seeds, sprouted									
ready-to-eat	VWA	single	25g	581	9	4	1		4
Fruits and vegetables									
precut									
ready-to-eat	VWA	single	25g	1811	1				1
Infant formula									
dried									
intended for infants below 6 months	VWA	single	25g	24	0				
Chocolate	VWA	single	25g	17	0				
Sauce and dressings	VWA	single	25g	625	0				
Spices and herbs	VWA	single	25g	978	5				5

2.1.4. Salmonella in animals

Table Salmonella in breeding flocks of Gallus gallus

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Thompson	S. Enteritidis	S. Typhimurium	S. Hadar	S. Infantis	S. Virchow	Salmonella spp., unspecified	S. Bovismorbificans	S. Mbandaka	S. Heidelberg
Gallus gallus (fowl)	parent breeding flocks for egg production line	day-old chicks (1)	64	0										
		during rearing period (2)	64	0										
		- at farm	78	6	3				1	2				
		during production period (3)	69	1							1			
		- at farm	106	1						1				
grandparent breeding flocks for meat production line (8)			114	0										
parent breeding flocks for meat production line	- at farm		151	2										2
day-old chicks (4)	during rearing period (5)		433	0										
			433	1		1								
		- at farm	499	1		1								

during production period (6)	PVE	flock	601	5	4				1			
- at farm	GD	flock	396	8	5		1		1		1	
grandparent breeding flocks for egg production line (7)	PVE	flock	16	0								
- at farm	GD	flock	58	0								

- (1) : boxpapers
 (2) : faeces
 (3) : faeces
 (4) : boxpapers
 (5) : faeces
 (6) : faeces
 (7) : faeces
 (8) : faeces

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl)							
laying hens							
during rearing period (1)	PVE	flock	1386	0			
- at farm	GD	flock	1460	21	18	3	
during production period (2)	PVE	flock	1870	109	109		
- at farm	GD	flock	2161	105	105		
broilers							
day-old chicks (3)	PVE	flock	27953	77	2	6	69
during rearing period (4)	PVE	flock	28310	843	5	21	817
Turkeys							
meat production flocks (5)	PVE	flock	216	4			4
- at farm - Survey (6)	GD	flock	175	19		2	17

(1) : blood

(2) : blood

(3) : boxpapers

(4) : faeces

(5) : faeces

(6) : framework of the turkey baseline survey

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Pigeons	GD	animal	31	7			7
Partridges	GD	flock	2	0			
Ostriches	GD	flock	1	0			
Ducks	GD	animal	7	2			2
Parrots	GD	animal	10	0			

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Montevideo	S. Dublin	S. London	S. enterica subsp. arizonae	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. group B	S. Derby	S. Brandenburg	S. Bovismorbificans	S. Manhattan	S. enterica subsp. enterica	S. Bredeney
Cattle (bovine animals)	GD	animal	5421	126		99				27								
calves (under 1 year)																		
- at farm - Surveillance (1)	VWA	holding	172	5	1	3				2								
dairy cows																		
- at farm - Surveillance	VWA	holding	140	2		2												
Sheep	GD	animal	782	1						1								
Goats	GD	animal	315	0														
Pigs	GD	animal	4744	82						82								
fattening pigs																		
- at farm - Surveillance (2)	VWA	holding	228	44	1		3			26	1		6	2	1	1	6	1
Solipeds, domestic																		
horses	VMDC	animal	194	5								5						
Deer	GD	animal	13	1							1							
Dogs	VMDC	animal	376	10								10						
Cats	VMDC	animal	245	3								3						

	VMDC	animal	120	2						2					
Birds	VMDC	animal	9	2											
Reptiles	VMDC	animal							2						

- (1) : At one holding *S. dublin* as well as *S. montevideo* were found.
- (2) : A few times more than one *Salmonella* serovar was found into one holding.

2.1.5. Salmonella in feedingstuffs

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. group C1	S. Livingstone
Feed material of land animal origin										
dairy products	PDV	batch	25g	209	0					
meat and bone meal	PDV	batch	25g	64	6			1	2	3
blood meal	PDV	batch	25g	2	0					
animal fat	PDV	batch	25g	6	0					
Feed material of marine animal origin										
fish meal	PDV	batch	25g	272	1			1		
other fish products	PDV	batch	25g	36	0					

Table Salmonella in other feed matter (Part A)

Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Infantis	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Rissen	S. Tennessee	S. Agona	S. London	S. Mbandaka	S. Senftenberg	S. Havana	S. Adelaide	S. Cubana	S. Derby	S. Hadar
Feed material of cereal grain origin	PDV	batch	25g	185	0														
	PDV	batch	25g	1309	4		1			1	1	1							
	PDV	batch	25g	703	1			1											
	PDV	batch	25g	143	0														
	PDV	batch	25g	79	0														
	PDV	batch	25g																
Feed material of oil seed or fruit origin	PDV	batch	25g	4461	49	2	1	16			4	6	4	4	2				
	PDV	batch	25g	82	0														
	PDV	batch	25g	5316	124	3		15	2	6	9	4	15			36	4	2	2
	PDV	batch	25g	893	8			1			6		1						
	PDV	batch	25g	69	0														
	PDV	batch	25g																
Other feed material																			

[illegible]

Table Salmonella in other feed matter (Part B)

	S. Kentucky	S. group B	S. Livingstone	S. Anatum	S. Lexington	S. Paratyphi B var. Java	S. group C1	S. Virchow	S. Minnesota
Feed material of cereal grain origin									
barley derived									
wheat derived									
maize									
derived									
other cereal grain derived									
Feed material of oil seed or fruit origin									
rape seed derived		1	1	4	4	4	1	2	1
palm kernel derived									
soya (bean) derived	2	4	2			18			
sunflower seed derived									
linseed derived									
Other feed material									
legume seeds and similar products									
tubers, roots and similar products									

[illegible]

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Yoruba	S. Alachua	S. Mbandaka	S. group B	S. Livingstone	S. Derby	S. Senftenberg	S. Infantis
Compound feedingstuffs for cattle																
	PDV	batch	25g	2428	5			2					1	1	1	
Compound feedingstuffs for pigs																
	PDV	batch	25g	2898	3					1					1	1
Compound feedingstuffs for poultry (non specified)																
	PDV	batch	25g	659	1	1										
Compound feedingstuffs for poultry -breeders																
	PDV	batch	25g	2045	1			1								
Compound feedingstuffs for poultry - laying hens																
	PDV	batch	25g	2757	14	2		7			1			1	2	1
Compound feedingstuffs for poultry - broilers																
	PDV	batch	25g	1936	8	1		5	1			1				

2.1.6. Salmonella serovars and phagetype distribution

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

Table Salmonella serovars in animals

Serovars		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		Gallus gallus (fowl) - laying hens		Turkeys		Solipeds, domestic - horses		Gallus gallus (fowl) - broilers	
		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. Agona				7		4				1		8					
S. Bovismorbificans				8		3				2						1	
S. Brandenburg				19													
S. Bredeney				1								5					
S. Cerro		1				4				1						3	
S. Coeln				2													
S. Derby				49		1						4				1	
S. Dublin		68		1													
S. Enteritidis		4		17		30				14						4	
S. Fluntern						5				5							
S. Give				2													
S. Goldcoast				6													
S. Hadar						6						18				1	
S. Heidelberg						13				3						3	

[illegible]

Footnote

(*)M : Monitoring, C : Clinical

Table Salmonella serovars in food

Serovars	Meat from turkey		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin		Meat from horse			Seeds, sprouted												
	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C												
	Sources of isolates (*)		N=																									
	Number of isolates in the laboratory				11		187		134																			
Number of isolates serotyped		N=		7		11		0		185		0		134		0		31		0		1		0		0		
Number of isolates per type																												
S. Agona							1			1							5									1		
S. Blockley										1								1										
S. Bovismorbificans							2			1																		
S. Brandenburg							9																					
S. Bredeney							1																					
S. Derby							22											4										
S. Dublin						7	1																					
S. Enteritidis					1					4								12										
S. Hadar																												
S. Heidelberg										5																		
S. Indiana										6								1										
S. Infantis							1			13								1										
S. Kimuenza							1																					
S. Livingstone							3																					

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(*)M : Monitoring, C : Clinical

(*)M : Monitoring, C : Clinical

Table Salmonella Enteritidis phage types in animals

Phagetype	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	14		4		17		30				4	
Number of isolates phagetyped	14	0	4	0	17	0	30	0	0	0	4	0
Number of isolates per type												
PT 1	1				1		3					
PT 4	3				3		9					
PT 6					1							
PT 8	1		2		3		3				1	
PT 14b					1		1				1	
PT 21	1		1				2					
Not typable	7				3		9				2	
PT 1b					2							
PT 6a					1		2					
PT 6b					1							
PT 7	1						1					
PT 5b					1							
PT 11			1									

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Enteritidis phagetypes in food

Phagetype	Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin		Crustaceans - shrimps	
	M	C	M	C	M	C	M	C	M	C	M	C
Sources of isolates (*)												
Number of isolates in the laboratory	N=	11	187	0	134	0	0	0	0	0	1	0
Number of isolates phagetyped	N=	1	0	0	4	0	0	0	0	0	1	0
Number of isolates per type												
PT 1					1							
PT 4					1						1	
Not typable		1										
PT 6a					2							

Footnote

(*) M : Monitoring, C : Clinical

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		Turkeys	
	M	C	M	C	M	C	M	C	M	C	M	C	M	C
Sources of isolates (*)														
Number of isolates in the laboratory	24		172		20				11		3		20	
Number of isolates phagetyped	24	0	172	0	20	0	0	0	11	0	3	0	20	0
Number of isolates per type														
DT 7	1		3											
FT 507	9		33		4				2					
other	6		76		7				3		2		5	
FT 506	6		33		7				4		1		2	
FT 3			1		1				1				1	
FT 350			2											
FT 80	1		1											
FT 61			2											
FT 20			1											
FT 510	1		10											
FT 301			2											
FT 296					1				1					
FT 60			2											
FT 655			2											

[illegible]

Footnote

(*)M : Monitoring, C : Clinical

Table Salmonella Typhimurium phagetypes in food

Phagetype	Meat from turkey		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
	M	C	M	C	M	C	M	C	M	C	M	C
	Sources of isolates (*)		Sources of isolates (*)		Sources of isolates (*)		Sources of isolates (*)		Sources of isolates (*)		Sources of isolates (*)	
	N=		N=		N=		N=		N=		N=	
Number of isolates in the laboratory			11		187		134				58	
Number of isolates phagetyped	4	0	1	0	107	0	2	0	0	0	8	0
Number of isolates per type												
FT 507	1				22						1	
Not typable					23		1					
other	1		1		18						1	
FT 506	2				26		1				5	
FT 560					1							
FT 350					2							
FT 80					1						1	
FT 20					1							
FT 508					2							
FT 510					4							
FT 301					2							
FT 401					2							
FT 281					1							
FT 110					2							

Footnote

(*) M : Monitoring, C : Clinical
For phagotyping *S. typhimurium* the Dutch phagotyping scheme is used (FT)

2.1.7. Antimicrobial resistance in Salmonella isolates

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

Table Antimicrobial susceptibility testing of S. Derby in Pigs - Surveillance - quantitative data [Dilution method]

S. Derby																											
Pigs - Surveillance																											
Isolates out of a monitoring programme		yes																									
Number of isolates available in the laboratory		17																									
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																											
Antimicrobials:		Break point	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			
Aminoglycosides																											
Gentamicin		2	17	0				6	8	3													0.25	32			
Kanamycin		4	2	0							2												4	128			
Neomycin		4	15	1					12	2							1						1	128			
Streptomycin		32	2	0										2									2	128			
Amphenicols																											
Chloramphenicol		16	17	0									13	4									2	128			
Florfenicol		16	17	0								1	15	1									2	128			
Cephalosporins																											
Cefotaxim		0.5	17	0			13	3	1														0.125	16			
Ceftazidim		2	17	0				8	8	1													0.125	16			
Fluoroquinolones																											
Ciprofloxacin		0.06	17	0	1	16																	0.06	8			
Penicillins																											
Ampicillin		4	17	1						14	2						1							0.5	64		
Polymyxins																											
Colistin		8	2	0									2										8	16			
Quinolones																											
Nalidixic acid		16	17	0						1	15	1											0.5	128			
Sulfonamides																											
Sulfamethoxazol		256	17	8									4	4	1						8		0.25	1024			
Tetracyclines																											
Tetracyclin		8	17	7						1	9						7						0.5	64			
Trimethoprim		2	17	8					9							2	6						0.5	64			

Table Antimicrobial susceptibility testing in S. Derby

n = Number of resistant isolates								
	S. Derby							
	Pigs - Surveillance		Gallus gallus (fowl) - broilers		Gallus gallus (fowl) - laying hens		Cattle (bovine animals)	
Isolates out of a monitoring programme	yes							
Number of isolates available in the laboratory	17							
Antimicrobials:	N	n	N	n	N	n	N	n
Aminoglycosides								
Gentamicin	17	0						
Kanamycin	2	0						
Neomycin	15	1						
Streptomycin	2	0						
Amphenicols								
Chloramphenicol	17	0						
Florfenicol	17	0						
Cephalosporins								
Cefotaxim	17	0						
Ceftazidim	17	0						
Fluoroquinolones								
Ciprofloxacin	17	0						
Fully sensitive	17	8						
Penicillins								
Ampicillin	17	1						
Polymyxins								
Colistin	17	0						
Quinolones								
Nalidixic acid	17	0						
Resistant to 1 antimicrobial	17	1						
Resistant to 2 antimicrobials	17	2						
Resistant to 3 antimicrobials	17	5						
Resistant to 4 antimicrobials	17	0						
Resistant to >4 antimicrobials	17	1						
Sulfonamides								
Sulfamethoxazol	17	8						
Tetracyclines								
Tetracyclin	17	7						
Trimethoprim	17	8						

Table Antimicrobial susceptibility testing in S. Dublin

n = Number of resistant isolates								
	S. Dublin							
	Cattle (bovine animals) - Surveillance		Gallus gallus (fowl) - broilers		Gallus gallus (fowl) - laying hens		Pigs - Surveillance	
Isolates out of a monitoring programme	yes							
Number of isolates available in the laboratory	59							
Antimicrobials:	N	n	N	n	N	n	N	n
Aminoglycosides								
Gentamicin	59	0						
Kanamycin	2	0						
Neomycin	57	0						
Streptomycin	59	0						
Amphenicols								
Chloramphenicol	59	3						
Florfenicol	59	0						
Cephalosporins								
Cefotaxim	59	0						
Ceftazidim	59	0						
Fluoroquinolones								
Ciprofloxacin	59	2						
Fully sensitive	59	51						
Penicillins								
Ampicillin	59	1						
Polymyxins								
Colistin	2	0						
Quinolones								
Nalidixic acid	59	2						
Resistant to 1 antimicrobial	59	2						
Resistant to 2 antimicrobials	59	2						
Resistant to 3 antimicrobials	59	1						
Resistant to 4 antimicrobials	59	0						
Resistant to >4 antimicrobials	59	0						
Sulfonamides								
Sulfamethoxazol	59	4						
Tetracyclines								
Tetracyclin	59	1						
Trimethoprim	59	1						

**Table Antimicrobial susceptibility testing of S. Dublin in Cattle (bovine animals) - dairy cows -
Surveillance - quantitative data [Dilution method]**

S. Dublin																											
Cattle (bovine animals) - dairy cows - Surveillance																											
Isolates out of a monitoring programme		yes																									
		59																									
Number of isolates available in the laboratory		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																									
		Break point	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			
Antimicrobials:																											
Aminoglycosides																											
	Gentamicin	2	59	0				37	20	2													0.25	32			
	Kanamycin	4	2	0							2												4	128			
	Neomycin	4	58	0					1	56	1												1	128			
	Streptomycin	32	2	0									2										2	128			
Amphenicols																											
	Chloramphenicol	16	59	3							7	39	10			2	1						2	128			
	Florfenicol	16	59	0						1	27	29	2										2	128			
Cephalosporins																											
	Cefotaxim	0.5	59	0		2	55	2															0.125	16			
	Ceftazidim	2	59	0			48	9	2														0.125	16			
Fluoroquinolones																											
	Ciprofloxacin	0.06	59	2	2	55	1	1															0.06	8			
Penicillins																											
	Ampicillin	4	59	1					36	21	1					1							0.5	64			
Polymyxins																											
	Colistin	8	2	0								2											8	16			
Quinolones																											
	Nalidixic acid	16	59	2						32	24	1					2						0.5	128			
Sulfonamides																											
	Sulfamethoxazol	256	59	4								40	15							4			0.25	1024			
Tetracyclines																											
	Tetracyclin	8	59	1						13	33	12				1							0.5	64			
	Trimethoprim	2	59	1					56	2						1							0.5	64			

Footnote

These data contains MIC's of Salmonella Dublin collected from dairy cows and veale calves.

Table Antimicrobial susceptibility testing of S. Enteritidis in animals

n = Number of resistant isolates												
	S. Enteritidis											
	Cattle (bovine animals)	Pigs		Gallus gallus (fowl)		Turkeys		Gallus gallus (fowl) - laying hens		Gallus gallus (fowl) - broilers		
Isolates out of a monitoring programme								yes		yes		
Number of isolates available in the laboratory								8		11		
Antimicrobials:	N	n	N	n	N	n	N	n	N	n	N	n
Aminoglycosides												
Gentamicin									8	0	11	0
Kanamycin									0	0	6	2
Neomycin									8	0	5	0
Streptomycin									0	0	6	0
Amphenicols												
Chloramphenicol									8	0	11	0
Florfenicol									8	0	11	0
Cephalosporins												
Cefotaxim									8	0	11	0
Ceftazidim									8	0	11	0
Fluoroquinolones												
Ciprofloxacin									8	2	11	5
Fully sensitive									8	6	11	6
Penicillins												
Ampicillin									8	0	11	0
Polymyxins												
Colistin									0	0	6	0
Quinolones												
Nalidixic acid									8	2	6	5
Resistant to 1 antimicrobial									8	6	11	3
Resistant to 2 antimicrobials									8	2	11	2
Resistant to 3 antimicrobials									8	0	11	0
Resistant to 4 antimicrobials									8	0	11	0
Resistant to >4 antimicrobials									8	0	11	0
Sulfonamides												
Sulfamethoxazol									8	0	11	0
Tetracyclines												
Tetracyclin									8	0	11	0
Trimethoprim									8	0	11	0

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

S. Enteritidis		Gallus gallus (fowl) - broilers - at slaughterhouse - Surveillance																									
Isolates out of a monitoring programme	Number of isolates available in the laboratory	yes																									
		11																									
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																									
Antimicrobials:	Break point	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				
Aminoglycosides																											
	2	11	0				5	6														0.25	32				
	4	6	2							4	2											4	128				
	4	5	0						5													1	128				
	32	6	0							3	3											2	128				
Amphenicols																											
	16	11	0								1	10										2	128				
	16	11	0								8	3										2	128				
Cephalosporins																											
	0.5	11	0		2	8	1															0.125	16				
	2	11	0			1	9	1														0.125	16				
Fluoroquinolones																											
	0.06	11	5	2	4		4		1													0.06	8				
Penicillins																											
	4	11	0					1	9	1												0.5	64				
Polymyxins																											
	8	6	0								6											8	16				
Quinolones																											
	16	11	5						1	5						4	1					0.5	128				
Sulfonamides																											
	256	11	0								4	7										0.25	1024				
Tetracyclines																											
	8	11	0						3	8												0.5	64				
	2	11	0					10	1													0.5	64				
Trimethoprim																											

Table Antimicrobial susceptibility testing of S. Enteritidis in calves (under 1 year) - Cattle (bovine animals) - veal calves - at slaughterhouse - Surveillance - quantitative data [Dilution method]

S. Enteritidis																						
Cattle (bovine animals) - calves (under 1 year) - veal calves - at slaughterhouse - Surveillance																						
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	100																					
Antimicrobials:																						
Break point	N	n	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																			
			<=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

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

S. Enteritidis		Gallus gallus (fowl) - laying hens - at slaughterhouse - Surveillance																								
Isolates out of a monitoring programme		yes																								
Number of isolates available in the laboratory		8																								
		</																								

Table Antimicrobial susceptibility testing of Salmonella in humans, Salmonella Enteritidis

n = Number of resistant isolates		
S. Enteritidis		
humans		
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		439
Antimicrobials:	N	n
Aminoglycosides		
Gentamicin	439	0
Kanamycin	125	4
Neomycin	314	0
Streptomycin	125	0
Amphenicols		
Chloramphenicol	439	2
Florfenicol	439	2
Cephalosporins		
Cefotaxim	439	2
Ceftazidim	439	1
Fluoroquinolones		
Ciprofloxacin	439	59
Fully sensitive	439	361
Penicillins		
Ampicillin	439	23
Polymyxins		
Colistin	125	0
Quinolones		
Nalidixic acid	439	55
Resistant to 1 antimicrobial	439	60
Resistant to 2 antimicrobials	439	11
Resistant to 3 antimicrobials	439	3
Resistant to 4 antimicrobials	439	2
Resistant to >4 antimicrobials	439	2
Sulfonamides		
Sulfamethoxazol	439	10
Tetracyclines		
Tetracyclin	439	7
Trimethoprim	439	7

Table Antimicrobial susceptibility testing of S. Enteritidis in humans - Surveillance - quantitative data [Dilution method]

S. Enteritidis																								
humans - Surveillance																								
Isolates out of a monitoring programme		yes																						
Number of isolates available in the laboratory		439																						
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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	
Aminoglycosides																								
Gentamicin	2	439	0				188	226	25													0.25	32	
Kanamycin	4	125	4								121	3	1									4	128	
Neomycin	4	314	0						298	14	2											1	128	
Streptomycin	32	125	0							36	83	4	1	1								2	128	
Amphenicols																								
Chloramphenicol	16	439	2								20	410	7			1	1					2	128	
Florfenicol	16	439	2							1	293	139	4	1			1					2	128	
Cephalosporins																								
Cefotaxim	0.5	439	2		77	337	22	1		1			1									0.125	16	
Ceftazidim	2	439	1			16	398	23	1					1								0.125	16	
Fluoroquinolones																								
Ciprofloxacin	0.06	439	59	109	271	7	36	15	1													0.06	8	
Penicillins																								
Ampicillin	4	439	23					22	366	25	3				2	21						0.5	64	
Polymyxins																								
Colistin	8	125	0									125										8	16	
Quinolones																								
Nalidixic acid	16	439	55							50	319	15				11	44					0.5	128	
Sulfonamides																								
Sulfamethoxazol	256	439	10									160	256	11	1	1				10		0.25	1024	
Tetracyclines																								
Tetracyclin	8	439	7						75	347	10					7						0.5	64	
Trimethoprim	2	439	7					424	8							7						0.5	64	

Table Antimicrobial susceptibility testing in S. Hadar

n = Number of resistant isolates		
S. Hadar		
humans		
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		7
Antimicrobials:	N	n
Aminoglycosides		
Gentamicin	7	0
Kanamycin	1	0
Neomycin	6	0
Streptomycin	1	1
Amphenicols		
Chloramphenicol	7	0
Florfenicol	7	0
Cephalosporins		
Cefotaxim	7	0
Ceftazidim	7	0
Fluoroquinolones		
Ciprofloxacin	7	7
Fully sensitive	7	0
Penicillins		
Ampicillin	7	2
Polymyxins		
Colistin	1	0
Quinolones		
Nalidixic acid	7	7
Resistant to 1 antimicrobial	7	0
Resistant to 2 antimicrobials	7	4
Resistant to 3 antimicrobials	7	3
Resistant to 4 antimicrobials	7	0
Resistant to >4 antimicrobials	7	0
Sulfonamides		
Sulfamethoxazol	7	0
Tetracyclines		
Tetracyclin	7	7
Trimethoprim	7	0

Table Antimicrobial susceptibility testing of S. Hadar in humans - Surveillance - quantitative data
[Dilution method]

S. Hadar																										
humans - Surveillance																										
Isolates out of a monitoring programme		yes																								
Number of isolates available in the laboratory		7																								
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																										
Antimicrobials:		Break point	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		
Aminoglycosides																										
	Gentamicin	2	7	0					6	1													0.25	32		
	Kanamycin	4	1	0							1												4	128		
	Neomycin	4	6	0						3	3												1	128		
	Streptomycin	32	1	1													1						2	128		
Amphenicols																										
	Chloramphenicol	16	7	0								4	3										2	128		
	Florfenicol	16	7	0								6	1										2	128		
Cephalosporins																										
	Cefotaxim	0.5	7	0		1	6																0.125	16		
	Ceftazidim	2	7	0				6	1														0.125	16		
Fluoroquinolones																										
	Ciprofloxacin	0.06	7	7			1	5	1														0.06	8		
Penicillins																										
	Ampicillin	4	7	2					1	4							2						0.5	64		
Polymyxins																										
	Colistin	8	1	0									1										8	16		
Quinolones																										
	Nalidixic acid	16	7	7													1	6					0.5	128		
Sulfonamides																										
	Sulfamethoxazol	256	6	0									5	1									0.25	1024		
Tetracyclines																										
	Tetracyclin	8	7	7													6	1					0.5	64		
	Trimethoprim	2	7	0					7														0.5	64		

Table Antimicrobial susceptibility testing in *S. Infantis*

n = Number of resistant isolates		
<i>S. Infantis</i>		
humans		
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		16
Antimicrobials:	N	n
Aminoglycosides		
Gentamicin	16	2
Kanamycin	3	0
Neomycin	13	3
Streptomycin	3	0
Amphenicols		
Chloramphenicol	16	2
Florfenicol	16	1
Cephalosporins		
Cefotaxim	16	2
Ceftazidim	16	0
Fluoroquinolones		
Ciprofloxacin	16	7
Fully sensitive	16	9
Penicillins		
Ampicillin	16	3
Polymyxins		
Colistin	3	0
Quinolones		
Nalidixic acid	16	7
Resistant to 1 antimicrobial	16	2
Resistant to 2 antimicrobials	16	0
Resistant to 3 antimicrobials	16	1
Resistant to 4 antimicrobials	16	1
Resistant to >4 antimicrobials	16	3
Sulfonamides		
Sulfamethoxazol	16	5
Tetracyclines		
Tetracyclin	16	4
Trimethoprim	16	3

**Table Antimicrobial susceptibility testing of *S. Infantis* in humans - Surveillance - quantitative data
[Dilution method]**

S. Infantis																											
humans - Surveillance																											
Isolates out of a monitoring programme		yes																									
		16																									
Number of isolates available in the laboratory																											
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																											
Antimicrobials:		Break point	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			
Aminoglycosides																											
	Gentamicin	2	16	2				4	9	1			1			1							0.25	32			
	Kanamycin	4	3	0								3											4	128			
	Neomycin	4	13	3					10								1	2					1	128			
	Streptomycin	32	3	0									2		1								2	128			
Amphenicols																											
	Chloramphenicol	16	16	2									12	2	1			1					2	128			
	Florfenicol	16	16	1								1	12	2	1								2	128			
Cephalosporins																											
	Cefotaxim	0.5	16	2			11	2	1	2													0.125	16			
	Ceftazidim	2	16	0				6	8		2												0.125	16			
Fluoroquinolones																											
	Ciprofloxacin	0.06	16	7	2	7		2	3	2													0.06	8			
Penicillins																											
	Ampicillin	4	16	3						11	2		2				1						0.5	64			
Polymyxins																											
	Colistin	8	3	0									3										8	16			
Quinolones																											
	Nalidixic acid	16	16	7							6	3					1	6					0.5	128			
Sulfonamides																											
	Sulfamethoxazol	256	16	5									9	2							5		0.25	1024			
Tetracyclines																											
	Tetracyclin	8	16	4						7	5							4					0.5	64			
	Trimethoprim	2	16	3					10	3							1	2					0.5	64			

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

S. Typhimurium		Gallus gallus (fowl) - broilers - at slaughterhouse - Surveillance																							
Isolates out of a monitoring programme	Number of isolates available in the laboratory	yes																							
		11																							
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																							
Antimicrobials:	Break point	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		
Aminoglycosides																									
	Gentamicin	2	11	0	8	3																0.25	32		
	Neomycin	4	11	1				9			1				1							1	128		
Amphenicols																									
	Chloramphenicol	16	11	3							1	4	3				3					2	128		
	Florfenicol	16	11	3							1	7		1	2							2	128		
Cephalosporins																									
	Cefotaxim	0.5	11	0		11																0.125	16		
	Ceftazidim	2	11	0			9	2														0.125	16		
Fluoroquinolones																									
	Ciprofloxacin	0.06	11	0	11																	0.06	8		
Penticillins																									
	Ampicillin	4	11	6				5								6						0.5	64		
Quinolones																									
	Nalidixic acid	16	11	0						1	8	1	1									0.5	128		
Sulfonamides																									
	Sulfamethoxazol	256	11	8								2	1							8		0.25	1024		
Tetracyclines																									
	Tetracyclin	8	11	7						4				3		4						0.5	64		
	Trimethoprim	2	11	2				9								2						0.5	64		

Table Antimicrobial susceptibility testing of S.Typhimurium in animals

n = Number of resistant isolates												
S. Typhimurium												
	Cattle (bovine animals)	Pigs	Gallus gallus (fowl)	Turkeys	Gallus gallus (fowl) - laying hens	Gallus gallus (fowl) - broilers						
Isolates out of a monitoring programme	yes	yes				yes						
Number of isolates available in the laboratory	8	84				11						
Antimicrobials:	N	n	N	n	N	n	N	n	N	n	N	n
Aminoglycosides												
Gentamicin	8	0	84	0							11	0
Kanamycin	0	0	8	0							0	0
Neomycin	8	0	76	0							11	1
Streptomycin	0	0	8	3							0	0
Amphenicols												
Chloramphenicol	8	1	84	25							11	3
Florfenicol	8	1	84	23							11	3
Cephalosporins												
Cefotaxim	8	0	84	0							11	0
Ceftazidim	8	0	84	0							11	0
Fluoroquinolones												
Ciprofloxacin	8	0	84	3							11	0
Fully sensitive	8	3	84	18							11	1
Number of multiresistant S. Typhimurium DT104												
resistant to other antimicrobials	1	0	22	3							5	0
with penta resistance	1	1	22	17							5	3
Penicillins												
Ampicillin	8	5	84	46							11	6
Polymyxins												
Colistin	0	0	8	0							0	0
Quinolones												
Nalidixic acid	8	0	84	3							11	0
Resistant to 1 antimicrobial	8	1	84	14							11	4
Resistant to 2 antimicrobials	8	0	84	2							11	0
Resistant to 3 antimicrobials	8	2	84	17							11	2
Resistant to 4 antimicrobials	8	2	84	25							11	3
Resistant to >4 antimicrobials	8	0	84	8							11	1
Sulfonamides												
Sulfamethoxazol	8	4	84	53							11	8
Tetracyclines												
Tetracyclin	8	4	84	56							11	7
Trimethoprim	8	1	84	24							11	2

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Cattle (bovine animals) - dairy cows - at slaughterhouse - Surveillance - quantitative data [Dilution method]

S. Typhimurium		Cattle (bovine animals) - dairy cows - at slaughterhouse - Surveillance																								
Isolates out of a monitoring programme	Number of isolates available in the laboratory	yes																								
		8																								
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:		Break point	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		
Aminoglycosides																										
	Gentamicin	2	8	0				2	6																	
	Neomycin	4	8	0						6	1	1														
Amphenicols																										
	Chloramphenicol	16	8	1								1	6					1								
	Florfenicol	16	8	1								5	2			1										
Cephalosporins																										
	Cefotaxim	0.5	8	0				8																		
	Ceftazidim	2	8	0			1	7																		
Fluoroquinolones																										
	Ciprofloxacin	0.06	8	0		8																				
Penicillins																										
	Ampicillin	4	8	5					1	2				1			4									
Quinolones																										
	Nalidixic acid	16	8	0							5	3														
Sulfonamides																										
	Sulfamethoxazol	256	8	4									2	2							4					
Tetracyclines																										
	Tetracyclin	8	8	4						1	3					1	3									
	Trimethoprim	2	8	1					7								1									

Table Antimicrobial susceptibility testing of *S. Typhimurium* in Pigs - at slaughterhouse - Surveillance
- quantitative data [Dilution method]

S. Typhimurium		Pigs - at slaughterhouse - Surveillance																								
Isolates out of a monitoring programme	Number of isolates available in the laboratory	yes																								
		84																								
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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			

Table Antimicrobial susceptibility testing of Salmonella in humans, Salmonella Typhimurium

n = Number of resistant isolates		
S. Typhimurium		
humans		
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		245
Antimicrobials:	N	n
Aminoglycosides		
Gentamicin	245	2
Kanamycin	46	10
Neomycin	199	7
Streptomycin	46	20
Amphenicols		
Chloramphenicol	245	36
Florfenicol	245	30
Cephalosporins		
Cefotaxim	245	0
Ceftazidim	245	0
Fluoroquinolones		
Ciprofloxacin	245	8
Fully sensitive	245	80
Number of multiresistant S. Typhimurium DT104		
resistant to other antimicrobials	47	7
with penta resistance	47	47
Penicillins		
Ampicillin	245	132
Polymyxins		
Colistin	46	0
Quinolones		
Nalidixic acid	245	6
Resistant to 1 antimicrobial	245	31
Resistant to 2 antimicrobials	245	8
Resistant to 3 antimicrobials	245	50
Resistant to 4 antimicrobials	245	49
Resistant to >4 antimicrobials	245	27
Sulfonamides		
Sulfamethoxazol	245	138
Tetracyclines		
Tetracyclin	245	130
Trimethoprim	245	52

Table Antimicrobial susceptibility testing of *S. Typhimurium* in humans - Surveillance - quantitative data [Dilution method]

S. Typhimurium																											
humans - Surveillance																											
Isolates out of a monitoring programme		yes																									
Number of isolates available in the laboratory		245																									
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																											
Antimicrobials:		Break point	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			
Aminoglycosides																											
	Gentamicin	2	245	2				47	162	33	1		1	1									0.25	32			
	Kanamycin	4	46	10								36	8	1				1					4	128			
	Neomycin	4	199	7						162	30					3	2	1					1	128			
	Streptomycin	32	46	20									11	8	7	2	5	13					2	128			
Amphenicols																											
	Chloramphenicol	16	245	36								4	185	20	0	0	9	27					2	128			
	Florfenicol	16	245	30								81	130	4	7	16	4	3					2	128			
Cephalosporins																											
	Cefotaxim	0.5	245	0		22	203	18	2	0													0.125	16			
	Ceftazidim	2	245	0		0	7	209	28	1													0.125	16			
Fluoroquinolones																											
	Ciprofloxacin	0.06	245	8	37	200	2	6															0.06	8			
Penicillins																											
	Ampicillin	4	245	132					7	94	11	1				25	107						0.5	64			
Polymyxins																											
	Colistin	8	46	0									46										8	16			
Quinolones																											
	Nalidixic acid	16	245	6							44	178	15	2	0	0	2	4					0.5	128			
Sulfonamides																											
	Sulfamethoxazol	256	245	138									69	38						138			0.25	1024			
Tetracyclines																											
	Tetracyclin	8	245	130						21	91	2	1	1	23	12	94						0.5	64			
	Trimethoprim	2	245	52					187	6						11	41						0.5	64			

Table Antimicrobial susceptibility testing in S. Virchow

n = Number of resistant isolates		
S. Virchow		
humans		
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		23
Antimicrobials:	N	n
Aminoglycosides		
Gentamicin	23	3
Kanamycin	8	4
Neomycin	15	0
Streptomycin	8	2
Amphenicols		
Chloramphenicol	23	2
Florfenicol	23	0
Cephalosporins		
Cefotaxim	23	2
Ceftazidim	23	2
Fluoroquinolones		
Ciprofloxacin	23	15
Fully sensitive	23	7
Penicillins		
Ampicillin	23	7
Polymyxins		
Colistin	8	0
Quinolones		
Nalidixic acid	23	15
Resistant to 1 antimicrobial	23	5
Resistant to 2 antimicrobials	23	0
Resistant to 3 antimicrobials	23	3
Resistant to 4 antimicrobials	23	4
Resistant to >4 antimicrobials	23	4
Sulfonamides		
Sulfamethoxazol	23	9
Tetracyclines		
Tetracyclin	23	8
Trimethoprim	23	8

Table Antimicrobial susceptibility testing of *S. Virchow* in humans - Surveillance - quantitative data [Dilution method]

S. Virchow																											
humans - Surveillance																											
Isolates out of a monitoring programme		yes																									
Number of isolates available in the laboratory		23																									
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																											
Antimicrobials:		Break point	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			
Aminoglycosides																											
	Gentamicin	2	23	3				3	13	4					2	1							0.25	32			
	Kanamycin	4	8	4								4	3					1					4	128			
	Neomycin	4	15	0						13	2												1	128			
	Streptomycin	32	8	2										4	2			2					2	128			
Amphenicols																											
	Chloramphenicol	16	23	2								3	18				2						2	128			
	Florfenicol	16	23	0								14	8	1									2	128			
Cephalosporins																											
	Cefotaxim	0.5	23	2		6	14	1							2								0.125	16			
	Ceftazidim	2	23	2			3	15	3					1	1								0.125	16			
Fluoroquinolones																											
	Ciprofloxacin	0.06	23	15	1	7	3	7	4		1												0.06	8			
Penicillins																											
	Ampicillin	4	23	7					3	13						3	4						0.5	64			
Polymyxins																											
	Colistin	8	8	0									8										8	16			
Quinolones																											
	Nalidixic acid	16	23	15						3	5						8	7					0.5	128			
Sulfonamides																											
	Sulfamethoxazol	256	23	9									9	5						9			0.25	1024			
Tetracyclines																											
	Tetracyclin	8	23	8						8	7					6	2						0.5	64			
	Trimethoprim	2	23	8					15							5	3						0.5	64			

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

Salmonella spp.																									
Gallus gallus (fowl) - broilers - Surveillance																									
Isolates out of a monitoring programme		yes																							
Number of isolates available in the laboratory		128																							
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																							
Antimicrobials:	Break point	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		
Aminoglycosides																									
	Gentamicin	2	128	2			74	43	8	1			1									0.25	32		
	Kanamycin	4	41	6					35								6					4	128		
	Neomycin	4	87	7					76	4				2	1	2	2					1	128		
	Streptomycin	32	41	14								3	8	16	6	6	2					2	128		
Amphenicols																									
	Chloramphenicol	16	128	3							14	81	30			3						2	128		
	Florfenicol	16	128	0						3	52	59	14									2	128		
Cephalosporins																									
	Cefotaxim	0.5	128	22		9	66	25	6			6	4	12								0.125	16		
	Ceftazidim	2	128	21			2	43	53	8	1	4	2	3	12							0.125	16		
Fluoroquinolones																									
	Ciprofloxacin	0.06	128	61	17	50	5	22	22	9	3											0.06	8		
Penicillins																									
	Ampicillin	4	128	59				11	40	14	4				16	43						0.5	64		
Polymyxins																									
	Colistin	8	41	0								41										8	16		
Quinolones																									
	Nalidixic acid	16	128	56					20	42	10			1	1	19	35					0.5	128		
Sulfonamides																									
	Sulfamethoxazol	256	128	58								43	23	3		1		1		57		0.25	1024		
Tetracyclines																									
	Tetracyclin	8	128	34					20	58	16				7	27						0.5	64		
	Trimethoprim	2	128	90				36	2						28	62						0.5	64		

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

Salmonella spp.																							
Cattle (bovine animals) - dairy cows - Surveillance																							
Isolates out of a monitoring programme		yes																					
Number of isolates available in the laboratory		11																					
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																					
Antimicrobials:	Break point	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
Aminoglycosides																							
	2	11	1				2	6	2		1												
	4	11	0					10			1												
Amphenicols																							
	16	11	1								1	9				1							
	16	11	0								6	4	1										
Cephalosporins																							
	0.5	11	0			11																	
	2	12	1			2	9								1								
Fluoroquinolones																							
	0.06	11	0		11																		
Penicillins																							
	4	11	1					2	8						1								
Quinolones																							
	16	11	0							3	8												
Sulfonamides																							
	256	11	1									5	5							1			
Tetracyclines																							
	8	11	1						5	5			1										
	2	11	0					11															
Trimethoprim																							

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

Salmonella spp.																										
Gallus gallus (fowl) - laying hens - Surveillance																										
Isolates out of a monitoring programme		yes																								
		6																								
Number of isolates available in the laboratory																										
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																										
Antimicrobials:		Break point	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		
Aminoglycosides									4	2													0.25	32		
	Gentamicin	2	6	0																						
	Kanamycin	4	4	0								4											4	128		
	Neomycin	4	2	0						1	1												1	128		
	Streptomycin	32	4	0									1	1	2								2	128		
Amphenicols																										
	Chloramphenicol	16	6	1								1	1	3	1								2	128		
	Florfenicol	16	6	1								2	1	2	1								2	128		
Cephalosporins																										
	Cefotaxim	0.5	6	0		1	2	3															0.125	16		
	Ceftazidim	2	6	0				2	2	2													0.125	16		
Fluoroquinolones																										
	Ciprofloxacin	0.06	6	2	1	3	1			1													0.06	8		
Penicillins																										
	Ampicillin	4	6	0						3	3												0.5	64		
Polymyxins																										
	Colistin	8	4	0									4										8	16		
Quinolones																										
	Nalidixic acid	16	6	1							1	2		2			1						0.5	128		
Sulfonamides																										
	Sulfamethoxazol	256	6	1									3	2							1		0.25	1024		
Tetracyclines																										
	Tetracyclin	8	6	1						2		1	2				1						0.5	64		
	Trimethoprim	2	6	1					4	1							1						0.5	64		

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

Salmonella spp.																								
Pigs - Surveillance																								
Isolates out of a monitoring programme		yes																						
Number of isolates available in the laboratory		43																						
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:		Break point	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
Aminoglycosides																								
	Gentamicin	2	43	2				13	23	5					2								0.25	32
	Kanamycin	4	9	1								8	1										4	128
	Neomycin	4	34	1					29	2	2					1							1	128
	Streptomycin	32	9	3									3	3				3					2	128
Amphenicols																								
	Chloramphenicol	16	43	5								3	27	8	1		3	1					2	128
	Florfenicol	16	43	0								18	20	5									2	128
Cephalosporins																								
	Cefotaxim	0.5	43	0		4	36	3															0.125	16
	Ceftazidim	2	43	0			3	28	11	1													0.125	16
Fluoroquinolones																								
	Ciprofloxacin	0.06	43	2	8	33			1	1													0.06	8
Penicillins																								
	Ampicillin	4	43	13					5	23	2				1	4	8						0.5	64
Polymyxins																								
	Colistin	8	9	0									9										8	16
Quinolones																								
	Nalidixic acid	16	43	2						8	27	6					1	1					0.5	128
Sulfonamides																								
	Sulfamethoxazol	256	43	22									13	7	1					22			0.25	32
Tetracyclines																								
	Tetracyclin	8	43	13						12	15	2	1				1	12					0.5	64
	Trimethoprim	2	43	19					23	1						3	16						0.5	64

Table Antimicrobial susceptibility testing of Salmonella in animals

n = Number of resistant isolates												
	Salmonella spp.											
	Cattle (bovine animals)	Pigs	Gallus gallus (fowl)	Turkeys	Gallus gallus (fowl) - laying hens	Gallus gallus (fowl) - broilers						
Isolates out of a monitoring programme	yes	yes			yes	yes						
Number of isolates available in the laboratory	11	43			6	128						
Antimicrobials:	N	n	N	n	N	n	N	n	N	n	N	n
Aminoglycosides												
Gentamicin	11	1	43	2					6	0	128	2
Kanamycin	0	0	9	1					4	0	41	6
Neomycin	11	0	34	1					2	0	87	7
Streptomycin	0	0	9	3					4	0	41	14
Amphenicols												
Chloramphenicol	11	1	43	5					6	1	128	3
Florfenicol	11	0	43	0					6	1	128	0
Cephalosporins												
Cefotaxim	10	0	43	0					6	0	128	22
Ceftazidim	10	0	43	0					6	0	128	21
Fluoroquinolones												
Ciprofloxacin	10	0	43	2					6	2	128	61
Fully sensitive	11	9	43	17					6	4	128	26
Penicillins												
Ampicillin	11	1	43	13					6	0	128	59
Polymyxins												
Colistin	0	0	9	0					4	0	41	0
Quinolones												
Nalidixic acid	11	0	43	2					6	1	128	56
Resistant to 1 antimicrobial	11	1	43	4					6	1	128	15
Resistant to 2 antimicrobials	11	0	43	9					6	0	128	19
Resistant to 3 antimicrobials	11	0	43	4					6	0	128	29
Resistant to 4 antimicrobials	11	0	43	5					6	1	128	15
Resistant to >4 antimicrobials	11	1	43	4					6	0	128	24
Sulfonamides												
Sulfamethoxazol	11	1	43	22					6	1	128	58
Tetracyclines												
Tetracyclin	11	1	43	13					6	1	128	34
Trimethoprim	11	1	43	19					6	1	128	90

Table Antimicrobial susceptibility testing of Salmonella in humans, Salmonella spp.

n = Number of resistant isolates		
Salmonella spp.		
humans		
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		420
Antimicrobials:	N	n
Aminoglycosides		
Gentamicin	420	16
Kanamycin	112	18
Neomycin	308	7
Streptomycin	112	18
Amphenicols		
Chloramphenicol	420	20
Florfenicol	420	10
Cephalosporins		
Cefotaxim	420	5
Ceftazidim	420	5
Fluoroquinolones		
Ciprofloxacin	420	57
Penicillins		
Ampicillin	420	85
Polymyxins		
Colistin	112	0
Quinolones		
Nalidixic acid	420	41
Resistant to 1 antimicrobial	420	40
Resistant to 2 antimicrobials	420	46
Resistant to 3 antimicrobials	420	28
Resistant to 4 antimicrobials	420	21
Resistant to >4 antimicrobials	420	13
Sulfonamides		
Sulfamethoxazol	420	108
Tetracyclines		
Tetracyclin	420	99
Trimethoprim	420	42

Table Antimicrobial susceptibility testing of Other serotypes in humans - Surveillance - quantitative data [Dilution method]

Other serotypes																										
humans - Surveillance																										
Isolates out of a monitoring programme		yes																								
Number of isolates available in the laboratory		420																								
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																										
Antimicrobials:		Break point	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		
Aminoglycosides																										
	Gentamicin	2	420	16				89	254	56	5		1	7	3	5							0.25	32		
	Kanamycin	4	112	18								94	12	3				3					4	128		
	Neomycin	4	308	7						270	27	4			2	3	1	1					1	128		
	Streptomycin	32	112	18							1	8	38	38	9	1	2	15					2	128		
Amphenicols																										
	Chloramphenicol	16	420	20							1	28	327	44	1		4	15					2	128		
	Florfenicol	16	420	10							2	197	199	12	1	4	1	4					2	128		
Cephalosporins																										
	Cefotaxim	0.5	420	5		54	334	23	4				2	1	2								0.125	16		
	Ceftazidim	2	419	5			40	268	101	5					5								0.125	16		
Fluoroquinolones																										
	Ciprofloxacin	0.06	420	57	94	269	6	15	16	5	2		2	3	8								0.06	8		
Penicillins																										
	Ampicillin	4	419	85					68	238	27	1				16	69						0.5	64		
Polymyxins																										
	Colistin	8	112	0									112										8	16		
Quinolones																										
	Nalidixic acid	16	420	41							96	250	23	10			10	31					0.5	128		
Sulfonamides																										
	Sulfamethoxazol	256	420	108									211	98	3						108		0.25	1024		
Tetracyclines																										
	Tetracyclin	8	420	99						1	129	163	26	2		5	7	87					0.5	64		
	Trimethoprim	2	420	42						363	13	2				12	30						0.5	64		

Table Breakpoints for antibiotic resistance testing in Animals

Test Method Used

Broth dilution

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 ≤
Amphenicols										
Chloramphenicol	EUCAST/ EFSA	16		16	2	128				
Florfenicol	EUCAST/ EFSA	16		16	2	128				
Tetracyclines										
Tetracyclin	EUCAST/ EFSA	8		8	0.5	64				
Fluoroquinolones										
Ciprofloxacin	EUCAST/ EFSA	0.06		0.06	0.06	8				
Enrofloxacin										
Quinolones										
Nalidixic acid	EUCAST/ EFSA	16		16	0.5	128				
Trimethoprim	EUCAST/ EFSA	2		2	0.5	64				
Sulfonamides										
Sulfonamide										
Sulfamethoxazol	CLSI	256		256	0.25	1024				
Aminoglycosides										
Streptomycin	EUCAST/ EFSA	32		32	2	128				
Gentamicin	EUCAST/ EFSA	2		2	0.25	32				
Neomycin	EUCAST/ EFSA	4		4	1	128				
Kanamycin	EUCAST/ EFSA	4		4	4	128				
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim	EFSA/ EUCAST	0.5		0.5	0.125	16				
Ceftazidim	EFSA/ EUCAST	2		2	0.125	16				
3rd generation cephalosporins										
Penicillins										
Ampicillin	EFSA/ EUCAST	4		4	0.5	64				
Polymyxins										
Colistin	EFSA/ EUCAST	8		8	8	16				

Table Breakpoints for antibiotic resistance testing in Humans

Test Method Used

Broth dilution

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 ≤
Amphenicols										
Chloramphenicol	EUCAST/ EFSA	16		16	2	128				
Florfenicol	EUCAST/ EFSA	16		16	2	128				
Tetracyclines										
Tetracyclin	EUCAST/ EFSA	8		8	0.5	64				
Fluoroquinolones										
Ciprofloxacin	EUCAST/ EFSA	0.06		0.06	0.06	8				
Enrofloxacin	EFSA/ EUCAST									
Quinolones										
Nalidixic acid	EUCAST/ EFSA	16		16	0.5	128				
Trimethoprim	EUCAST/ EFSA	2		2	0.5	64				
Sulfonamides										
Sulfonamide										
Sulfamethoxazol	CLSI	256		256	0.25	1024				
Aminoglycosides										
Streptomycin	EUCAST/ EFSA	32		32	2	128				
Gentamicin	EUCAST/ EFSA	2		2	0.25	32				
Neomycin	EUCAST/ EFSA	4		4	1	128				
Kanamycin	EUCAST/ EFSA	4		4	4	128				
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim	EFSA/ EUCAST	0.5		0.5	0.125	16				
Ceftazidim	EFSA/ EUCAST	2		2	0.125	16				
3rd generation cephalosporins										
Penicillins										
Ampicillin	EFSA/ EUCAST	4		4	0.5	64				
Polymyxins										
Colistin	EFSA/ EUCAST	8		8	8	16				

2.2. CAMPYLOBACTERIOSIS**2.2.1. General evaluation of the national situation****2.2.2. Campylobacteriosis in humans****2.2.3. Campylobacter 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. upsaliensis	C. jejuni	Thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus)										
fresh										
- at retail	VWA	single	25g	1407	153					153
minced meat										
intended to be eaten cooked										
- at retail	VWA	single	25g	9	0					
meat preparation										
intended to be eaten cooked										
- at retail	VWA	single	25g	4	0					
meat products										
raw but intended to be eaten cooked										
- at retail	VWA	single	25g	2	1					1
Meat from turkey										
fresh										
- at retail	VWA	single	25g	711	112					112

Table Campylobacter in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	Thermophilic Campylobacter spp., unspecified
Meat from pig						
fresh						
- at retail	VWA	single	25g	269	3	3
Meat from bovine animals						
fresh						
- at retail	VWA	single	25g	264	0	
minced meat						
intended to be eaten raw						
- at retail	VWA	single	25g	12	0	
intended to be eaten cooked						
- at retail	VWA	single	25g	325	2	2
Meat from sheep						
fresh						
- at retail	VWA	single	25g	90	6	6
minced meat						
intended to be eaten cooked						
- at retail	VWA	single	25g	5	1	1

2.2.4. Campylobacter in animals

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Cattle (bovine animals)	GD	animal	3005	20					20
Sheep	GD	animal	782	22					22
Goats	GD	animal	315	0					
Solipeds, domestic									
horses	VMDC	animal	194	0					
Gallus gallus (fowl)	GD	flock	1623	0					
Turkeys	GD	flock	42	0					
Ducks	GD	flock	13	0					
Dogs	VMDC	animal	376	75					75
Cats	VMDC	animal	245	20					20
Birds	VMDC	animal	120	0					
Reptiles	VMDC	animal	9	0					

2.2.5. Antimicrobial resistance in *Campylobacter* isolates

Table Antimicrobial susceptibility testing of C. coli in Cattle (bovine animals) - dairy cows - quantitative data [Dilution method]

C. coli																										
Cattle (bovine animals) - dairy cows																										
Isolates out of a monitoring programme	yes																									
	6																									
Number of isolates available in the laboratory																										
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																										
Antimicrobials:	Break point	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			
Aminoglycosides																										
Gentamicin	2	6	0				3	3														0.25	32			
Neomycin	2	6	0					5	1													0.5	32			
Streptomycin	4	6	1						4	1				1								1	128			
Amphenicols																										
Chloramphenicol	16	6	0									5	1									2	128			
Fluoroquinolones																										
Ciprofloxacin	1	6	1			3	1	1						1								0.125	16			
Macrolides																										
Erythromycin	16	6	0						1	2	2	1										0.5	64			
Penicillins																										
Ampicillin	8	6	5									1	5									0.5	64			
Quinolones																										
Nalidixic acid	32	6	1								1	3	1				1					1	128			
Sulfonamides																										
Sulfamethoxazol	256	6	2									1			2	1		1	1			8	512			
Tetracyclines																										
Tetracyclin	2	6	2						3	1						2						0.125	128			

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

C. coli																								
Cattle (bovine animals) - calves (under 1 year) - veal calves																								
Isolates out of a monitoring programme	yes																							
	71																							
Number of isolates available in the laboratory																								
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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	
Aminoglycosides																								
Gentamicin	2	71	5				21	34	11						5							0.25	32	
Neomycin	2	71	20					33	16	2		1		4	5	10						0.5	32	
Streptomycin	4	71	53						16	2		2	14	23	8	1	5					1	128	
Amphenicols																								
Chloramphenicol	16	71	2							1	11	49	8	2								2	128	
Fluoroquinolones																								
Ciprofloxacin	1	71	52			13	6					11	24	17								0.125	16	
Macrolides																								
Erythromycin	16	71	14						4	20	27	6		1		13						0.5	64	
Penicillins																								
Ampicillin	8	71	49							2	7	13	41	5	3							0.5	64	
Quinolones																								
Nalidixic acid	32	71	52								9	9	1			11	41					1	128	
Sulfonamides																								
Sulfamethoxazol	256	71	26								12	6	11	3	1		12	16	10			8	512	
Tetracyclines																								
Tetracyclin	2	71	69					2							1	68						0.125	128	

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

C. coli																								
Pigs																								
Isolates out of a monitoring programme		yes																						
Number of isolates available in the laboratory		103																						
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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	
Aminoglycosides																								
Gentamicin	2	103	0				61	31	11													0.25	32	
Neomycin	2	103	5					77	20	1	1	2	1	1								0.5	32	
Streptomycin	4	103	78						22	3		8	33	21	4	1	11					1	128	
Amphenicols																								
Chloramphenicol	16	103	0							7	41	48	7									2	128	
Fluoroquinolones																								
Ciprofloxacin	1	103	10			73	18	1	1		1	6	3									0.125	16	
Macrolides																								
Erythromycin	16	103	19					5	21	24	31	3		2	1	16						0.5	64	
Penicillins																								
Ampicillin	8	103	21						2	3	31	46	13	1	7							0.5	64	
Quinolones																								
Nalidixic acid	32	103	10							1	46	38	8			7	3					1	128	
Sulfonamides																								
Sulfamethoxazol	256	103	62									22	12	3			4	36	17	9		8	512	
Tetracyclines																								
Tetracyclin	2	103	91					11	1						8	83						0.125	128	

Table Antimicrobial susceptibility testing in *C. coli*

n = Number of resistant isolates								
	C. coli							
	Cattle (bovine animals) - dairy cows	Cattle (bovine animals) - calves (under 1 year) - veal calves	Gallus gallus (fowl) - broilers	Pigs				
Isolates out of a monitoring programme	yes	yes	yes	yes				
Number of isolates available in the laboratory	6	71	21	103				
Antimicrobials:	N	n	N	n	N	n	N	n
Aminoglycosides								
Gentamicin	6	0	71	5	21	0	103	0
Neomycin	6	0	71	20	21	1	103	5
Streptomycin	6	1	71	53	21	0	103	78
Amphenicols								
Chloramphenicol	6	0	71	2	21	0	103	0
Fluoroquinolones								
Ciprofloxacin	6	1	71	52	21	16	103	10
Fully sensitive	6	0	71	1	21	1	103	4
Macrolides								
Erythromycin	6	0	71	14	21	3	103	19
Penicillins								
Ampicillin	6	5	71	49	21	11	103	21
Quinolones								
Nalidixic acid	6	1	71	52	21	16	103	10
Resistant to 1 antimicrobial	6	4	71	1	21	6	103	7
Resistant to 2 antimicrobials	6	1	71	9	21	10	103	30
Resistant to 3 antimicrobials	6	0	71	10	21	1	103	35
Resistant to 4 antimicrobials	6	0	71	17	21		103	21
Resistant to >4 antimicrobials	6	1	71	33	21	1	103	6
Sulfonamides								
Sulfamethoxazol	6	2	71	38	21	1	103	62
Tetracyclines								
Tetracyclin	6	1	71	69	21	10	103	91

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

C. coli																								
Gallus gallus (fowl) - broilers - Surveillance																								
Isolates out of a monitoring programme	yes																							
	21																							
Number of isolates available in the laboratory																								
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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	
Aminoglycosides																								
Gentamicin	2	21	0				18	3														0.25	32	
Neomycin	2	21	1					20			1											0.5	32	
Streptomycin	4	21	0						19	1	1											1	128	
Amphenicols																								
Chloramphenicol	16	21	0								12	8	1									2	128	
Fluoroquinolones																								
Ciprofloxacin	1	21	16			1	3	1			2	7	2	5								0.125	16	
Macrolides																								
Erythromycin	16	21	3					6	5	4	1	1	1			3						0.5	64	
Penicillins																								
Ampicillin	8	21	11								2	8	3		8							0.5	64	
Quinolones																								
Nalidixic acid	32	21	16								1	4				10	6					1	128	
Sulfonamides																								
Sulfamethoxazol	256	21	1										2	13	4	1			1			8	512	
Tetracyclines																								
Tetracyclin	2	21	10					6	4	1						10						0.125	128	

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

C. jejuni																								
Gallus gallus (fowl) - broilers																								
Isolates out of a monitoring programme	yes																							
	45																							
Number of isolates available in the laboratory																								
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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	
Aminoglycosides																								
Gentamicin	2	45	0				42	3														0.25	32	
Neomycin	2	45	3					41	1				3									0.5	32	
Streptomycin	4	45	1						44				1									1	128	
Amphenicols																								
Chloramphenicol	16	45	0							2	31	4	8									2	128	
Fluoroquinolones																								
Ciprofloxacin	1	45	26			14	4	1				9	10	7								0.125	16	
Macrolides																								
Erythromycin	16	45	0						4	19	20	1	1									0.5	64	
Penicillins																								
Ampicillin	8	45	26								11	8	2	3	21							0.5	64	
Quinolones																								
Nalidixic acid	32	45	26								12	5	2			2	24					1	128	
Sulfonamides																								
Sulfamethoxazol	256	45	1										1	2	18	19	4	1				8	512	
Tetracyclines																								
Tetracyclin	2	45	23					17	1	4	2		1		7	13						0.125	128	

Table Antimicrobial susceptibility testing in *C. jejuni*

n = Number of resistant isolates								
	<i>C. jejuni</i>							
	Cattle (bovine animals) - dairy cows	Cattle (bovine animals) - calves (under 1 year) - veal calves	Gallus gallus (fowl) - broilers	Pigs				
Isolates out of a monitoring programme	yes	yes	yes					
Number of isolates available in the laboratory	32	39	45					
Antimicrobials:	N	n	N	n	N	n	N	n
Aminoglycosides								
Gentamicin	32	0	39	0	45	0		
Neomycin	32	1	39	8	45	3		
Streptomycin	32	0	39	0	45	1		
Amphenicols								
Chloramphenicol	32	0	39	0	45	0		
Fluoroquinolones								
Ciprofloxacin	32	6	39	14	45	26		
Fully sensitive	32	23	39	4	45	4		
Macrolides								
Erythromycin	32	0	39	0	45	1		
Penicillins								
Ampicillin	32	0	39	5	45	24		
Quinolones								
Nalidixic acid	32	6	39	14	45	26		
Resistant to 1 antimicrobial	32	7	39	14	45	16		
Resistant to 2 antimicrobials	32	1	39	16	45	14		
Resistant to 3 antimicrobials	32	1	39	2	45	9		
Resistant to 4 antimicrobials	32	0	39	3	45	2		
Resistant to >4 antimicrobials	32	0	39	0	45	0		
Sulfonamides								
Sulfamethoxazol	32	3	39	0	45	1		
Tetracyclines								
Tetracyclin	32	2	39	35	45	23		

FootnoteBreakpoints differ from *C. coli*.

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

C. jejuni																								
Cattle (bovine animals) - calves (under 1 year) - veal calves																								
Isolates out of a monitoring programme	yes																							
	39																							
Number of isolates available in the laboratory																								
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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	
Aminoglycosides																								
Gentamicin	1	39	0				34	4	1															
Neomycin	1	39	8					30	1					5	2	1								
Streptomycin	2	39	2						36	1				2										
Amphenicols																								
Chloramphenicol	16	39	0						8	25	4	2												
Fluoroquinolones																								
Ciprofloxacin	1	39	14			20	3	2			1	1	10	2										
Macrolides																								
Erythromycin	4	39	0					8	15	14	2													
Penicillins																								
Ampicillin	16	39	5					1		3	19	9	2	1	4									
Quinolones																								
Nalidixic acid	16	39	14						1	5	15	3	1			3	11							
Sulfonamides																								
Sulfamethoxazol	256	39	0									12	9	6	9	3								
Tetracyclines																								
Tetracyclin	2	39	35					3		1					4	31								

Table Antimicrobial susceptibility testing of *C. jejuni* in Cattle (bovine animals) - dairy cows - quantitative data [Dilution method]

C. jejuni																										
Cattle (bovine animals) - dairy cows																										
Isolates out of a monitoring programme	yes																									
	32																									
Number of isolates available in the laboratory																										
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																										
Antimicrobials:	Break point	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			
Aminoglycosides																										
Gentamicin	1	32	0				28	4																		
Neomycin	1	32	1					28	3						1											
Streptomycin	2	32	0						32																	
Amphenicols																										
Chloramphenicol	16	32	0							15	17															
Fluoroquinolones																										
Ciprofloxacin	1	32	6			22	4					2	3	1												
Macrolides																										
Erythromycin	4	32	0					9	13	8	2															
Penicillins																										
Ampicillin	16	32	0						1	1	25	5														
Quinolones																										
Nalidixic acid	16	32	6							2	24					4	2									
Sulfonamides																										
Sulfamethoxazol	256	32	3									7	3	6	10	1	2	2	1							
Tetracyclines																										
Tetracyclin	2	32	2					30								2										

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

Broth dilution

Standards used for testing

NCCLS

Campylobacter	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 ≤
Amphenicols										
Chloramphenicol	EFSA/ EUCAST	16		16	2	128				
Tetracyclines										
Tetracyclin	EFSA/ EUCAST	2		2	0.125	128				
Fluoroquinolones										
Ciprofloxacin	EFSA/ EUCAST	1		1	0.125	16				
Quinolones										
Nalidixic acid	EFSA/ EUCAST	32		32	1	128				
Aminoglycosides										
Streptomycin	EFSA/ EUCAST	4		4	1	128				
Gentamicin	EFSA/ EUCAST	2		2	0.25	32				
Neomycin	EFSA/ EUCAST	2		2	0.5	32				
Macrolides										
Erythromycin	EFSA/ EUCAST	16		16	0.5	64				
Penicillins										
Ampicillin	EFSA/ EUCAST	8		8	0.5	64				
Sulfonamides										
Sulfamethoxazol	EFSA/ EUCAST	256		256	8	512				

Footnote

The breakpoints used in this table are for *Campylobacter coli*. They differ from the breakpoints we use for *Campylobacter jejuni*.

2.3. LISTERIOSIS**2.3.1. General evaluation of the national situation****2.3.2. Listeriosis in humans****2.3.3. Listeria in foodstuffs****Table Listeria monocytogenes in milk and dairy products**

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but ≤ 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Cheeses made from cows' milk										
soft and semi-soft										
made from pasteurised milk										
- at retail	VWA	single	25g	26	1			26	1	0
hard										
made from raw or low heat-treated milk										
- at retail	VWA	single	25g	2	0			2	0	
made from pasteurised milk										
- at retail	VWA	single	25g	52	1	6	0	49	1	0
Cheeses made from goats' milk										
soft and semi-soft										
made from pasteurised milk										
- at retail	VWA	single	25g	9	0			9	0	
Dairy products (excluding cheeses)										
cream										
- at retail	VWA	single	25g	7	0			7	0	

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but ≤ 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Meat from pig										
fresh	VWA	single	10-20g	271	1			271	0	1
meat products										
raw but intended to be eaten cooked										
- at retail	VWA	single	10-20g	79	1			79	0	1
minced meat										
- at retail	VWA	single	10-20g	4	0			4	0	0
Meat from bovine animals										
fresh	VWA	single	10-20g	271	1			271	0	1
meat products										
cooked, ready-to-eat										
- at retail	VWA	single	10-20g	28	3			28	3	0
raw and intended to be eaten raw	VWA	single	10-20g	56	0			56	0	0
minced meat										
- at retail	VWA	single	10-20g	238	13			238	10	3
Fish										
smoked										
- at retail	VWA	single	25g/ 10-20g	820	177	709	160	820	35	38
Meat from sheep										
fresh										
- at retail	VWA	single	10-20g	89	0			89	0	0
minced meat										
- at retail	VWA	single	10-20g	4	1			4	0	1
meat products										
raw but intended to be eaten cooked	VWA	single	10-20g	2	0	0		2		
Meat from bovine animals and pig										
minced meat										
- at retail	VWA	single	10-20g	19	1			19	1	0

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Fruits										
- at retail	VWA	single	10-20g	769	0			769	0	0
Seeds, sprouted										
- at retail	VWA	single	10-20g	1722	4			1722	4	0

2.3.4. Listeria in animals**Table Listeria in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Listeria spp.	L. monocytogenes	Listeria spp., unspecified
Cattle (bovine animals)	GD	animal	1241	14		14
Sheep	GD	animal	171	10		10
Goats	GD	animal	85	8		8
Gallus gallus (fowl)	GD	flock	1623	0		
Turkeys	GD	flock	42	0		

2.4. E. COLI INFECTIONS**2.4.1. General evaluation of the national situation****2.4.2. E. Coli Infections in humans****2.4.3. Escherichia coli, pathogenic in foodstuffs****Table VT E. coli in food**

	Source of information	Sampling unit	Sample weight	Units tested	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Meat from pig								
fresh	VWA	single	25g	270	0			
minced meat								
intended to be eaten cooked								
- at retail	VWA	single	25g	4	0			
meat preparation								
intended to be eaten cooked								
- at retail	VWA	single	25g	6	0			
meat products								
raw but intended to be eaten cooked								
- at retail	VWA	single	25g	48	0			
Meat from bovine animals								
fresh								
- at retail	VWA	single	25g	271	0			
minced meat								
intended to be eaten raw								
- at retail	VWA	single	25g	921	1	1		
intended to be eaten cooked								
- at retail	VWA	single	25g	340	0			

meat preparation intended to be eaten cooked - at retail								
	VWA	single	25g	6	0			
meat products raw but intended to be eaten cooked - at retail								
	VWA	single	25g	53	0			
Meat from sheep								
fresh - at retail								
	VWA	single	25g	97	0			
Vegetables								
pre-cut - at retail								
	VWA	single	25g	1852	0			
Meat, mixed meat								
- at retail	VWA	single	25g	17	0			

2.4.4. Escherichia coli, pathogenic in animals

Table VT E. coli in animals

	Source of information	Sampling unit	Sample weight	Units tested	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Cattle (bovine animals)								
calves (under 1 year) (1)	VWA	holding		174	23	23		
dairy cows								
- at farm (2)	VWA	holding		157	6	6		

(1) : surveillance

(2) : surveillance

2.5. TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1. General evaluation of the national situation

2.5.2. Tuberculosis, Mycobacterial Diseases in humans

2.5.3. Mycobacterium in animals

A. Mycobacterium bovis in bovine animals

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

The 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 (M. 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 spp.	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Sheep	GD	animal	782	0			
Goats	GD	animal	315	0			
Pigs	GD	animal	3766	10			10
Poultry, unspecified	GD	flock	1473	0			
Birds	GD	animal	141	2			2

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/ 432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests (*)	Number of animals tested			
NEDERLAND	48256	3762784	48254	99.996	2	0.004	0	0	0	19	2
Total	48256	3762784	48254	99.996	2	0.004		0	0	19	2

(*) Legend:

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

2.6. BRUCELLOSIS

2.6.1. General evaluation of the national situation

2.6.2. Brucellosis in humans

2.6.3. Brucella in foodstuffs

2.6.4. Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

The Dutch cattle has been 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 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 sheep.

C. Brucella melitensis in goats

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 spp.	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Pigs	GD	animal	5789	0				
Pet animals, all	GD	animal	114	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				Epidemiological investigation				
	Herd	Animals	Number of herds	%	Number of herds	%	Number of animals tested	Number of infected herds tested	Number of bovine herds tested	Number of infected animals or pools tested	Number of animals tested	Number of infected herds	Number of notified abortions wherever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with blood tests	Number of suspected herds	Number of positive animals		Number of animals examined serologically	Number of animals examined microbiologically	Number of animals positive microbiologically	
																		Serologically	RST				
NEDERLAND	48256	3762784	48256	100	0	0							13399	0	0	13399	63					23	0
Total	48256	3762784	48256	100	0	0	0	0	0	0	0	0	13399	0	0	13399	63			0	0	23	0

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

Region	Total number of existing ovine / caprine		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of herds	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microscopically	Number of animals positive microscopically	Number of suspected herds
NEDERLAND	52262	1693357	52262	100	0	0	1521	14790	0	16	0	0	0	1
	52262	1693357	52262	100	0	0	1521	14790	0	16	0	0	0	1
Total														

2.7. YERSINIOSIS**2.7.1. General evaluation of the national situation****2.7.2. Yersiniosis in humans****2.7.3. Yersinia in foodstuffs****2.7.4. Yersinia in animals****Table Yersinia in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. enterocolitica - O:9	Y. enterocolitica - O:3	Y. enterocolitica - unspecified
Cattle (bovine animals)	GD	animal	1062	1					1
Sheep	GD	animal	415	1					1
Goats	GD	animal	128	1					1
Pigs	GD	animal	899	0					
- at slaughterhouse - animal sample - faeces (1)	VWA	animal	20	0	0				
- at slaughterhouse - animal sample - tonsil	VWA	animal	20	3	3				

(1) : sampling unit 25g

2.8. TRICHINELLOSIS**2.8.1. General evaluation of the national situation****2.8.2. Trichinellosis in humans****2.8.3. Trichinella in animals****Table Trichinella in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. spiralis	Trichinella spp., unspecified
Pigs	VWA	animal	14766589	0		
Solipeds, domestic						
horses	VWA	animal	1808	0		
Wild boars						
wild (1)	VWA	animal	881	0		
- Surveillance (serology)	RIVM	animal	449	1		1

(1) : serology

2.9. ECHINOCOCCOSIS**2.9.1. General evaluation of the national situation****2.9.2. Echinococcosis in humans****2.9.3. Echinococcus in animals****Table Echinococcus in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals) (1)	RIVM		29	9	9		
Dogs (2)	RIVM	animal	1	1		1	
Foxes (3)	RIVM	animal	116	11		11	

(1) : PCR/ microscopy
cattle originated from Romania

(2) : PCR
intermediate host

(3) : PCR/ microscopy

2.10. TOXOPLASMOSIS

2.10.1. General evaluation of the national situation

2.10.2. Toxoplasmosis in humans

2.10.3. Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii
Cattle (bovine animals) (1)	RIVM	animal	1072	424	424

(1) : serology
ELISA based

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 pets with bats. In these cases bats are euthanised and tested for rabies at the CVI in Lelystad. Humans or pets which have direct contact with a bat are vaccinated when the bat is found positive for EBLV-virus in the test.

2.11.2. Lyssavirus (rabies) in animals**Table Rabies in animals**

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	Unspecified Lyssavirus	European Bat Lyssavirus - unspecified	Classical rabies virus (genotype 1)
Dogs	CVI	animal	2	0			
Cats	CVI	animal	5	0			
Bats							
wild (1)	CVI	animal	154	7		7	
Foxes							
wild	CVI	animal	10	0			

(1) : six bats were not suitable for investigation

2.12. Q-FEVER

2.12.1. General evaluation of the national situation

2.12.2. Coxiella (Q-fever) in animals

Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii
Cattle (bovine animals)	GD	animal	1062	1	1
Sheep	GD	animal	144	0	
Goats	GD	animal	74	7	7

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ENTEROCOCCUS, NON-PATHOGENIC

3.1.1. General evaluation of the national situation

3.1.2. Antimicrobial resistance in Enterococcus, non-pathogenic isolates

Table Antimicrobial susceptibility testing in *E. faecium*

n = Number of resistant isolates								
	E. faecium							
	Gallus gallus (fowl) - broilers - Monitoring	Cattle (bovine animals) - dairy cows - Monitoring	Cattle (bovine animals) - calves (under 1 year) - veal calves - Monitoring	Pigs - Monitoring				
Isolates out of a monitoring programme	yes	yes	yes	yes				
Number of isolates available in the laboratory	15	68	87	61				
Antimicrobials:	N	n	N	n	N	n	N	n
Aminoglycosides								
Gentamicin	15	0	68	0	87	3	61	0
Streptomycin	15	3	68	1	87	37	61	6
Amphenicols								
Chloramphenicol	15	0	68	0	87	3	61	0
Fluoroquinolones								
Ciprofloxacin	15	0	68	4	87	5	61	0
Fully sensitive	15	5	68	27	87	10	61	2
Glycopeptides (Cyclic peptides, Polypeptides)								
Bacitracin	15	5	68	26	87	27	61	11
Vancomycin	15	0	68	0	87	1	61	2
Ionophores								
Salinomycin	15	4	68	0	87	2	61	17
Macrolides								
Erythromycin	15	6	68	11	87	55	61	22
Oxazolidines								
Linezolid	15	0	68	0	87	0	61	0
Penicillins								
Amoxicillin	15	0	68	0	87	10	61	1
Resistant to 1 antimicrobial	15	3	68	21	87	21	61	15
Resistant to 2 antimicrobials	15	0	68	14	87	15	61	17
Resistant to 3 antimicrobials	15	3	68	6	87	22	61	14
Resistant to 4 antimicrobials	15	2	68	0	87	16	61	8
Resistant to >4 antimicrobials	15	2	68	0	87	15	61	5
Streptogramins								
Quinupristin/ Dalfopristin	15	5	68	21	87	32	61	38
Tetracyclines								
Tetracyclin	15	7	68	4	87	57	61	51

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

E. faecium		Gallus gallus (fowl) - broilers																								
Isolates out of a monitoring programme	Number of isolates available in the laboratory	yes																								
		15																								
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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			
Aminoglycosides																										
	Gentamicin	500	15	0												15						128	1024			
	Streptomycin	1024	15	3														12			3	512	2048			
Amphenicols																										
	Chloramphenicol	32	15	0								11	2	2								2	64			
Fluoroquinolones																										
	Ciprofloxacin	4	15	0				1	4	7	3											0.5	64			
Glycopeptides (Cyclic peptides, Polypeptides)																										
	Bacitracin	128	15	5											5	5		5				2	256			
	Vancomycin	4	15	0				10	2	3												0.5	64			
Ionophores																										
	Salinomycin	4	15	4					2	5	4	4										0.5	64			
Macrolides																										
	Erythromycin	4	15	6					6	2	1			1			5					1	128			
Oxazolidinones																										
	Linezolid	4	15	0						13	2											0.5	64			
Penicillins																										
	Amoxicillin	4	15	0					12	1	2											1	128			
Streptogramins																										
	Quinupristin/ Dalfopristin	2	15	5				2	3	5	3	1		1								0.5	32			
Tetracyclines																										
		2	15	7				8								7						0.5	128			

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

E. faecium																										
Pigs - Monitoring																										
Isolates out of a monitoring programme		yes																								
Number of isolates available in the laboratory		61																								

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

E. faecium																										
Cattle (bovine animals) - calves (under 1 year) - veal calves - Monitoring																										
Isolates out of a monitoring programme		yes																								
Number of isolates available in the laboratory		87																								

Table Antimicrobial susceptibility testing of E. faecium in Cattle (bovine animals) - dairy cows - Monitoring - quantitative data [Dilution method]

E. faecium																										
Cattle (bovine animals) - dairy cows - Monitoring																										
Isolates out of a monitoring programme		yes																								
Number of isolates available in the laboratory		68																								
		</																								

Table Antimicrobial susceptibility testing of E. faecalis in Cattle (bovine animals) - dairy cows - Monitoring - quantitative data [Dilution method]

E. faecalis		Cattle (bovine animals) - dairy cows - Monitoring																							
Isolates out of a monitoring programme		yes																							
Number of isolates available in the laboratory		16																							
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																							
Antimicrobials:	Break point	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		
Aminoglycosides																									
Gentamicin	500	16	0													16						128	1024		
Streptomycin	2000	16	3															13			3	512	2048		
Amphenicols																									
Chloramphenicol	32	16	1									13	2		1							2	64		
Fluoroquinolones																									
Ciprofloxacin	4	16	0					1	12	3												0.5	64		
Glycolipids																									
Bamernycin	16	16	0								14	1	1									4	512		
Glycopeptides (Cyclic peptides, Polypeptides)																									
Bacitracin	128	16	2											2	2	10	2					2	256		
Vancomycin	4	16	0					2	6	8												0.5	64		
Ionophores																									
Salinomycin	4	16	0						12	4												0.5	64		
Macrolides																									
Erythromycin	4	16	4					6	2	4	2					2						1	128		
Oxazolidinones																									
Linezolid	4	16	0							16												0.5	64		
Penicillins																									
Amoxicillin	4	16	0						16													1	128		
Streptogramins																									
Quinupristin/ Dalopristin	32	16	0							1	1	3	11									0.5	32		
Tetracyclines																									
	2	16	7					5	4					2	2	3						0.5	128		

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

E. faecalis		Cattle (bovine animals) - calves (under 1 year) - veal calves - Monitoring																							
Isolates out of a monitoring programme	yes																								
		34																							
Number of isolates available in the laboratory																									
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																							
Antimicrobials:	Break point	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		
Aminoglycosides																									
	Gentamicin	500	34	2												31	1			2		128	1024		
	Streptomycin	1024	34	13														20	1	3	10	512	2048		
Amphenicols																									
	Chloramphenicol	32	34	10								18	6		8	2						2	64		
Fluoroquinolones																									
	Ciprofloxacin	4	34	0				6	22	6												0.5	64		
Glycolipids																									
	Bamernycin	16	34	0							32	2										4	512		
Glycopeptides (Cyclic peptides, Polypeptides)																									
	Bacitracin	128	34	7										3	9	15	1	6				2	256		
	Vancomycin	4	34	0				1	22	11												0.5	64		
Ionophores																									
	Salinomycin	4	34	0				2	31	1												0.5	64		
Macrolides																									
	Erythromycin	4	34	15				10	6	3							15					1	128		
Oxazolidinones																									
	Linezolid	4	34	0						32	2											0.5	64		
Penicillins																									
	Anoxicillin	4	34	0					34													1	128		
Streptogramins																									
	Quinupristin/ Dalfopristin	32	34	1							1	11	18	3	1							0.5	32		
Tetracyclines																									
		2	34	20				9	5					1	3	16						0.5	128		

Table Antimicrobial susceptibility testing in *E. faecalis*

n = Number of resistant isolates								
	E. faecalis							
	Gallus gallus (fowl) - broilers - Monitoring	Cattle (bovine animals) - dairy cows - Monitoring	Cattle (bovine animals) - calves (under 1 year) - veal calves - Monitoring	Pigs - Monitoring				
Isolates out of a monitoring programme	yes	yes	yes	yes				
Number of isolates available in the laboratory	4	16	34	34				
Antimicrobials:	N	n	N	n	N	n	N	n
Aminoglycosides								
Gentamicin	4	0	16	0	34	2	34	5
Streptomycin	4	1	16	3	34	13	34	18
Amphenicols								
Chloramphenicol	4	0	16	1	34	10	34	6
Fluoroquinolones								
Ciprofloxacin	4	0	16	0	34	0	34	0
Fully sensitive	4	0	16	7	34	13	34	2
Glycolipids								
Bambermycin	4	0	16	0	34	0	34	0
Glycopeptides (Cyclic peptides, Polypeptides)								
Bacitracin	4	1	16	2	34	7	34	2
Vancomycin	4	0	16	0	34	0	34	0
Ionophores								
Salinomycin	4	0	16	0	34	0	34	0
Macrolides								
Erythromycin	4	2	16	4	34	15	34	20
Oxazolidines								
Linezolid	4	0	16	0	34	0	34	0
Penicillins								
Amoxicillin	4	0	16	0	34	0	34	0
Resistant to 1 antimicrobial	4	1	16	4	34	5	34	10
Resistant to 2 antimicrobials	4	2	16	3	34	3	34	5
Resistant to 3 antimicrobials	4	1	16	1	34	3	34	7
Resistant to 4 antimicrobials	4	0	16	1	34	4	34	9
Resistant to >4 antimicrobials	4	0	16	0	34	6	34	1
Streptogramins								
Quinupristin/ Dalfopristin	4	0	16	0	34	1	34	0
Tetracyclines								
Tetracyclin	4	4	16	7	34	20	34	31

Table Antimicrobial susceptibility testing of *E. faecalis* in Gallus gallus (fowl) - at slaughterhouse - Monitoring - quantitative data [Dilution method]

E. faecalis		Gallus gallus (fowl) - at slaughterhouse - Monitoring																								
Isolates out of a monitoring programme	yes																									
		4																								
Number of isolates available in the laboratory																										
		Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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			
Aminoglycosides																										
	Gentamicin	500	4	0												4						128	1024			
	Streptomycin	2000	4	1														3			1	512	2048			
Amphenicols																										
	Chloramphenicol	32	4	0								4										2	64			
Fluoroquinolones																										
	Ciprofloxacin	4	4	0				2	2												0.5	64				
Glycolipids																										
	Bamernycin	16	4	0							4											4	512			
Glycopeptides (Cyclic peptides, Polypeptides)																										
	Bacitracin	128	4	1											3				1			2	256			
	Vancomycin	4	4	0					3	1											0.5	64				
Ionophores																										
	Salinomycin	4	4	0					1	1	2											0.5	64			
Macrolides																										
	Erythromycin	4	4	2					1		1						2					1	128			
Oxazolidinones																										
	Linezolid	4	4	0						4											0.5	64				
Penicillins																										
	Anoxiellin	4	4	0					4												1	128				
Streptogramins																										
	Quinupristin/ Dalopristin	32	4	0								2	2									0.5	32			
Tetracyclines																										
		2	4	4				0	0	0	0	0	0	0	1	3					0.5	128				

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

E. faecalis																									
Pigs - Monitoring																									
Isolates out of a monitoring programme		yes																							
Number of isolates available in the laboratory		34																							
Antimicrobials:		Break point	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	
Aminoglycosides																									
Gentamicin	500	34	5														29				5		128	1024	
Streptomycin	1024	34	18																16		1	17	512	2048	
Amphenicols																									
Chloramphenicol	32	34	6										18	10		3	3						2	64	
Fluoroquinolones																									
Ciprofloxacin	4	34	0						10	18	6												0.5	64	
Glycolipids																									
Bamernycin	16	34	0									33	1										4	512	
Glycopeptides (Cyclic peptides, Polypeptides)																									
Bacitracin	128	34	2												1	14	17	1	1				2	256	
Vancomycin	4	34	0						1	23	10												0.5	64	
Ionophores																									
Salinomycin	4	34	0						1	27	5	1											0.5	64	
Macrolides																									
Erythromycin	4	34	20						5	7	2	1						19					1	128	
Oxazolidinones																									
Linezolid	4	34	0						1	31	2												0.5	64	
Penicillins																									
Amoxicillin	4	34	0						33	1													1	128	
Streptogramins																									
Quinupristin/ Dalfopristin	32	34	0								1	8	23	2									0.5	32	
Tetracyclines																									
	2	34	31					3							1	16	14						0.5	128	

Table Breakpoints for antibiotic resistance of *Enterococcus*, non-pathogenic in Animals

Test Method Used

Broth dilution

Standards used for testing

NCCLS

Enterococcus, 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	EFSA/ EUCAST	2		2	0.5	128				
Amphenicols										
Chloramphenicol	EFSA/ EUCAST	32		32	2	64				
Fluoroquinolones										
Ciprofloxacin	EFSA/ EUCAST	4		4	0.5	64				
Aminoglycosides										
Streptomycin	EFSA/ EUCAST	1024		1024	512	2048				
Gentamicin	EFSA/ EUCAST	500		500	128	1024				
Macrolides										
Erythromycin	EFSA/ EUCAST	4		4	1	128				
Glycolipids										
Bamermycin	EFSA/ EUCAST	16		16	4	512				
Glycopeptides (Cyclic peptides, Polypeptides)										
Bacitracin	EFSA/ EUCAST	128		128	2	256				
Vancomycin	EFSA/ EUCAST	4		4	0.5	64				
Ionophores										
Salinomycin	EFSA/ EUCAST	4		4	0.5	64				
Oxazolidines										
Linezolid	CLSI	4		4	0.5	64				
Penicillins										
Amoxicillin	EFSA/ EUCAST	4		4	1	128				
Streptogramins										
Quinupristin/ Dalfopristin	EFSA/ EUCAST/ CLSI	32		32	0.5	32				

Footnote

The breakpoints in this table are the breakpoints for *Enterococcus faecalis*. For *Enterococcus faecium* the breakpoint for Quino/ dalfopristine is 2 microg/ ml (CLSI-breakpoint).

3.2. *ESCHERICHIA COLI, NON-PATHOGENIC*

3.2.1. General evaluation of the national situation

3.2.2. Antimicrobial resistance in *Escherichia coli*, non-pathogenic isolates

Table Antimicrobial susceptibility testing of E. coli in Cattle (bovine animals) - dairy cows - dairy cows - Surveillance (E. coli O157) - quantitative data [Dilution method]

E. coli		Cattle (bovine animals) - dairy cows - Surveillance (E. coli O157)																						
Isolates out of a monitoring programme	Number of isolates available in the laboratory	yes																						
		18																						
Antimicrobials:		Break point	N	n	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																	lowest		highest
					<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048		
Aminoglycosides									10	7	1											0.25	32	
	Gentamicin	2	18	0																				
	Kanamycin	4	18	2							16						2					4	128	
	Neomycin	8																				1	128	
	Streptomycin	16	18	2							10	6					2					2	128	
Amphenicols																								
	Chloramphenicol	16	18	2							4	12					2					2	128	
	Florfenicol	16	18	0							4	14										2	128	
Cephalosporins																								
	Cefotaxim	0.25	18	1		11	6			1												0.125	16	
	Ceftazidim	0.5	18	1				15	2		1											0.125	16	
Fluoroquinolones																								
	Ciprofloxacin	0.06	18	1	17		1															0.06	8	
Penicillins																								
	Ampicillin	8	18	2						3	13					2						0.5	64	
Polymyxins																								
	Colistin	8	18	1								17			1							8	16	
Quinolones																								
	Nalidixic acid	16	18	0							17	1										0.5	128	
Sulfonamides																								
	Sulfamethoxazol	256	18	2									16							2		0.25	1024	
Tetracyclines																								
	Tetracyclin	8	18	2							14	2				2						0.5	64	
	Trimethoprim	2	18	2					16							2						0.5	64	

Table Antimicrobial susceptibility testing of E. coli in calves (under 1 year) - Cattle (bovine animals) - veal calves - at farm - Surveillance (E. coli O157) - quantitative data [Dilution method]

E. coli																										
Cattle (bovine animals) - calves (under 1 year) - veal calves - at farm - Surveillance (E. coli O157)																										
Isolates out of a monitoring programme		yes																								
		87																								
Number of isolates available in the laboratory																										
Antimicrobials:		Break point	N	n	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																					
					<=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		
Aminoglycosides		2	87	2					59	24	2			1	1								0.25	32		
Gentamicin												74	6				1	6					4	128		
Kanamycin		4	87	13																			1	128		
Neomycin		8																								
Streptomycin		16	87	18								43	26			5	4	9					2	128		
Amphenicols																										
Chloramphenicol		16	87	6								5	61	15			6					2	128			
Florfenicol		16	87	1								6	69	11			1					2	128			
Cephalosporins																										
Cefotaxim		0.25	87	1		72	14			1												0.125	16			
Ceftazidim		0.5	87	1				84	2			1										0.125	16			
Fluoroquinolones																										
Ciprofloxacin		0.06	87	1	86		1															0.06	8			
Penicillins																										
Ampicillin		8	87	18						11	57	1				18						0.5	64			
Polymyxins																										
Colistin		8	87	1									86		1							8	16			
Quinolones																										
Nalidixic acid		16	87	0								85	2									0.5	128			
Sulfonamides																										
Sulfamethoxazol		256	87	18									69							18		0.25	1024			
Tetracyclines																										
Tetracyclin		8	87	8							61	18				3	5					0.5	64			
Trimethoprim		2	87	8					76	3						8						0.5	64			

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

E. coli																											
Cattle (bovine animals) - dairy cows - Surveillance																											
Isolates out of a monitoring programme		yes																									
		152																									
Number of isolates available in the laboratory																											
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																											
Antimicrobials:		Break point	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			
Aminoglycosides																											
	Gentamicin	2	152	1				7	88	50	6			1									0.25	32			
	Kanamycin	4	67	13								54	10	3									4	128			
	Neomycin	8	85	1						68	14	2					1						1	128			
	Streptomycin	16	67	8								21	35	3	1	1	2	4					2	128			
Amphenicols																											
	Chloramphenicol	16	144	2										117	25		1		1				2	128			
	Florfenicol	16	152	2							1	17	121	11	1		1						2	128			
Cephalosporins																											
	Cefotaxim	0.25	152	0		59	92	1															0.125	16			
	Ceftazidim	0.5	152	0			47	98	7														0.125	16			
Fluoroquinolones																											
	Ciprofloxacin	0.06	152	1	66	85									1												
Penicillins																											
	Ampicillin	8	152	8						5	47	88	4	1		6	1						0.5	64			
Polymyxins																											
	Colistin	8	67	0										67									8	16			
Quinolones																											
	Nalidixic acid	16	152	1							63	85	3					1									
Sulfonamides																											
	Sulfamethoxazol	256	152	9										143							1	8	0.25	1024			
Tetracyclines																											
	Tetracyclin	8	152	10							14	69	58	1		1	2	7					0.5	64			
	Trimethoprim	2	152	8					138	5	1			1			5	2					0.5	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 - at farm - Surveillance	Cattle (bovine animals) - dairy cows - at farm - Surveillance						
Isolates out of a monitoring programme	no	yes	no		no	no						
Number of isolates available in the laboratory	152	169	43		87	18						
Antimicrobials:	N	n	N	n	N	n	N	n	N	n	N	n
Aminoglycosides												
Gentamicin	152	1	169	9	43	1			87	2	18	0
Kanamycin	67	13	81	32	43	16			87	13	18	2
Neomycin	85	1	88	4								
Streptomycin	67	8	81	42	43	22			87	18	18	2
Amphenicols												
Chloramphenicol	152	2	169	21	43	7			87	6	18	2
Florfenicol	152	2	169	1	43	1			87	1	18	0
Cephalosporins												
Cefotaxim	152	0	169	2	43	9			87	1	18	1
Ceftazidim	152	0	169	2	43	9			87	1	18	1
Fluoroquinolones												
Ciprofloxacin	152	1	169	5	43	21			87	1	18	1
Fully sensitive	152	129	169	28	43	2			87	56	18	16
Penicillins												
Ampicillin	152	8	169	62	43	26			87	18	18	2
Polymyxins												
Colistin	67	0	81	0	43	0			87	1	18	1
Quinolones												
Nalidixic acid	152	1	169	4	43	21			87	0	18	0
Resistant to 1 antimicrobial	152	12	169	29	43	5			87	3	18	0
Resistant to 2 antimicrobials	152	1	169	14	43	6			87	0	18	0
Resistant to 3 antimicrobials	152	2	169	24	43	5			87	2	18	0
Resistant to 4 antimicrobials	152	2	169	35	43	5			87	0	18	0
Resistant to >4 antimicrobials	152	6	169	39	43	20			87	8	18	2
Sulfonamides												
Sulfamethoxazol	152	9	169	93	43	27			87	18	18	2
Tetracyclines												
Tetracyclin	152	10	169	123	43	24			87	8	18	2
Trimethoprim	152	8	169	86	43	21			87	8	18	2

Footnote

Cattle(bovine animals) contains the data of E. coli (not O157) from dairy cows.Gallus gallus (fowl) contains the data from broilers.

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E. coli																						
Gallus gallus (fowl) - broilers																						
Isolates out of a monitoring programme		yes																				
Number of isolates available in the laboratory		43																				

Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
Break point	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
Antimicrobials:																						
Aminoglycosides																						
	2	43	1				13	23	6				1									
	4	43	16							27	11	2				3						
	16	43	22							3	10	8	2	2	2	16						
Streptomycin																						
Amphenicols																						
	16	43	7							5	27	4	3		4							
	16	43	1							10	28	4	1									
Florfenicol																						
Cephalosporins																						
	0.25	43	9		30	4				1	8											
	0.5	43	9				32	2	2	1	2	4										
Ceftazidim																						
Fluoroquinolones																						
	0.06	43	21	22			10	8	1		1	1										
Ciprofloxacin																						
Penicillins																						
	8	43	26					2	9	6				26								
Ampicillin																						
Polymyxins																						
	8	43	0								43											
Colistin																						
Quinolones																						
	16	43	21							20	1	1		4	17							
Nalidixic acid																						
Sulfonamides																						
	256	43	27								16							6	21			
Sulfamethoxazol																						
Tetracyclines																						
	8	43	24					7	8	4				8	16							
	2	43	21					20	1	1				21								
Trimethoprim																						

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

E. coli																								
Cattle (bovine animals) - calves (under 1 year) - veal calves - Surveillance																								
Isolates out of a monitoring programme	yes																							
	175																							
Number of isolates available in the laboratory																								
Antimicrobials:	Break point	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	
	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																							
Aminoglycosides																								
Gentamicin	2	202	39				7	75	70	11	1	1	1	1	36							0.25	32	
Kanamycin	4	75	30								45	12	1				17					4	128	
Neomycin	8	100	22						56	16	5	1	1	1	3	9	9					1	128	
Streptomycin	16	75	39							1	14	17	4	4	5	6	24					2	128	
Amphenicols																								
Chloramphenicol	16	175	49								13	96	17	5	8	16	20					2	128	
Florfenicol	16	175	17							1	24	107	26	4		5	8					2	128	
Cephalosporins																								
Cefotaxim	0.25	175	8		57	102	8	4	2	1		1										0.125	16	
Ceftazidim	0.5	175	5			53	106	11	2		1	2										0.125	16	
Fluoroquinolones																								
Ciprofloxacin	0.06	175	29	62	84	1	6	6	4	1			7	4								0.06	8	
Penicillins																								
Ampicillin	8	175	82						2	44	44	3	1	2	32	47						0.5	64	
Polymyxins																								
Colistin	8	75	0									75										8	16	
Quinolones																								
Nalidixic acid	16	175	28							55	89	2	1		1	13	14					0.5	128	
Sulfonamides																								
Sulfamethoxazol	256	174	89									85							5	84		0.25	1024	
Tetracyclines																								
Tetracyclin	8	175	122						5	30	17	1		2	28	92						0.5	64	
Trimethoprim	2	175	73					101	1				1		34	38						0.5	64	

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

E. coli																								
Pigs - Surveillance																								
Isolates out of a monitoring programme		yes																						
Number of isolates available in the laboratory		169																						
Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																								
Antimicrobials:	Break point	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	
Aminoglycosides																								
Gentamicin	2	169	9				8	86	54	12	7		1	1										
Kanamycin	4	81	32								49	21	7	1			3							
Neomycin	8	88	4						50	24	10			1	2	1								
Streptomycin	16	81	42								14	21	4	6	5	6	25							
Amphenicols																								
Chloramphenicol	16	169	21								21	114	13	6	6	5	4							
Florfenicol	16	169	1							1	34	117	16				1							
Cephalosporins																								
Cefotaxim	0.25	169	2		66	100	1	1		1														
Ceftazidim	0.5	169	2			62	101	4		2														
Fluoroquinolones																								
Ciprofloxacin	0.06	169	5	77	87	2	2	1																
Penicillins																								
Ampicillin	8	169	62						5	53	49			1	28	33								
Polymyxins																								
Colistin	8	81	0									81												
Quinolones																								
Nalidixic acid	16	169	4							73	89	3		1		3								
Sulfonamides																								
Sulfamethoxazol	256	169	93									75	1						5	88				
Tetracyclines																								
Tetracyclin	8	169	123						11	19	14	2	5	4	41	73								
Trimethoprim	2	169	86					77	5	1					40	46								

Table Antimicrobial susceptibility testing of E. coli in humans

n = Number of resistant isolates		
E. coli		
humans		
Isolates out of a monitoring programme		no
Number of isolates available in the laboratory		88
Antimicrobials:	N	n
Aminoglycosides		
Gentamicin	88	0
Kanamycin	88	6
Neomycin	0	
Streptomycin	88	6
Amphenicols		
Chloramphenicol	88	2
Florfenicol	88	1
Cephalosporins		
Cefotaxim	88	0
Ceftazidim	87	0
Fluoroquinolones		
Ciprofloxacin	88	0
Fully sensitive	88	77
Penicillins		
Ampicillin	88	3
Polymyxins		
Colistin	88	0
Quinolones		
Nalidixic acid	88	0
Resistant to 1 antimicrobial	88	7
Resistant to 2 antimicrobials	88	1
Resistant to 3 antimicrobials	88	2
Resistant to 4 antimicrobials	88	0
Resistant to >4 antimicrobials	88	1
Sulfonamides		
Sulfamethoxazol	88	6
Tetracyclines		
Tetracyclin	88	2
Trimethoprim	88	2

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

E. coli																										
humans - Surveillance																										
Isolates out of a monitoring programme		yes																								
Number of isolates available in the laboratory		88																								
Antimicrobials:		Break point	N	n	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																					
					<=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		
Aminoglycosides																										
	Gentamicin	2	88	0				9	61	15	3	0	0	0	0	0							0.25	32		
	Kanamycin	4	88	6								82	4	1	0	0	0	1					4	128		
	Neomycin	8																					1	128		
	Streptomycin	32	88	6							2	71	9	0	0	1	2	3					2	128		
Amphenicols																										
	Chloramphenicol	16	88	2						0	0	4	73	9	0	0	2						2	128		
	Florfenicol	16	88	1							0	13	71	3	0	0	1						2	128		
Cephalosporins																										
	Cefotaxim	0.25	88	0		78	10	0	0	0	0	0											0.125	16		
	Ceftazidim	0.5	88	0				85	3	0	0	0	0	0	0								0.125	16		
Fluoroquinolones																										
	Ciprofloxacin	0.06	88	0	88	0	0	0	0	0	0	0	0	0									0.06	8		
Penicillins																										
	Ampicillin	8	88	3					0	0	30	55	0	0	0	3							0.5	64		
Polymyxins																										
	Colistin	8	88	0									88	0									8	16		
Quinolones																										
	Nalidixic acid	16	88	0								86	2	0	0	0	0						0.5	128		
Sulfonamides																										
	Sulfamethoxazol	256	88	6									82	0	0	0	0	0	0	6			0.25	1024		
Tetracyclines																										
	Tetracyclin	8	88	2						1	81	4	0	0	0	1	1						1	64		
	Trimethoprim	2	88	2					86	0	0	0	0	0	0	2							0.5	64		

Footnote

The data concerns E. coli O157.

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

Broth dilution

Standards used for testing

NCCLS

EUCAST

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 <=
Amphenicols										
Chloramphenicol	EUCAST	16		16	2	128				
Florfenicol	EUCAST	16		16	2	128				
Tetracyclines										
Tetracyclin	EUCAST	8		8	0.5	64				
Fluoroquinolones										
Ciprofloxacin	EUCAST	0.06		0.06	0.06	8				
Enrofloxacin										
Quinolones										
Nalidixic acid	EUCAST	16		16	0.5	128				
Trimethoprim	EUCAST	2		2	0.5	64				
Sulfonamides										
Sulfonamide										
Sulfamethoxazol	CLSI	256		256	0.25	1024				
Aminoglycosides										
Streptomycin	EUCAST	16		16	2	128				
Gentamicin	EUCAST	2		2	0.25	32				
Neomycin	EUCAST	8		8	1	128				
Kanamycin	EUCAST	4		4	4	128				
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim	EUCAST	0.25		0.25	0.125	16				
Ceftazidim	EUCAST	0.5		0.5	0.125	16				
3rd generation cephalosporins										
Penicillins										
Ampicillin	EUCAST	8		8	0.5	64				
Polymyxins										
Colistin	EUCAST	8		8	8	16				

Table Breakpoints used for antimicrobial susceptibility testing in Humans

Test Method Used

Broth dilution

Standards used for testing

NCCLS

EUCAST

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest		Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol						128				
Florfenicol						128				
Tetracyclines										
Tetracyclin					0.5					
Fluoroquinolones										
Ciprofloxacin					0.06					
Enrofloxacin										
Quinolones										
Nalidixic acid					0.5	128				
Trimethoprim						64				
Sulfonamides										
Sulfonamide										
Sulfamethoxazol					0.25					
Aminoglycosides										
Streptomycin	EUCAST	16		16	2	128				
Gentamicin										
Neomycin		8		8	1	128				
Kanamycin		4		4	4	128				
Trimethoprim + sulfonamides										
Cephalosporins										
Cefotaxim	EUCAST				0.125	16				
Ceftazidim					0.125					
3rd generation cephalosporins										
Penicillins										
Ampicillin					0.5	64				
Polymyxins										
Colistin		8		8	8	16				

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1. HISTAMINE**4.1.1. General evaluation of the national situation****4.1.2. Histamine in foodstuffs****Table Histamine in food**

	Source of information	Sampling unit	Sample weight	Units tested	Total units in non- conformity	≤ 100 mg/ kg	>100 - ≤ 200 mg/ kg	>200 - ≤ 400 mg/ kg	> 400 mg/ kg
Fish									
Fishery products from fish species associated with a high amount of histidine - not enzyme matured	VWA	batch	10-20g	1792					
Cheeses made from cows' milk									
hard									
- at retail	VWA		10-20g	74	?				
soft and semi-soft									
- at retail	VWA		10-20g	7	?				
Crustaceans									
- at retail	VWA		10-20g	9	0				

4.2. ENTEROBACTER SAKAZAKII

4.2.1. General evaluation of the national situation

4.2.2. Enterobacter sakazakii in foodstuffs

Table Enterobacter sakazakii in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Enterobacter sakazakii	E. sakazakii
Infant formula (1)	VWA		25g	16	0	

(1) : Prepared infant formule from hospitals

4.3. STAPHYLOCOCCAL ENTEROTOXINS

4.3.1. General evaluation of the national situation

4.3.2. Staphylococcal enterotoxins in foodstuffs

5. FOODBORNE OUTBREAKS

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

A. Foodborne outbreaks

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

In the Netherlands, two authorities are involved in investigations of foodborne outbreaks: the national food safety authority (VWA) and the municipal public health services (GGD).

Doctors are legally obliged to report foodborne outbreaks (defined as 2 or more persons ill within 24 hours who have consumed the same food) to the GGD and to report individual cases of foodborne diseases if they work in the food preparation or as a caretaker. The GGD is responsible for the epidemiological investigation of these reports and for the reporting of these cases to the RIVM (national institute of public health and the environment). Reports to the RIVM are real-time.

Consumers who think they have become ill due to food consumption can use a special telephone line to report their illness to the VWA. The VWA is responsible for the investigation of food implicated. They visit the place where food is prepared and take samples for microbiological investigation. The VWA report these incidents to the RIVM. Reports to the RIVM are usually done about 2 months after the incident.

Thus, the GGDs are focussed on the human cases and the epidemiological investigation and the VWA is focussed on the microbiological investigation of food. Reports from GGDs are notifiable, but reports from the VWA are voluntary. In foodborne outbreaks with large numbers of cases both VWA and GGD are involved in the investigation.

In previous years, only foodborne outbreaks reported by the GGD have been reported to EFSA, because these reports have a legal basis and in most reported outbreaks a causative agent was found in samples from patients. Reports of the VWA were not reported to the EFSA, because these reports are based on voluntary reports of consumers and in most of these incidents a causative agent in food could not be found. However, now that EFSA uses special definitions for verified and possible outbreaks, in the current report over 2007, also VWA-reports are included. Most of them are possible, but foodborne outbreaks where a causative agent in food was found, are mentioned as verified outbreaks. Outbreaks in which both VWA and GGD were involved have been reported once (although in the national surveillance these are reported twice: once by the VWA and once by the GGD).

Therefore, the report over 2007 includes (many) more foodborne outbreaks than in previous years

Description of the types of outbreaks covered by the reporting:

Both in the VWA-reports and in the GGD-reports, foodborne outbreaks in which the food was consumed in a restaurant or other outdoor facility are mostly reported. In GGD-reports, mostly large outbreaks (with a high number of cases) are reported.

Definition for reporting of foodborne outbreaks by the GGD:

- 2 or more persons that have become ill within 24 hours who have consumed the same food

In 2008, this definition will be changed into:

- 2 or more persons with the same illness who have consumed the same food.

For the reporting of foodborne outbreaks by the VWA there is no definition used. The VWA report all incidents that are reported by consumers. To EFSA only those incidents with 2 or more persons ill are reported (whereas in the national surveillance also individual illness is reported).

Causative agents in the GGD-reports are mainly Salmonella, Norovirus and Campylobacter (because these are the agents that cause illness in humans and can be found in (fecal) samples). Causative agents in the VWA-reports are mainly Bacillus cereus and Staphylococcus aureus (because these are the agents that are mainly found in food samples taken). In VWA-reports Norovirus is sometimes found in environmental samples (for example a swab from the handle of the refrigerator), but according to the definitions used by EFSA, these incidents should not be reported as verified. Therefore, these incidents are reported as possible, unless epidemiological evidence exists that Norovirus was the cause of the outbreak.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

In 2007, the number of incidents reported by the VWA increased from 530 in 2006 to 621 in 2007 (these incidents include reports of individual cases and foodborne outbreaks) and more patients were involved (1723 in total, in 2006: 1329 patients). Of these incidents, 315 were foodborne outbreaks (295 in 2006).

The number of incidents reported by the GGDs remained at the same level: 44 foodborne outbreaks in 2007 and 49 in 2006, but the number of patients involved, increased from 476 in 2006 to 759 in 2007. This was mainly due to a few very large outbreaks.

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

VWA-reports: of the 315 foodborne outbreaks reported by the VWA, a causative agent was found in 9% (29 outbreaks). Just as in the previous years, Bacillus cereus and Staphylococcus aureus were the agents that were mostly found. In 2006, in 11% of the outbreaks, a causative agent was found. The food products in which a causative agent could be found were mainly rice/ chinese dishes, such as fried rice or fried noodles (with vegetables and/ or meat). In some incidents a causative agent was found in more than one food product.

GGD-reports: in 77% of the foodborne outbreaks, a causative agent was found (34 outbreaks). Salmonella was mostly found (16 outbreaks, 36%), followed by Campylobacter (10 outbreaks, 23%) and Norovirus (7 outbreaks, 16%). Foods implied were mostly unknown or well-known risk products were reported (such as eggs for S. Enteritidis). In some instances (especially in large outbreaks) an epidemiological investigation was done (these are reported as verified outbreaks).

Relevance of the different type of places of food production and preparation in outbreaks

Both in the VWA-reports and in the GGD-reports, restaurants are the main place of food production in outbreaks. Outbreaks where food has been prepared in a private home are largely underreported. In 58% of the VWA-reports (all reports including individual cases (n=621)) and in 43% of the foodborne outbreaks reported by the GGD, the food implied was prepared in a restaurant.

Snack bars were reported in 17% of the VWA-reports, a shop (such as a supermarket, bakery,

or butcher were reported in 14% of the reports, the home in 3% and an institution in 1%. In GGD-reports: in 27% the home was reported, in 7% an institution and in 16% other (including supermarkets or other shops, farms, etc.).

Evaluation of the severity and clinical picture of the human cases

Of the patients involved in the VWA-reports, 80% had diarrhea and 75% vomiting. Of the patients involved in the GGD-reports of foodborne outbreaks, 115 were hospitalised. In previous years, the number of hospitalised patients was much lower (27 in 2006). This high number of hospitalisations was due to a large outbreak in the eastern part of the Netherlands with 225 patients, of which 62 were hospitalised. This outbreak was caused by cheese produced at a local farm. Furthermore in an outbreak involving 37 children, all children were hospitalised (mainly as a precaution measure). These children were at a scouts camp and consumed water that was provided by a local farmer.

Descriptions of single outbreaks of special interest

Single outbreaks of special interest in 2007:

- outbreak in the eastern part of the country, which started already in the beginning of 2006. About 225 patients were identified with *S. Typhimurium* FT560, 62 were hospitalised. The outbreak was caused by cheese produced at a local farm.
- outbreak of *Clostridium perfringens*: about 180-200 patients were identified. The causative agent was found in multiple foods consumed at a buffet. It was an Lftar-meal that was organised in a theater. Lentil soup was the probable source of infection, since this product was prepared long before the meal and inadequately chilled.
- outbreak of *Campylobacter jejuni*: about 18 patients became ill out of a group of 23 colleges who visited a dairy farm during a day-trip. 19 persons had consumed unpasteurised milk.
- outbreak in the eastern part of the country. About 26 patients were identified with *S. Typhimurium* FT507. The outbreak was probably caused by filet americain (stake tartar) bought in a local supermarket.
- outbreak of Norovirus among 37 children at a scouts camp. The outbreak was probably caused by contaminated water that was provided by a local farmer.

Control measures or other actions taken to improve the situation

The outbreak of *S. Typhimurium* FT 560 has been controlled by temporary closure of the farm, temporary pasteurisation of the milk used for production of the cheese and thorough cleaning of the farm.

In other foodborne outbreaks, the outbreaks were mostly caused by a point source contamination.

Suggestions to the community for the actions to be taken

Some outbreaks, especially norovirus outbreaks with large numbers of cases, are caused by an infected food handler that worked while he was ill or started working just after he had recovered. This suggests that education about food safety and the risks of spreading illness when working during illness is needed for food handlers.

Foodborne Outbreaks: summarized data

	Total number of outbreaks	Number of possible outbreaks	Number of verified outbreaks
Bacillus	12	0	12
Campylobacter	12	10	2
Clostridium	2	0	2
Escherichia coli, pathogenic	0	0	0
Foodborne viruses	8	0	8
Listeria	0	0	0
Other agents	0	0	0
Parasites	0	0	0
Salmonella	16	13	3
Staphylococcus	11	1	10
Unknown	284	284	0
Yersinia	0	0	0

Verified Foodborne Outbreaks: detailed data

B. cereus

Value

Code	VWA_622081
Subagent Choice	Bacillus; B. cereus, Listeria; L. monocytogenes
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Fish and fish products
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	B. cereus and L. monocytogenes detected in fish

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B. cereus

Value

Code	VWA_634571
Subagent Choice	Bacillus; B. cereus, Clostridium; C. perfringens
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Cheese
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	Take-away or fast-food outlet
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	B. cereus and C. perfringens detected in cheese

B. cereus

Value

Code	VWA_532227
Subagent Choice	Bacillus; B. cereus
Outbreak type	Unknown
Human cases	4
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	Chicken curry soup
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

B. cereus

Value

Code	VWA_533717
Subagent Choice	Bacillus; B. cereus
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	Fried noodles with meat
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

B. cereus

Value

Code	VWA_638117
Subagent Choice	Bacillus; B. cereus
Outbreak type	Unknown
Human cases	4
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Cereal products including rice and seeds/pulses (nuts, almonds)
More Foodstuff	Boiled rice
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

B. cereus

Value

Code	VWA_633351
Subagent Choice	Bacillus; B. cereus
Outbreak type	Unknown
Human cases	3
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Cereal products including rice and seeds/pulses (nuts, almonds)
More Foodstuff	Boiled noodles with vegetables
Type of evidence	Laboratory detection in implicated food
Setting	Take-away or fast-food outlet
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

B. cereus

Value

Code	VWA_539195
Subagent Choice	Bacillus; B. cereus, Salmonella
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	Boiled noodles and shrimps
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	Salmonella and B. cereus detected in shrimps; and B. cereus detected in noodles;

B. cereus

Value

Code	VWA_558021
Subagent Choice	Bacillus; B. cereus, Listeria; L. monocytogenes
Outbreak type	Unknown
Human cases	3
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	Fried noodles with meat
Type of evidence	Laboratory detection in implicated food
Setting	Take-away or fast-food outlet
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	B. cereus detected in left-over of consumed fried noodles with meat; Listeria monocytogenes detected in other prepared fried noodles

B. cereus

Value

Code	VWA_635419
Subagent Choice	Bacillus; B. cereus, Staphylococcus; Staphylococcus spp., unspecified
Outbreak type	Unknown
Human cases	3
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	Fried noodles and eggs (foe yong hai)
Type of evidence	Laboratory detection in implicated food
Setting	Take-away or fast-food outlet
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	B. cereus and S. aureus detected in left-over of fried noodles; B. cereus detected in left-over of egg meal (foe yong hai)

B. cereus

Value

Code	VWA_622147
Subagent Choice	Bacillus; B. cereus
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Other foods
More Foodstuff	Vegetables: aubergine salad
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

B. cereus

Value

Code	VWA_623635
Subagent Choice	Bacillus; B. cereus
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	Boiled rice with egg
Type of evidence	Laboratory detection in implicated food
Setting	Take-away or fast-food outlet
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

B. cereus

Value

Code	GGD_VWA_12
Subagent Choice	Bacillus; B. cereus
Outbreak type	General
Human cases	15
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	Chinese rice table
Type of evidence	Laboratory detection in implicated food, Analytical epidemiological evidence
Setting	Take-away or fast-food outlet
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	B. cereus detected in fried rice; no stool samples taken from the human cases, but an analytical epidemiological study was performed indicating eggs as possible source of infection.

C. jejuni

Value

Code	IB_1
Subagent Choice	Campylobacter; C. jejuni
Outbreak type	General
Human cases	18
Hospitalized	0
Deaths	0
Foodstuff implicated	Milk
More Foodstuff	Unpasteurised milk
Type of evidence	Laboratory detection in implicated food, Analytical epidemiological evidence, Laboratory characterization of isolates, Laboratory detection in human cases
Setting	Other setting
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	Unpasteurised milk, consumed at a farm during a company trip

Campylobacter spp., unspecified

Value

Code	VWA_622875
Subagent Choice	Campylobacter; Campylobacter spp., unspecified
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Broiler meat (Gallus gallus) and products thereof
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	Household
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	Campylobacter detected in raw chicken

C. perfringens

Value

Code	VWA_606083
Subagent Choice	Clostridium; C. perfringens
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	roast meal
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	Contributory factor: unhygienic handling of food by food handler

C. perfringens

Value

Code	GGD_VWA_9
Subagent Choice	Clostridium; C. perfringens
Outbreak type	General
Human cases	200
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	Lftar meal
Type of evidence	Laboratory detection in implicated food, Analytical epidemiological evidence
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	Clostridium detected in several foods at the buffet; no stool samples taken from the patients, an analytical epidemiological study was performed indicating rice, lamb meat or lentil soup as sources of infection.

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norovirus (Norwalk-like virus)

Value

Code	GGD_481315
Subagent Choice	Food borne viruses; calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	18
Hospitalized	0
Deaths	0
Foodstuff implicated	Unknown
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

Netherlands 2007 Report on trends and sources of zoonoses
norovirus (Norwalk-like virus)

Value

Code	VWA_638059
Subagent Choice	Food borne viruses; calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	36
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	frankfurter roll
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Infected food handler
Outbreaks	1
Comment	

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norovirus (Norwalk-like virus)

Value

Code	GGD_538321
Subagent Choice	Food borne viruses; calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	37
Hospitalized	37
Deaths	0
Foodstuff implicated	Tap water, including well water
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Camp, picnic
Place of origin of problem	Water source
Origin of foodstuff	Unknown
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	Foodborne outbreak in a scouts camp; Dutch scouts were camping in Belgium under primitive circumstances; water was provided by a farmer in the neighbourhood

Netherlands 2007 Report on trends and sources of zoonoses
norovirus (Norwalk-like virus)

Value

Code	GGD_VWA_2
Subagent Choice	Food borne viruses; calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	25
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Infected food handler
Outbreaks	1
Comment	

Netherlands 2007 Report on trends and sources of zoonoses
norovirus (Norwalk-like virus)

Value

Code	GGD_VWA_5
Subagent Choice	Food borne viruses; calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	22
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	buffet
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

Netherlands 2007 Report on trends and sources of zoonoses
norovirus (Norwalk-like virus)

Value

Code	GGD_VWA_14
Subagent Choice	Food borne viruses; calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	24
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	potato salad and fish
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Infected food handler
Outbreaks	1
Comment	

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norovirus (Norwalk-like virus)

Value

Code	GGD_VWA_8
Subagent Choice	Bacillus; B. cereus, Food borne viruses; calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	38
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Analytical epidemiological evidence, Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	Contributory factor: unhygienic food handling by food handler

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norovirus (Norwalk-like virus)

Value

Code	GGD_VWA_15
Subagent Choice	Food borne viruses; calicivirus (including norovirus); norovirus (Norwalk-like virus)
Outbreak type	General
Human cases	6
Hospitalized	0
Deaths	0
Foodstuff implicated	Dairy products (other than cheeses)
More Foodstuff	whipped cream
Type of evidence	Analytical epidemiological evidence
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Infected food handler
Outbreaks	1
Comment	

S. Typhimurium

Value

Code	GGD_533505
Subagent Choice	Salmonella; S. Typhimurium; FT 560
Outbreak type	General
Human cases	225
Hospitalized	62
Deaths	0
Foodstuff implicated	Cheese
More Foodstuff	
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases, Laboratory characterization of isolates, Analytical epidemiological evidence
Setting	Other setting
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Domestic
Contributory factors	Unprocessed contaminated ingredient, Cross-contamination
Outbreaks	1
Comment	Contaminated hard cheeses produced at a dairy farm and sold by the farm and on markets

S. group B

Value

Code	GGD_517673
Subagent Choice	Salmonella; S. Typhimurium; FT 507
Outbreak type	General
Human cases	26
Hospitalized	5
Deaths	0
Foodstuff implicated	Bovine meat and products thereof
More Foodstuff	steak tartar (filet américain)
Type of evidence	Analytical epidemiological evidence, Laboratory detection in human cases
Setting	Household
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unprocessed contaminated ingredient
Outbreaks	1
Comment	

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Salmonella spp.

Value

Code	GGD_VWA_1
Subagent Choice	Salmonella
Outbreak type	General
Human cases	8
Hospitalized	0
Deaths	0
Foodstuff implicated	Unknown
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	Other setting
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	Setting: holiday park

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S. aureus

Value

Code	VWA_613659
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Cereal products including rice and seeds/pulses (nuts, almonds)
More Foodstuff	pasta
Type of evidence	Laboratory detection in implicated food
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	Contributory factor: unhygienic food handling by food handler

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S. aureus

Value

Code	VWA_606959
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Cereal products including rice and seeds/pulses (nuts, almonds)
More Foodstuff	pasta
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

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S. aureus

Value

Code	VWA_482803
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	Unknown
Human cases	7
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Bakery products
More Foodstuff	pancake dough
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Infected food handler
Outbreaks	1
Comment	

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S. aureus

Value

Code	VWA_500935
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	Unknown
Human cases	7
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Pig meat and products thereof
More Foodstuff	spare ribs
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

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S. aureus

Value

Code	VWA_637545
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	Unknown
Human cases	3
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Cheese
More Foodstuff	goat cheese
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

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S. aureus

Value

Code	VWA_618249
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	Unknown
Human cases	4
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Cereal products including rice and seeds/pulses (nuts, almonds)
More Foodstuff	rice
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

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S. aureus

Value

Code	VWA_480217
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	Indonesian rice table
Type of evidence	Laboratory detection in implicated food
Setting	Take-away or fast-food outlet
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	

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S. aureus

Value

Code	VWA_638313
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	General
Human cases	4
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Cereal products including rice and seeds/pulses (nuts, almonds)
More Foodstuff	boiled noodles
Type of evidence	Laboratory detection in implicated food
Setting	Take-away or fast-food outlet
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	Contributory factor: unhygienic handling of food by food handler

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S. aureus

Value

Code	VWA_633873
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	Unknown
Human cases	2
Hospitalized	unknown
Deaths	unknown
Foodstuff implicated	Cereal products including rice and seeds/pulses (nuts, almonds)
More Foodstuff	Vietnamese spring roll sheet
Type of evidence	Laboratory detection in implicated food
Setting	Take-away or fast-food outlet
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

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S. aureus

Value

Code	GGD_VWA_10
Subagent Choice	Staphylococcus; S. aureus; S. aureus enterotoxins
Outbreak type	General
Human cases	24
Hospitalized	0
Deaths	0
Foodstuff implicated	Bakery products
More Foodstuff	cake and biscuits
Type of evidence	Laboratory detection in human cases, Laboratory detection in implicated food, Analytical epidemiological evidence
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Inadequate chilling
Outbreaks	1
Comment	