ZOONOSES MONITORING

BELGIUM

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

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

including information on foodborne outbreaks and antimicrobial resistance in zoonotic agents

IN 2005

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Belgium**

Reporting Year: **2005**

Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
IPH	Scientific Institute of Public Health	
FASFC	Federal Agency for the Safety of the Food Chain	
VAR CODA CERVA	Veterinary and Agrochemical Research Centre	
IPH Pasteur	Pasteur Institute of Public Health	
ITG	Institute of Tropical Medicine Antwerp	

PREFACE

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/EC[1]. The information has also been forwarded to the European Food Safety Authority (EFSA).

The report contains information on trends and sources of zoonoses and zoonotic agents in Belgium during the year 2005. The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given.

The information given covers both zoonoses that are important for the public health in the whole European Community as well as zoonoses, which are relevant on the basis of the national epidemiological situation.

The report describes the monitoring systems in place and the prevention and control strategies applied in the country. For some zoonoses this monitoring is based on legal requirements laid down by the Community Legislation, while for the other zoonoses national approaches are applied.

The report presents the results of the examinations carried out in the reporting year. A national evaluation of the epidemiological situation, with special reference to trends and sources of zoonotic infections, is given. Whenever possible, the relevance of findings in foodstuffs and animals to zoonoses cases in humans is evaluated.

The information covered by this report is used in the annual Community Summary Report on zoonoses that is published each year by EFSA.

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

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1. ANIMAL POPULATIONS

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

A. Information on susceptible animal population

Sources of information:

Sanitel database of the Federal Agency for the Safety of the Food Chain, a computerised identification and registration system for farm animals.

Dates the figures relate to and the content of the figures:

Number of animals = number of animals at a certain time point (January - February - March) of the year.
Number of slaughtered animals = total number of slaughtered animals in the year.

Definitions used for different types of animals, herds, flocks and holdings as well as the types covered by the information:

Holding: total stock of an animal species hold on a defined geographical entity and forming a clear epidemiological unit, determined by the Competent Authority.
The localisation of the holding is based on the address and the coordinates of the geographical entity. A geographical entity is a unit of one building or a complex of buildings included grounds and territories where an animal species is or could be hold.

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

2005
For the last years, there's a significant decrease in total number of holdings for bovines. On the other hand, the total number of animals of these species is only slightly decreasing what means that the total number of animals per premise is increasing. This is due to the take over of livestock animals from small holdings who are ceasing breeding activity by large farms.

Geographical distribution and size distribution of the herds, flocks and holdings

2005
Belgium can be geographically divided into two regions: the Flemish region situated in the north of the country and the Walloon region situated in the south. There's a very dense animal population of bovines, swine and poultry in the Flemish region. The Walloon region is important for his cattle breeding holdings of the Belgian Blue White race. The number of swine and poultry holdings in this region is limited.

Table Susceptible animal populations

* Only if different than current reporting year

Animal species	Category of animals	Livestock numbers (live animals)	Year*	Number of slaughtered animals	Year*	Number of herds or flocks	Year*	Number of holdings	Year*
Cattle (bovine animals)	dairy cows and heifers							13216	
	meat production animals			523795					
	calves (under 1 year)			313115					
	in total (1)	2492757		836910				42204	
Deer	farmed - in total	14655		5857				1799	
Ducks	parent breeding flocks	800						1	
	meat production flocks	44340						14	
	in total	45140		118845				15	
Gallus gallus (fowl)	parent breeding flocks, unspecified - in total	2129874						155	
	grandparent breeding flocks for meat production line	15000						1	
	laying hens	10562160		29907674				386	
	broilers	26754817		237670666				1024	
	in total	39461851						1566	
Geese	parent breeding flocks	1400						2	
	meat production flocks	2400						2	
	in total			1234					
Goats	in total (2)	60330		2585					
Pigs	breeding animals	657998							
	fattening pigs	4989016							
	in total (3)			10861234				10792	
Sheep	in total (4)	266278		112771				40654	
Solipeds, domestic	horses - in total			11542					
Turkeys	parent breeding flocks	300						1	
	meat production flocks	245776						35	
	in total	246076		694927				36	
Pigeons	in total	1300		290334				2	
Ostriches	in total			192					
Pheasants	in total	226049		5225				9	
Guinea fowl	in total	71400		96261				14	
Partridges	in total	129000		3575				4	
Quails	in total	1700		80260				1	

(1): January 2005
(2): February 2005
(3): February 2005
(4): February 2005
Total number of holdings with sheep, goats and cervids

2. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

Zoonoses are diseases or infections, which are naturally transmissible directly or indirectly between animals and humans. Foodstuffs serve often as vehicles of zoonotic infections. Zoonotic agents cover viruses, bacteria, fungi, parasites or other biological entities that are likely to cause zoonoses.

2.1. SALMONELLOSIS

2.1.1. General evaluation of the national situation

2.1.2. Salmonella in foodstuffs

A. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

A monitoring programme was organised by the FASFC. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of carcasses and meat were selected.
The matrixes were carcasses, meat preparation and fillets of broilers. The carcass samples of broiler and fowl consisted of 10g with neck skin. The following contamination levels were analysed: 25g cutting or minced meat of chicken and 1g of chicken carcasses.
Sampling was done by a specially trained staff. For most matrixes, approximatively 100 - 300 independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence.
The contamination of broiler carcasses is decreasing from 12,1%, 7,9% to 5,7% in 2003, 2004 and 2005 respectively. The contamination of broiler fillets and minced meat with neckskin comes up to 14,2% in 2005. The increase from 12% in 2003 to 19,9% in 2004 was probably caused by the new sampling method where the impact of the presence of neck skin in the analysed samples becomes more important on the contamination percentage.

B. Salmonella spp. in pig meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

A monitoring programme was organised by the FASFC. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of carcasses and meat were selected.
The matrixes were carcasses, cuts and minced meat of pork. Sampling of pork carcasses was done by means of swabs. The following contamination levels were analysed: 25g (cutting, minced meat of pork) and 600 cm2 (pork carcasses). Sampling was done by a specially trained staff. For most matrixes, approximatively 100 - 300 independent samples were taken per matrix in order

to detect a minimal contamination rate of 1% with 95% confidence.
The contamination of pig carcasses is slightly decreasing since 2002 from 15% to 9,3% in 2005. The contamination of cutting and minced meat remains unchanged for some years (cuttings 7,2%, minced meat 6,5%).

C. Salmonella spp. in bovine meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

A monitoring programme was organised by the FASFC. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of carcasses and meat were selected.
The matrixes were carcasses, cuts and minced meat of beef.
The following contamination levels were analysed: 25g cutting or minced meat of beef.
Sampling was done by a specially trained staff. For most matrixes, approximatively 100 - 300 independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence.
The contamination of minced meat of beef was limited to 1,4%.

D. Salmonella spp. in food

Monitoring system

Sampling strategy

A monitoring programme was organised by the Federal Agency for the Safety of the Food Chain. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of carcasses and meat, were selected for this study. The samples assayed were carcasses, cuts and minced meat from pork, carcasses, cuts and meat preparation from chicken, layer carcasses and beef minced meat. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain. For most of the matrixes, approximately 100 - 300 independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence. All Salmonella isolates were serotyped and serotypes Typhimurium, Enteritidis, Virchow and Hadar were lysotyped. The antibiotic resistance profiles were determined for all isolates, and included ceftriaxone, ampicillin, kanamycin, sulfamethoxazole, tetracycline, nalidixic acid, ciprofloxacin, chloramphenicol and trimethoprim.

Frequency of the sampling

Samples have been taken every week from the first to the 52nd week, except during the 30th week.

Type of specimen taken

Meat

Methods of sampling (description of sampling techniques)

Sampling of pork carcasses was done by means of swabs. The carcass samples of broiler and layer consisted of 10g of neck skin. The other samples were about 200g of meat.
The detection of Salmonella has been assessed in these dilutions: 25g (cutting and minced meat of pork, chicken cuts and beef), 600 cm2 (pork carcasses), and 1g (chicken and layer carcasses, chicken meat preparation).

Definition of positive finding

A sample is considered to be positive after biochemical confirmation of one Salmonella spp. in the sample.

Diagnostic/analytical methods used

Five laboratories licensed by the Federal Agency for the Safety of the Food Chain and accredited following ISO 17025 standard analyzed all the samples. The Belgian official method SP-VG-M002 was used for the detection of Salmonella in 25g, 1g or on swabs:
- pre-enrichment in buffered peptone water at 37°C for 16 to 20 h,
- selective enrichment on the semi-solid Diassalm medium at 42°C for 24 h,
- isolation of positive colonies on XLD at 37°C for 24 h,
- confirmation of minimum 2 colonies on TSI at 37°C and miniaturised biochemical tests,
- serotyping and lysotyping were done at the National Reference Center for Salmonella and Shigella (NRCSS-IPH) and at the Institute Pasteur, both located in Brussels, respectively.
- antibiotic resistance determination by IPH Brussels by disk diffusion method.

Preventive measures in place

Controls are made in place by the Federal Agency in case of notification.

Control program/mechanisms

The control program/strategies in place

Notification is mandatory since 1/3/2004 (Ministerial Decree on mandatory notification in the food chain of 22/1/2004). For Salmonella, absence in 25g in ready-to-eat food putted on the market is mandatory. Laboratories have to inform the Federal Agency in case of positive sample.

Notification system in place

See control program.

Table Salmonella in poultry meat and products thereof (Part A)

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Duisburg	S. Braenderup	S. 4,12:-:1,7	S. Texas	S. Minnesota	S. Brandenburg	S. Hadar	S. Paratyphi B	S. Blockley	S. Derby	S. Bredeney	S. Coeln
Meat from broilers (Gallus gallus)																				
fresh	FASFC DPA019	Single	caeca	5609	452	14	33	44				1	12	2	26	37	35		20	
with skin																				
- at retail	FASFC DIS821	Single	25g	46	1			1												
- at slaughterhouse - animal sample	FASFC DPA003	Single	1g	228	13	1	4	3								2				1
- at cutting plant	FASFC TRA200	Single	1g	260	37		3	10			1		1		1	5	1		3	
skinned																				
- at retail	FASFC DIS822	Single	25g	44	1			1												
Meat from poultry, unspecified																				
carcass																				
- at retail	FASFC DIS819	Single	0,1g	57	8	2		4												
meat preparation intended to be eaten cooked																				

	FASFC DIS826	Single	1g	85	5	2		1						2				
- at retail																		
- at processing plant	FASFC TRA202	Single	1g	269	16	3	3	1							3		1	
Meat from other poultry species																		
fresh																		
- at slaughterhouse - animal sample (1)	FASFC DPA020	Single	caeca	1209	210	67		125	1	1								

(1) : Meat of boiling hens (boilers)
(2) : Meat of boiling hens (boilers)

Table Salmonella in poultry meat and products thereof (Part B)

	S. Livingstone	S. Virchow	S. Ohio	S. Agona	S. Paratyphi B var. Java	S. Kentucky	S. Indiana	S. Infantis	S. Anatum	S. 4,5,12:-:-	S. Uppsala	S. Abony	S. 6,7:-:-	S. Rissen	S. Kapemba	S. Give
Meat from broilers (Gallus gallus)																
fresh		51		29	92	14	14	8	6	4	2	2	2	2	1	1
with skin																
- at retail																
- at slaughterhouse - animal sample					1	1										
- at cutting plant		4		1	7											
skinned																
- at retail																
Meat from poultry, unspecified																
carcass																
- at retail	1													1		
meat preparation intended to be eaten cooked																
- at retail																
- at processing plant		3	1	1												
Meat from other poultry species																
fresh																

	2	4	1	3	6
- at slaughterhouse - animal sample (1)					

(1) : Meat of boiling hens (boilers)
(2) : Meat of boiling hens (boilers)

Table Salmonella spp. in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Milk, cows'								
raw								
intended for direct human consumption	FASFC DPA016	Single	25g	164	0			
pasteurised milk	FASFC TRA115	Single	25g	105	0			
Milk, goats'								
raw								
intended for direct human consumption	FASFC DPA011	Single	25g	8	0			
Milk, sheep's								
raw	FASFC DPA 011	Single	25g	8	0			
Cheeses made from cows' milk								
soft and semi-soft								
made from raw or low heat-treated milk								
- at processing plant	FASFC TRA133	Single	25g	38	0			
- at farm	FASFC DPA008	Single	25g	141	0			
made from pasteurized milk								
- at processing plant	FASFC TRA134	Single	25g	144	0			0
- at retail	FASFC DIS818	Single	25g	185	0			0
Dairy products (excluding cheeses)								
butter								
made from raw or low heat-treated milk								
- at farm	FASFC DPA009	Single	25g	185	0			
made from pasteurized milk								
- at processing plant	FASFC TRA151	Single	25g	106	0			

milk powder and whey powder	FASFC TRA 123	Single	25g	13	0			
ice-cream								
- at farm	FASFC DPA010	Single	25g	40	0			
- at processing plant	FASFC TRA160	Single	25g	51	0			

Table Salmonella in red meat and products thereof (Part A)

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Braenderup	S. Saintpaul	S. Paratyphi B	S. Dublin	S. Derby	S. Infantis	S. Goldcoast	S. Mbandaka	S. Ohio	S. Brazzaville	S. Rissen	S. Livingstone
Meat from pig																				
fresh																				
- at processing plant	FASFC TRA306	Single	25g	300	22		9	3					2			1	1			2
- at cutting plant	FASFC TRA306	Single	25g	307	22		12	2					2			1	1			2
minced meat																				
intended to be eaten cooked																				
- at retail	FASFC DIS823	Single	25g	155	10		1	6					1				2			
- at processing plant	FASFC TRA303	Single	25g	292	10		1	3					2		1		2		1	
meat products																				
raw and intended to be eaten raw																				
- at retail (1)	FASFC DIS817	Single	25g	119	0			0												
carcass																				

- at slaughterhouse - animal sample - carcass swabs	FASFC DPA002	carcass	600 cm2	442	41		19	3	1	1	1		4	1	1	3	2			1
- at slaughterhouse - animal sample - meat	FASFC DPA002	carcass	destructive	261	8		1	3					3					1		
Meat from bovine animals																				
minced meat																				
intended to be eaten raw																				
- at retail	FASFC DIS816	Single	25g	171	1			1												
- at processing plant	FASFC TRA304	Single	25g	280	4		1	1				1	1							
meat preparation																				
intended to be eaten raw																				
- at retail	FASFC DIS815	Single	25g	116	1			1												

(1) : Raw ham

Table Salmonella in red meat and products thereof (Part B)

	S. Thompson	S. Typhimurium var. Copenhagen	S. Brandenburg
Meat from pig			
fresh			
- at processing plant	1	2	1
- at cutting plant	1		1
minced meat			
intended to be eaten cooked			
- at retail			
- at processing plant			
meat products			
raw and intended to be eaten raw			
- at retail (1)			
carcass			
- at slaughterhouse - animal sample - carcass swabs			4

- at slaughterhouse - animal sample - meat								
Meat from bovine animals								
minced meat								
intended to be eaten raw - at retail								
- at processing plant								
meat preparation								
intended to be eaten raw - at retail								

(1) : Raw ham

Table Salmonella spp. in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Goldcoast
Egg products	FASFC TRA105	Single	25g	151	0				
Crustaceans									
unspecified									
cooked - at processing plant	FASFC TRA401	Single	25g	50	0				
Molluscan shellfish									
cooked	FASFC DIS800	Single	25g	49	0				
Live bivalve molluscs	FASFCDIS844-806	Single	25g	98	2				
Fruits and vegetables									
precut ready-to-eat	FASFC DIS813	Single	25g	114	0				
Infant formula									
dried	FASFC DIS803	Single	25g	80	0				
Bakery products									
pastry									
with egg filling	FASFC DIS805	Single	25g	118	0			0	
desserts									
containing raw eggs									
- at retail	FASFC DIS838	Single	25g	188	1			1	
Spices and herbs									
- at retail	FASFC DIS828	Single	25g	205	0			0	
dried									
- at processing plant	FASFC TRA504	Single	25g	22	0				
Other processed food products and prepared dishes									
unspecified									
ready-to-eat foods									
- at retail	FASFCDIS830842	Single	25g	370	1				1
Chocolate									
- at retail	FASFC DIS834	Single	25g	153	0				

- at processing plant	FASFC TRA501	Single	25g	10	0				
Fruits									
products									
dried									
- at retail	FASFC DIS836	Single	25g	50	0				
Vegetables									
non-precut									
- at retail	FASFC DIS841	Single	25g	56	0				
pre-cut									
ready-to-eat									
- at processing plant	FASFC TRA502	Single	25g	20	0				

2.1.3. Salmonella in animals

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

Monitoring system

Sampling strategy

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

Breeding flocks are sampled as day-old chicks, at the age of 16 weeks and every 2 weeks during production. A specific Salmonella control is performed 4 times a year in the hatcheries by the owner.

Laying hens flocks

There is no official surveillance programme for layers. The farmer is responsible for a voluntary sampling at entrance. Sampling of flocks from farms with more than 5000 birds is required within 3 weeks before slaughter.

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Every flock is sampled

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

At the age of 16 weeks

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

Every 2 weeks

Laying hens: Day-old chicks

Other: not compulsory

Laying hens: Before slaughter at farm

Other: every flock on farms > 5000 birds

Type of specimen taken

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Internal linings of delivery boxes

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

Faeces

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

Faeces

Laying hens: Day-old chicks

Internal linings of delivery boxes

Laying hens: Production period

Faeces

Laying hens: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

At the farm, pieces (5 by 5 cm) of the inner linings of deliveryboxes are taken of each flock. 2 samples are taken, one for the hen-chicks and one for the cock-chicks. Each sample consists of 20 pieces of innerlining. The two samples are analyzed separately.
In addition, 20 living hen-chicks and 20 living cock-chicks are brought to the laboratory for serological testing.
The samples have to be taken the day of delivery, the samples have to reach the lab within 24 hours of sampling.
In the hatcheries, pooled samples from dead-in-the-shell chicks and of fluff and meconium, are taken by the owner every 3 months. These are sent to an accredited laboratory.

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

A pooled faeces sample of 60 X 1g is taken at the age of 16 weeks by technicians of DGZ and ARSIA. The sample is analyzed in the laboratories of DGZ and ARSIA.

Breeding flocks: Production period

Every six weeks, one or two pooled faeces sample of 60 X 1g is taken of every flock in production by technicians of DGZ and ARSIA. Every two weeks each

flock is sampled on voluntary basis with 2 pair of overshoes. The samples are immediately analyzed in the laboratories of DGZ and ARSIA.

Laying hens: Day-old chicks

Pieces of inner linings of the delivery boxes are sampled by the owner on a voluntary basis in the same way as for breeding flocks. The samples have to reach an accredited laboratory within 48 hours of sampling.

Laying hens: Production period

Faeces samples are taken by the owner from the delivery boxes on a voluntary basis. A sample made of 60 x 1g subsamples is taken of every flock with different origin of rearing. The samples have to reach an accredited and validated laboratory within 48 hours of sampling.

Laying hens: Before slaughter at farm

On farms with more than 5000 birds, all flocks are sampled, by the owner, within 3 weeks before slaughter. The sampling can be performed in 3 ways. 1) A pooled faeces sample (60 X 1g) taken with swabs. 2) A pooled faeces sample (60 X 1g) taken by hand. 3) Two pair of overboots, pooled. The samples have to reach an accredited laboratory within 48 hours.

Case definition

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

A sample is considered positive if Salmonella Enteritidis or Typhimurium is isolated from a sample. A flock is considered positive as soon as one sample is positive.

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

A sample is considered positive if Salmonella Enteritidis or Typhimurium is isolated. A flock is considered positive as soon as one sample is positive. If the farmer requests a confirmation sampling, new samples are taken by or under the authority of the competent authority. The result of the confirmation samples are binding.

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

A sample is considered positive if Salmonella Enteritidis or Typhimurium is isolated from a sample taken by or under the authority of the Federal Agency for the Safety of the Food Chain. A flock is considered positive as soon as one sample is positive. If a sample taken by the farmer is positive, new samples are taken by or under the authority of the competent authority for confirmation. The result of the confirmation samples are binding.

Laying hens: Day-old chicks

A sample is considered positive if Salmonella Enteritidis is isolated. A flock is considered positive as soon as one sample is positive.

Laying hens: Rearing period

A sample is considered positive if Salmonella Enteritidis is isolated. A flock is considered positive as soon as one sample is positive.

Laying hens: Before slaughter at farm

A sample is considered positive if Salmonella is isolated. A flock is considered positive as soon as one sample is positive.

Diagnostic/analytical methods used

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

Laying hens: Day-old chicks

Bacteriological method: ISO 6579:2002

Laying hens: Production period

Bacteriological method: ISO 6579:2002

Laying hens: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

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

Strongly recommended for parent flocks. Strongly discouraged for grand parent flocks and elite flocks.

Laying hens flocks

Strongly recommended.

Other preventive measures than vaccination in place

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

Health qualification system (e.g. infrastructure, management).

Laying hens flocks

Health qualification system (e.g. infrastructure, management).

Control program/mechanisms

The control program/strategies in place

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

The national control programme for Salmonella in breeding flocks is based on Directive 92/117/EEC.

Laying hens flocks

There is no national or regional control programme for Salmonella in laying hens. The sanitary qualification for farms with more than 5000 birds requires an exit sampling for Salmonella in general, within 3 weeks of slaughter.

Measures in case of the positive findings or single cases

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

1) Incubation of hatching eggs is prohibited.
2) Incubated hatching eggs are removed and destroyed.
3) Not yet incubated hatching eggs may be pasteurized.
4) Positive breeding flock is slaughtered.
5) Cleaning and desinfection of housing after removal of the breeding flock.

Laying hens flocks

1) Pasteurization of eggs
2) Cleaning and desinfection of housing after removal of the positive flock.

Notification system in place

Zoonotic Salmonella is notifiable since the first of Januari 2004. Notification is done by phone, fax or electronic.

Results of the investigation

In the parent flocks, 11 flocks of day-old chicks were tested of which none were positive for

Salmonella. 11 flocks were tested during rearing and 46 flocks were tested during production. All of them were Salmonella negative.
Within 3 weeks before slaughter, 41 out of 754 samples were positive for Salmonella, 40 out of 666 flocks and 36 out of 346 farms were positive for Salmonella.

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

Layer breeders were free of Salmonella in 2005. In 2004, 5% of flocks in production were positive, of which one Salmonella Infantis.
In 2004, 27% of laying hen flocks were positive for Salmonella. In 2005 about 6% of laying hen flocks were positive. This dramatic decrease is partly due to the recommended vaccination.

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

Monitoring system

Sampling strategy

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

Breeding flocks are sampled as day-old chicks, at the age of 16 weeks and every 2 weeks during production. A specific Salmonella control is performed 4 times a year in the hatcheries by the owner.

Broiler flocks

There is no official surveillance programme for broilers. It is compulsory to sample, for Salmonella in general, all flocks from farms with more than 5000 birds in the last three weeks before slaughter. Flocks from farms with less than 5000 birds are sampled voluntarily.
There is also a voluntary sampling of day-old chicks (health qualification A).

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Every flock is sampled

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

At the age of 16 weeks

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

Every 2 weeks

Broiler flocks: Day-old chicks

Other: not compulsory

Broiler flocks: Before slaughter at farm

Every hatch is sampled from farm with > 5000 birds

Type of specimen taken

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Internal linings of delivery boxes

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

Faeces

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

Faeces

Broiler flocks: Day-old chicks

Internal linings of delivery boxes

Broiler flocks: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

At the farm, pieces (5 by 5 cm) of the inner linings of deliveryboxes are taken of each flock. 2 samples are taken, one for the hen-chicks and one for the cock-chicks. Each sample consists of 20 pieces of innerlining. The two samples are analyzed separately.
In addition, 20 living hen-chicks and 20 living cock-chicks are brought to the laboratory for serological testing.
The samples have to be taken the day of delivery, the samples have to reach the lab within 24 hours of sampling.
In the hatcheries, pooled samples from dead-in-the-shell chicks and of fluff and meconium, are taken by the owner every 3 months. These are sent to an accredited laboratory.

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

A pooled faeces sample of 60 X 1g is taken at the age of 16 weeks by technicians of DGZ and ARSIA. The sample is analyzed in the laboratories of DGZ and ARSIA.

Breeding flocks: Production period

Every six weeks, one or two pooled faeces sample of 60 X 1g is taken of every flock in production by technicians of DGZ and ARSIA. Every two weeks each flock is sampled on voluntary basis with 2 pair of overshoes. The samples are immediately analyzed in the laboratories of DGZ and ARSIA.

Broiler flocks: Day-old chicks

Pieces of inner linings of the delivery boxes are sampled by the owner in the same way as for breeding flocks. The samples have to reach an accredited laboratory within 48 hours of sampling.

Broiler flocks: Before slaughter at farm

On farms with more than 5000 birds, all flocks are sampled, by the owner, within 3 weeks before slaughter. The sampling can be performed in 3 ways. 1) A pooled faeces sample (60 X 1g) taken with swabs. 2) A pooled faeces sample (60 X 1g) taken by hand. 3) Two pair of overboots, pooled. The samples have to reach an accredited laboratory within 48 hours.

Case definition

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

A sample is considered positive if Salmonella Enteritidis or Typhimurium is isolated. A flock is considered positive as soon as one sample is positive.

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

A sample is considered positive if Salmonella Enteritidis or Typhimurium is isolated. A flock is considered positive as soon as one sample is positive. If the farmer requests a confirmation sampling, new samples are taken by or under the authority of the competent authority. The result of the confirmation samples are binding.

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

A sample is considered positive if Salmonella Enteritidis or Typhimurium is isolated from a sample taken by or under the authority of the Federal Agency for the Safety of the Food Chain. A flock is considered positive as soon as one sample is positive. If a sample taken by the farmer is positive, new samples are taken by or under the authority of the competent authority for confirmation. The result of the confirmation samples are binding.

Broiler flocks: Day-old chicks

A sample is considered positive if Salmonella is isolated. A flock is considered positive as soon as one sample is positive.

Broiler flocks: Before slaughter at farm

A sample is considered positive if Salmonella is isolated. A flock is considered positive as soon as one sample is positive.

Diagnostic/analytical methods used

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

Broiler flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Broiler flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

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

Strongly recommended for parent flocks. Strongly discouraged for grand-parent and elite flocks.

Other preventive measures than vaccination in place

Broiler flocks

Health qualification system (e.g. infrastructure, management).

Control program/mechanisms

The control program/strategies in place

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

necessary)

The national control programme for Salmonella in breeding flocks is based on Directive 92/117/EEC.

Broiler flocks

There is no national or regional control programme for Salmonella in broiler flocks. The sanitairy qualification for farms with more than 5000 birds requires an exit sampling for Salmonella in general, within 3 weeks of slaughter.

Measures in case of the positive findings or single cases

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Positive flocks are destroyed.

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

Positive flocks are destroyed or slaughtered.

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

1) Incubation of hatching eggs is prohibited.
2) Incubated hatching eggs are removed and destroyed.
3) Not yet incubated hatching eggs may be pasteurized.
4) Positive breeding flock is slaughtered.
5) Cleaning and desinfection of housing after removal of the breeding flock.

Broiler flocks: Day-old chicks

No measures apply for positive flocks.

Broiler flocks: Before slaughter at farm

If a flock is Salmonella positive, it is slaughtered at the end of the day (logistic slaughter).

Notification system in place

A notification system is in place since the first of Januari 2004.

Results of the investigation

For the meat production line, 2 grandparent flocks were tested, both of them negative for Salmonella. 168 flocks of day-old chicks (parents) were tested, one was positive for Salmonella, not being Salmonella Enteritidis or Typhimurium. 190 rearing flocks were tested, one was positive for another serotype than Salmonella Enteritidis or Typhimurium. Of the 567 flocks tested during production, 24 were positive for Salmonella, of which 3 for S. Enteritidis, 2 S.

virchow and 1 for S. infantis.
The results of the sampling within 3 weeks of slaughter, 710 of 17146 samples were positive for Salmonella, 462 out of 9352 flocks and 248 out of 1102 farms were positive for Salmonella.

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

During rearing and production S. Enteritidis was found in 3 flocks. In broiler breeders, the Salmonella isolates belonged to a much wider range of serotypes (including S. infantis and S. vichow) than in layer breeders.

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

Monitoring system

Sampling strategy

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

Health Qualification A is mandatory for all commercial breeding flocks. They are at least sampled as day-old chick, when entering the production unit if this is on a different farm than the rearing unit, at the age of 26 weeks and within the last 3 weeks before slaughter.

Meat production flocks

If the holding has a capacity of more than 5000 birds (Health Qualification B), all flocks are sampled within three weeks of slaughter.

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Every flock is sampled

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

At the age of 26 weeks

Meat production flocks: Day-old chicks

Other: not mandatory

Meat production flocks: Before slaughter at farm

Every flock is sampled

Type of specimen taken

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

necessary): Day-old chicks

Internal linings of delivery boxes

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

Blood

Meat production flocks: Day-old chicks

Internal linings of delivery boxes

Meat production flocks: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

At the farm, pieces (5 by 5 cm) of the inner linings of deliveryboxes are taken of each flock. 2 samples are taken, one for the hen-chicks and one for the cock-chicks. Each sample consists of 20 pieces of innerlining. The two samples are analyzed separately.

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

Faeces samples are taken by the owner from the delivery boxes at time of delivery. A sample made of 60 X 5-10g subsamples is taken of every flock with different origin of rearing. The samples have to reach an accredited and validated laboratory within 48 hours of sampling.
At 26 weeks, 60 blood samples are taken of each flock. If one or more blood sample is positive, additional feaces samples are taken to confirm the result.
Within 3 weeks before slaughter, a pooled faeces sample consisting of 60 X 1g subsamples is taken of each flock.

Meat production flocks: Day-old chicks

Pieces of inner linings of the delivery boxes are sampled by the owner on a voluntary basis (Health Qualification A) in the same way as for breeding flocks. The samples have to reach an accredited laboratory within 48 hours of sampling.

Meat production flocks: Before slaughter at farm

On farms with more than 5000 birds (Health Qualification B), all flocks are sampled, by the owner, within 3 weeks before slaughter. The sampling can be performed in 3 ways. 1) A pooled faeces sample (60 X 1g) taken with swabs. 2) A pooled faeces sample (60 X 1g) taken by hand. 3) Two pair of overboots, pooled. The samples have to reach an accredited laboratory within 48 hours.

Case definition

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

A flock is positive if Salmonella is found.

Meat production flocks: Day-old chicks

A flock is positive if Salmonella is found.

Meat production flocks: Before slaughter at farm

A flock is positive if Salmonella is found.

Diagnostic/analytical methods used

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Bacteriological method: ISO 6579:2002

Meat production flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Meat production flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Case definition

A flock is positive if Salmonella is found.

Vaccination policy

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

There is no vaccination policy for breeding flocks.

Meat production flocks

There is no vaccination policy for meat production flocks.

Other preventive measures than vaccination in place

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

Health Qualification A: infrastructural and management obligations.

Meat production flocks

Health Qualification B: infrastructural and management obligations.

Measures in case of the positive findings or single cases

Only measures are taken at time of slaughter, if Salmonella positive, a flock is slaughtered at the end of the day (logistic slaughter).

Notification system in place

Zoonotic Salmonella is notifiable since 1 january 2004. Notification is done by phone, fax or e-mail.

Results of the investigation

Two of the three breeding flocks were positive for Salmonella Typhimurium during production. Ten of the 127 meat producing flocks were positive for Salmonella within 3 weeks of slaughter. The isolates were not serotyped.

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

Monitoring system

Sampling strategy

Breeding flocks

Health Qualification A is mandatory for all commercial breeding flocks. They are at least sampled as day-old chick, when entering the production unit if this is on a different farm than the rearing unit, at one point during production and within the last 3 weeks before slaughter.

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Every flock is sampled

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

Once a year

Meat production flocks: Day-old chicks

Other: not mandatory

Meat production flocks: Before slaughter at farm

3 weeks prior to slaughter

Type of specimen taken

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Internal linings of delivery boxes

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

Blood

Meat production flocks: Day-old chicks

Internal linings of delivery boxes

Meat production flocks: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

At the farm, pieces of the inner linings of delivery boxes are taken of each flock. Two samples are taken, one for the hen-chicks and one for the cock-chicks. Each sample consists of 20 pieces of inner lining. The two samples are analyzed separately.

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

Faeces samples are taken by the owner from the delivery boxes at time of delivery. A sample made of 60 X 5-10g subsamples is taken of every flock with different origin of rearing. The samples have to reach an accredited and validated laboratory within 48 hours of sampling.
Once during production, 60 blood samples are taken of each flock. If one or more blood sample is positive, additional feaces samples are taken to confirm the result.
Within 3 weeks before slaughter, a pooled faeces sample consisting of 60 X 1g subsamples is taken of each flock.

Meat production flocks: Day-old chicks

Pieces of inner linings of the delivery boxes are sampled by the owner on a voluntary basis (Health Qualification A) in the same way as for breeding flocks.

Meat production flocks: Before slaughter at farm

On farms with more than 5000 birds, all flocks are sampled, by the owner, within 3 weeks before slaughter. The sampling can be performed in 3 ways. 1) A pooled faeces sample (60 X 1g) taken with swabs. 2) A pooled faeces sample (60 X 1g) taken by hand. 3) Two pair of overboots, pooled. The samples have to reach an

accredited laboratory within 48 hours.

Case definition

Breeding flocks: Day-old chicks

A flock is positive if Salmonella is found.

Breeding flocks: Production period

A flock is positive if Salmonella is found.

Meat production flocks: Day-old chicks

A flock is positive if Salmonella is found.

Meat production flocks: Before slaughter at farm

A flock is positive if Salmonella is found.

Diagnostic/analytical methods used

Breeding flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Breeding flocks: Production period

Bacteriological method: ISO 6579:2002

Meat production flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Meat production flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

Breeding flocks

There is no vaccination policy for breeding flocks.

Meat production flocks

There is no vaccination policy for meat production flocks.

Other preventive measures than vaccination in place

Breeding flocks

Health Qualification A is mandatory for breeding flocks, hygienic infrastructural and management obligations are included.

Meat production flocks

If the holding has a capacity of 5000 birds or more, Health Qualification B is mandatory, A optional. Both include hygienic infrastructural and management obligations.

Measures in case of the positive findings or single cases

Breeding flocks

The samples are taken for monitoring purposes. At this moment, no measures are implemented in case of a positive finding. At time of slaughter, poultry positive for Salmonella is slaughtered at the end of the day (logistic slaughter).

Meat Production flocks

If samples taken within 3 weeks before slaughter are positive for Salmonella, the flock is slaughtered at the end of the day (logistic slaughter).

Notification system in place

A notification system for zoonotic Salmonella is in place since 1 january 2004. The notification can be done by e-mail, fax or post.

Results of the investigation

Three breeding flocks were tested. None were positive for Salmonella.

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

Monitoring system

Sampling strategy

Breeding flocks

Health Qualification A is mandatory for all commercial breeding flocks. They are at least sampled as day-old chick, when entering the production unit if this is on a different farm than the rearing unit, at one point during production and within the last 3 weeks before slaughter.

Meat production flocks

On voluntary basis (Health Qualification A), day-old chicks are sampled.
On farms with a capacity of 5000 or more birds (Health Qualification B), all flocks are sampled within 3 weeks before going to the slaughterhouse.

Frequency of the sampling

Breeding flocks: Day-old chicks

Every flock is sampled

Breeding flocks: Production period

Every flock is sampled

Meat production flocks: Day-old chicks

Other: not mandatory

Meat production flocks: Before slaughter at farm

Every flock is sampled

Type of specimen taken

Breeding flocks: Day-old chicks

Internal linings of delivery boxes

Breeding flocks: Production period

Blood

Meat production flocks: Day-old chicks

Internal linings of delivery boxes

Meat production flocks: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

Breeding flocks: Day-old chicks

At the farm, pieces (5 by 5 cm) of the inner linings of deliveryboxes are taken of each flock. 2 samples are taken, one for the hen-chicks and one for the cock-chicks. Each sample consists of 20 pieces of innerlining. The two samples are analyzed separately.

Breeding flocks: Production period

Faeces samples are taken by the owner from the delivery boxes at time of delivery. A sample made of 60 X 5-10g subsamples is taken of every flock with different origin of rearing. The samples have to reach an accredited and validated laboratory within 48 hours of sampling.
Once during production, 60 blood samples are taken of each flock. If one or more blood sample is positive, additional feaces samples are taken to confirm the result.
Within 3 weeks before slaughter, a pooled faeces sample consisting of 60 X 1g subsamples is taken of each flock.

Meat production flocks: Day-old chicks

Pieces of inner linings of the delivery boxes are sampled by the owner on a voluntary basis (Health Qualification A) in the same way as for breeding flocks.

Meat production flocks: Before slaughter at farm

On farms with more than 5000 birds (Health Qualification B), all flocks are sampled, by the owner, within 3 weeks before slaughter. The sampling can be performed in 3 ways. 1) A pooled faeces sample (60 X 1g) taken with swabs. 2) A pooled faeces sample (60 X 1g) taken by hand. 3) Two pair of overboots, pooled. The samples have to reach an accredited laboratory within 48 hours.

Case definition

Breeding flocks: Day-old chicks

A flock is positive if Salmonella is found.

Breeding flocks: Production period

A flock is positive if Salmonella is found.

Meat production flocks: Day-old chicks

A flock is positive if Salmonella is found.

Meat production flocks: Before slaughter at farm

A flock is positive if Salmonella is found.

Diagnostic/analytical methods used

Breeding flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Meat production flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Meat production flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

Breeding flocks

There is no vaccination policy.

Meat production flocks

There is no vaccination policy.

Other preventive measures than vaccination in place

Breeding flocks

Health Qualification A is mandatory. Hygienic infrastructural and management

obligations are included.

Meat production flocks

If the holding has a capacity of 5000 birds or more, Health Qualification B is mandatory, A is optional. Both include hygienic infrastructural and management obligations.

Measures in case of the positive findings or single cases

Samples are taken for monitoring purposes only. Flocks are slaughtered at the end of the day (logistic slaughter) if samples taken before slaughter are positive.

Notification system in place

A notification system for zoonotic Salmonella is in place since 1 january 2004. The notification can be done by e-mail, fax or phone.

Results of the investigation

Three breeding flocks were tested, one was positive for Salmonella Typhimurium and one for Salmonella Enteritidis.
28 meat production flocks were tested, 2 were positive for Salmonella, 1 for Salmonella Kottbus and 1 for Salmonella Reading.

F. Salmonella spp. in pigs

Monitoring system

Sampling strategy

Fattening herds

Blood samples from fattening pigs taken in the framework of the monitoring of Aujeszky's disease, are also analysed for Salmonella.

Frequency of the sampling

Fattening herds at farm

Every 4 months

Type of specimen taken

Fattening herds at farm

Blood

Methods of sampling (description of sampling techniques)

Fattening herds at farm

Depending on the capacity of the farm, 1 to 12 bloodsamples are taken of the fattening pigs.

Case definition

Fattening herds at farm

The samples taken in 2005 will be used to set the case definition.

Vaccination policy

Breeding herds

In 2005, no vaccine was authorized in Belgium for the vaccination of pigs against Salmonellosis.

Multiplying herds

In 2005, no vaccine was authorized in Belgium for the vaccination of pigs against salmonellosis.

Fattening herds

In 2005, no vaccine was authorized in Belgium for the vaccination of pigs against salmonellosis.

Measures in case of the positive findings or single cases

At this stage, since 'positive' had not been defined yet, no measures are taken.

Results of the investigation

208.013 serological analyses were performed. 26.584 samples had a S/P ratio greater than 1 (12.78%).

G. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

There was no official monitoring of cattle in 2005 in Belgium. Isolates were diagnostic samples sent to the NRL Salmonella, animal health, for serotyping.

Vaccination policy

In 2005, no vaccine was authorized for the vaccination of cattle against salmonellosis.

Results of the investigation

Laboratory findings of the NRL Salmonella, animal health.
The number of cattle Salmonella isolates analysed was 60 in total (2004 n=92). Most frequently found serotypes were S. Dublin (68,3%) and S. Typhimurium (13,3%).

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

The predominant serotype found among cattle continued to be S. Dublin, as in previous years but increased from 39,1% in 2004 to 68,3% in 2005. Serotype S. Typhimurium decreased from 34,8% in 2004 to 13,3% in 2005.

Table Salmonella in breeding flocks of Gallus gallus

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl)							
parent breeding flocks for egg production line							
day-old chicks		flock	11	0	0	0	0
during rearing period		flock	11	0	0	0	0
during production period		flock	46	0	0	0	0
grandparent breeding flocks for meat production line		flock	2	0	0	0	0
parent breeding flocks for meat production line							
day-old chicks		flcok	168	1			1
during rearing period		flock	190	1			1
during production period		flock	567	16	3	0	13

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl)							
laying hens							
day-old chicks	extern labs	flocks	279	8			8
during rearing period	extern labs	flock	34	0			
during production period	extern labs	flock	666	40			40
broilers							
day-old chicks	extern labs	flock	5416	46			46
during rearing period	extern labs	flock	9352	462			462
Ducks							
breeding flocks	DGZ	flock	2	1	1		
meat production flocks	ARSIA	flock	28	2			
Geese							
breeding flocks	DGZ	flock	3	0			
Turkeys							
breeding flocks	DGZ	flcok	3	2		2	
meat production flocks	extern lab	flock	127	10			10

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Guinea fowl	extern labs	flock	27	2			2
Pheasants	DGZ	flock	4	1			1
Partridges	DGZ	flock	2	0			
Ostriches	DGZ	flock	5	0			

Table Salmonella in other animals

Pigs	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. 4,12:i:-	S. Typhimurium var. Copenhagen	S. Derby	S. Brandenburg	S. London	S. Livingstone	S. Infantis
	FASFC	holdings	51	50		25		4	12	13	4	3	4	2

Footnote

Monitoring of holdings with high prevalence of Salmonella spp. were sampled every 2 months for scientific purpose. Sometimes two or more serotypes of Salmonella were detected at the same time. In total 1962 samples were analysed for this survey.

2.1.4. Salmonella in feedingstuffs

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Infantis
Feed material of land animal origin									
dairy products	FASFC	Batch	25g	13	0				
meat and bone meal	FASFC	Batch	25g	10	0				
poultry offal meal	FASFC	Batch	25g	3	0				
animal fat	FAFSC	Batch	25g	38	1				1
Feed material of marine animal origin									
fish meal	FASFC	Batch	25g	34	0				
fish oil	FASFC	Batch	25g	7	0				

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Senftenberg	S. Lexington	S. Agona	S. Mbandaka
Feed material of cereal grain origin												
barley derived	FASFC	Batch	25g	1	0							
maize	FASFC	Batch	25g	1	0							
other cereal grain derived	FASFC	Batch	25g	1	0							
Feed material of oil seed or fruit origin												
rape seed derived	FASFC	Batch	25g	15	3				1	1		1
palm kernel derived	FASFC	Batch	25g	8	0							
soya (bean) derived	FASFC	Batch	25g	19	0							
sunflower seed derived	FASFC	Batch	25g	29	1						1	
linseed derived	FASFC	Batch	25g	2	0							
other oil seeds derived	FASFC	Batch	25g	46	4				4			
Other feed material												
tubers, roots and similar products	FASFC	Batch	25g	1	0							


miscellaneous
FASFC
Batch
25g
8
0

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Livingstone	S. Jerusalem	S. Senftenberg
Compound feedingstuffs for cattle											
process control	FASFC	Batch	25g	8	0						
Compound feedingstuffs for pigs											
process control	FASFC	Batch	25g	57	2				1		1
Compound feedingstuffs for poultry (non specified)											
process control	FASFC	Batch	25g	23	0						
Compound feedingstuffs for poultry -breeders											
process control	FASFC	Batch	25g	6	0						
Compound feedingstuffs for poultry - laying hens											
process control	FASFC	Batch	25g	37	0						
Compund feedingstuffs for poultry - broilers											
process control	FASFC	Batch	25g	76	1					1	
Complementary feedingstuffs											
- in total	FASFC	Batch	25g	60	0						

2.1.5. Salmonella serovars and phagetype distribution

Table Salmonella serovars in animals

Serovars		Birds		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory (1)	N=		41		60		443	1496			
Number of isolates serotyped	N=		40		59		439	1433			
Number of isolates per type											
S. Abony								2			
S. Adelaide								2			
S. Agona			4				6	73			
S. Anatum			1				2	11			
S. Blockley								47			
S. Braenderup								28			
S. Brandenburg							5	1			
S. Bredeney								19			
S. Cerro								6			
S. Coeln								1			
S. Corvallis								1			
S. Cubana								4			
S. Derby					1		55	1			
S. Dublin					41						
S. Enteritidis			1		2		1	424			
S. Give								6			

S. Goldcoast												11																					
S. Hadar													46																				
S. Havana												1	6																				
S. Indiana													57																				
S. Infantis												51	66																				
S. Jerusalem													13																				
S. Kapemba												1	2																				
S. Kedougou												2																					
S. Kentucky													20																				
S. Kottbus					2								11																				
S. Lexington													4																				
S. Liverpool													2																				
S. Livingstone												8	20																				
S. London												26																					
S. Mbandaka												3	28																				
S. Minnesota													20																				
S. Montevideo													4																				
S. Newport													1																				
S. Ohio												4																					
S. Oranienburg													1																				
S. Paratyphi B (2)													32																				
S. Reading													1																				
S. Regent						1																											
S. Rissen												4	22																				
S. Schwarzengrund													10																				
S. Senftenberg						1							88																				
S. Sundsvall													2																				
S. Tennessee													3																				
S. Texas													1																				
S. Typhimurium					8			8				158	114																				
S. Uppsala													2																				
S. Virchow													85																				

S. 4,12:-:-		5		2		15	4			
S. 6,7:-:-						5	2			
S. 9,46:-:-							2			
S. Paratyphi B var. Java		1					117			
S. Gallinarum							1			
S. Typhimurium var. Copenhagen		16		5		81	13			
S. 3,19:-:-							2			
S. 9:-:-							5			
Total of typed *Salmonella* isolates										

(1) : Isolates obtained in the context of official sanitary programmes or for diagnostic reasons
(2) : Tartrate negative

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella serovars in food

Serovars		All foodstuffs		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates		M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)	M(*)	C(*)
Number of isolates in the laboratory	N=	29											
Number of isolates serotyped	N=	27											
Number of isolates per type													
S. Agona		4											
S. Cerro		4											
S. Cubana		1											
S. Derby		1											
S. Enteritidis		4											
S. Infantis		3											
S. Kentucky		1											
S. Lexington		1											
S. Litchfield		1											
S. Livingstone		1											
S. Ohio		1											
S. Orion		1											
S. Virchow		1											

S. Paratyphi B var. Java	2											
S. 13:-:-	1											
Total of typed *Salmonella* isolates												

Footnote

(*) M : Monitoring, C : Clinical

2.1.6. Antimicrobial resistance in Salmonella isolates

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

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Type of specimen taken

Laboratory findings of the National Reference Laboratory Salmonella, animal health.

Methods of sampling (description of sampling techniques)

Diagnostic samples sent to NRL.

Procedures for the selection of isolates for antimicrobial testing

Based on the number of serotypes of the Salmonella isolates.
S. Dublin 39
S. Enteritidis 2
S. O4 2
S. Typhimurium O5- 5
S. Typhimurium O5+ 8
Auto agglutinating 1
Total 57

Methods used for collecting data

All requests to the CODA - CERVA for isolation of Salmonella and for typing of Salmonella strains were routinely encoded in the Laboratory Management Information System (LIMS). The analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance are based on the results registered in the LIMS files that were created in 2004.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme. In case no unequivocal type was identified, strains were sent to the Scientific Institute for Public Health - Louis Pasteur (IPH) in Brussels for serotyping. Both isolation and serotyping at the CODA - CERVA was done under Beltest accreditation conditions (EN 17025).

Laboratory used for detection for resistance

Breakpoints used in testing

Susceptibility tests were performed by the disk diffusion test, using Neo-Sensitabs (Rosco). Tests and interpretation were done according to the manufacturers guidelines using an inoculum and breakpoints as described by NCCLS (Kirby-Bauer). Internal control was performed with quality control strain E. coli ATCC25922. Results were accepted when results with the QC strain were within the limits as proposed by Rosco.

Control program/mechanisms

The control program/strategies in place

There was no monitoring programme for Salmonella in cattle in 2005.

Results of the investigation

Obviously, the resistance of Salmonella strains isolated from a certain origin is reflected by the resistance of the serotypes most prevalent in the corresponding samples. Therefore, Salmonella from cattle are relatively less susceptible in comparison with those from other animal origin.

B. Antimicrobial resistance in Salmonella in pigs

Sampling strategy used in monitoring

Type of specimen taken

Laboratory findings of the NRL Salmonella, animal health.

Methods of sampling (description of sampling techniques)

Diagnostic samples sent to the NRL.

Procedures for the selection of isolates for antimicrobial testing

Based on the number of serotypes of the S. isolates.
S. Agona 6
S. Anatum 1
S. Brandenburg 4
S. Derby 45
S. Enteritidis 1
S. Goldcoast 10
S. Havana 1
S. Infantis 51
S. Kapemba 1
S. Kedougou 1
S. Livingstone 6
S. London 25
S. Mbandaka 3
S. Ohio 4
S. O4 12
S. O6,7 5

S. Rissen 2
S. Typhimurium 225
Non typable 4
Total 407

Methods used for collecting data

All requests to the CODA - CERVA for isolation of Salmonella and for typing of Salmonella strains were routinely encoded in the Laboratory Management Information System (LIMS). The analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance are based on the results registered in the LIMS files that were created in 2004.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme. In case no unequivocal type was identified, strains were sent to the Scientific Institute for Public Health - Louis Pasteur (IPH) in Brussels for serotyping. Both isolation and serotyping at the CODA - CERVA was done under Beltest accreditation conditions (EN 17025).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Susceptibility tests were performed by the disk diffusion test, using Neo-Sensitabs (Rosco). Tests and interpretation were done according to the manufacturers guidelines using an inoculum and breakpoints as described by NCCLS (Kirby-Bauer). Internal control was performed with quality control strain E. coli ATCC25922. Results were accepted when results with the QC strain were within the limits as proposed by Rosco.

Control program/mechanisms

The control program/strategies in place

There was a monitoring programme for Salmonella in pigs in 2005.

Results of the investigation

Obviously, the resistance of Salmonella strains isolated from a certain origin is reflected by the resistance of the serotypes most prevalent in the corresponding samples. Therefore, Salmonella from pigs are relatively less susceptible in comparison with those from other origin.

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Methods of sampling (description of sampling techniques)

Analysis of diagnostic samples sent to the National Reference Laboratory.

Procedures for the selection of isolates for antimicrobial testing

Based on the number of serotypes of the S. isolates:
S. Abony 2
S. Agona 68
S. Anatum 10
S. Blockley 39
S. Braenderup 24
S. Brandenburg 1
S. Bredeney 18
S. Cerro 2
S. Coeln 1
S. Corvallis 1
S. Cubana 4
S. Enteritidis 369
S. Gallinarum 1
S. Give 6
S. Hadar 46
S. Havana 6
S. Indiana 45
S. Infantis 60
S. Jerusalem 1
S. Kapemba 2
S. Kentucky 19
S. Kottbus 11
S. Lexington 2
S. Livingstone 18
S. Mbandaka 24
S. Minnesota 13
S. Montevideo 4
S. Oranienburg 1
S. Paratyphi var. Java 110
S. Paratyphi B 29
S. Reading 1
S. Rissen 20
S. Schwartzengrund 10
S. Senftenberg 60
S. Tennessee 3
S. Texas 1
S. Typhimurium 95
S. Uppsala 2
S. Virchow 83
S. O4 4
S. O6,7 2
S. O8 3
S. O9 5
S. O9,46 2
Non typable 49
Total 1277

Methods used for collecting data

All requests to the CODA - CERVA for isolation of Salmonella and for typing of Salmonella strains were routinely encoded in the Laboratory Management Information System (LIMS). The analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance are based on the results registered in the LIMS files that were created in 2004.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme. In case no unequivocal type was identified, strains were sent to the Scientific Institute for Public Health - Louis Pasteur (IPH) in Brussels for serotyping. Both isolation and serotyping at the CODA - CERVA was done under Beltest accreditation conditions (EN 17025).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Susceptibility tests were performed by the disk diffusion test, using Neo-Sensitabs (Rosco). Tests and interpretation were done according to the manufacturers guidelines using an inoculum and breakpoints as described by NCCLS (Kirby-Bauer). Internal control was performed with quality control strain E. coli ATCC25922. Results were accepted when results with the QC strain were within the limits as proposed by Rosco.

D. Antimicrobial resistance in Salmonella in foodstuff derived from cattle

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated during the zoonosis monitoring program were sent to the Institute of Public Health for serotyping and determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.
Antimicrobial Breakpoints(microg / ml)
Ampicillin 8 - 32
Ceftriaxon 8 - 64
Streptomycin 8 - 32
Kanamycin 16 - 64
Tetracycline 4 - 16
Sulfamethoxazole 256 - 512
Trimethoprim 8 - 16
Trimethoprim - sulfonamides 2 - 4
Nalidixic acid 16 - 32
Ciprofloxacin 1 - 4

Chloramphenicol 8 - 32
Salmonella from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

Only 3 Salmonella isolates from beef were analysed for antibiotic resistance, one was susceptible for all tested antibiotics the two others were resistant against ampicillin and streptomycin and one strain was resistant against nalidixic acid.

E. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated during the zoonosis monitoring program were sent to the Institute of Public Health for serotyping and determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.
Antimicrobial Breakpoints(microg / ml)
Ampicillin 8 - 32
Ceftriaxon 8 - 64
Streptomycin 8 - 32
Kanamycin 16 - 64
Tetracycline 4 - 16
Sulfamethoxazole 256 - 512
Trimethoprim 8 - 16
Trimethoprim - sulfonamides 2 - 4
Nalidixic acid 16 - 32
Ciprofloxacin 1 - 4
Chloramphenicol 8 - 32
Salmonella from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

In total 84 Salmonella strains from pork were tested for their susceptibility. The overall resistance was high, 77% of the strains were at least resistant against one antibiotic tested. The level of resistance was the same as for 2004, with a high degree of resistance for sulfamethoxazole 54%, streptomycin 33% and tetracycline, 29%. In comparison with 2004 the resistance against ampicillin, 40%, trimethroprim 30% and chloramphenicol 17% increased. No resistance was noticed to ceftriaxone and only 1% of the isolates were resistant against ciprofloxacin or nalidixic acid.
Salmonella Typhimurium was the most frequently isolated serotype from pork, in total 62 strains were tested for their susceptibility. The overall resistance was high but in comparison

with 2004 a decrease was noticed for tetracycline (from 53% to 27%) and sulfamethoxazole (from 53% to 37%). The resistance against chloramphenicol (23%) increased slightly and the resistance against trimethoprim and trimethoprim+sulfonamides increased from 18% to 31%. Only one strain (2%) was resistant to nalidixic acid, in combination with a resistance to ampicillin. No resistance was noticed to ceftriaxone and ciprofloxacin.

F. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated during the zoonosis monitoring program were sent to the Institute of Public Health for serotyping and determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.
Antimicrobial Breakpoints(microg / ml)
Ampicillin 8 - 32
Ceftriaxon 8 - 64
Streptomycin 8 - 32
Kanamycin 16 - 64
Tetracycline 4 - 16
Sulfamethoxazole 256 - 512
Trimethoprim 8 - 16
Trimethoprim - sulfonamides 2 - 4
Nalidixic acid 16 - 32
Ciprofloxacin 1 - 4
Chloramphenicol 8 - 32
Salmonella from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

Antimicrobial resistance in strains isolated from poultry meat.
In 2005, 126 Salmonella enterica isolates from poultry meat were tested for their antimicrobial susceptibility. Of all tested strains 40% were sensitive for all tested antibiotics. Most resistance was found to sulfamethoxazole (34%), tetracycline (29%), streptomycin (26%) trimethoprim and trimethoprim+sulfonamides (24%), ampicillin (21%) and nalidixic acid (15%). Chloramphenicol resistance was observed in 4% of the Salmonella strains isolated from poultry meat. No resistance was found for the fluoroquinolone ciprofloxacin and the cephalosporin ceftriaxon. From the Salmonella isolates from broiler the percentage of resistance decreased for almost all the antibiotics tested except for tetracycline were and increase in the percentage resistance was noticed in comparison with 2004.
- For 2005, 54 Salmonella Enteritidis isolates from poultry meat were tested for their susceptibility to all antimicrobials. It was clear that a much higher resistance against tetracycline

(30%), trimethoprim (26%), sulfamethaxozole (30%) and trimethoprim+sulfonamides (26%) was found in comparison with previous years.
- Salmonella Paratyphi B (n=19) was 100% resistant to streptomycin and showed in 74% of the isolated strains resistance against ampicillin. Resistance was noticed for tetracycline 32%, nalidixic acid (53%), sulfamethoxazole (48%) and trimethoprim and 16 % to ceftriaxone.
- Salmonella Derby (n=10) isolates from poultry showed resistance to sulfamethoxazole(20%), tetracyclines (20%) and trimethoprim+sulfonamides (10%) and a decline in resistance against streptomycin (10%) in comparison with 2004 (21%).
- Salmonella Ohio (n=10) isolated from poultry showed resistance against tetracycline (20%), trimethoprim (10%), sulfamethoxazole and trimethoprim+sulfonamides (40%) and streptomycin (10%).

G. Antimicrobial resistance of Salmonella spp. in food

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated during the zoonosis monitoring program were sent to the Institute of Public Health for serotyping and determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested are listed in the following table.
Antimicrobial
Ampicillin
Ceftriaxon
Streptomycin
Kanamycin
Tetracycline
Sulfamethoxazole
Trimethoprim
Trimethoprim - sulfonamides
Nalidixic acid
Ciprofloxacin
Chloramphenicol

Breakpoints used in testing

Minimum Inhibitory Concentrations (MIC) were determined by the use of E-test following the NCCLS standards.
The antimicrobials tested and the breakpoints used are listed in the following table.
Antimicrobial Breakpoints(microg / ml)
Ampicillin 8 - 32
Ceftriaxon 8 - 64
Streptomycin 8 - 32
Kanamycin 16 - 64

Tetracycline 4 - 16
Sulfamethoxazole 256 - 512
Trimethoprim 8 - 16
Trimethoprim - sulfonamides 2 - 4
Nalidixic acid 16 - 32
Ciprofloxacin 1 - 4
Chloramphenicol 8 - 32

H. Antimicrobial resistance of Salmonella spp. in animal - All animals - farmed

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

The susceptibility of 1.970 Salmonella strains was tested. The antimicrobials used are mentioned in "antimicrobial included in monitoring".

Methods used for collecting data

All requests to the CODA-CERVA for isolation of Salmonella and for typing of Salmonella strains were routinely encoded in the Laboratory Management Information System (LIMS). The analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance are based on the results registered in the LIMS files that were created in 2004.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme. In case no unequivocal type was identified, strains were sent to the Scientific Institute for Public Health - Louis Pasteur (IPH) in Brussels for serotyping. Both isolation and serotyping at the CODA-CERVA was done under Beltest accreditation conditions (EN 17025).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

List of the antimicrobials tested
Abbreviation Antimicrobial Amount of antimicrobial
Ap Ampicillin 33microg
Cef Ceftiofur 30microg
Sm Streptomycin 100microg
Ne Neomycin 120microg
Gm Gentamicin 40microg
Tc Tetracycline 80microg
Su Sulfonamides 240microg
Tsu Trimethoprim - sulfonamides 5,2microg + 240microg
Nal Nalidixic acid 130microg
Enr Enrofloxacin 10microg

Cm Chloramphenicol 60microg
Ff Florfenicol 30microg
For all susceptibility tests Neo-Sensitabs from Rosco were used according to the providers instructions

Results of the investigation

A total of 1.090 Salmonella isolates (55,3%) was fully susceptible to all antimicrobial drugs tested. Most resistance was found against Ap (29.2%), Su (27.2%), Tc (23.6%) and St (22.3%). Also resistance against Nal (18.8%) and against TSu (17.3%) are noteworthy. Only 1 Enr resistant strain (Salmonella Indiana from poultry) was detected. Relatively high resistance percentages were found against Cm (6.3%) of which 60.5% were also resistant against Ff. Finally, 82 isolates were Cef resistant (4.2%) (Figure 10). The cephalosporin resistant strains (n=82) mainly originated from poultry (n=72), but also from pigs (n=8) and one strain each from cattle and from food. Especially serotypes Paratyphi B var. Java (n=20), Virchow (n=16) and Infantis (n=14) were associated with Cef resistance (Table 8). Frequently, Cef resistant strains are multi-resistant to a large number of antimicrobials (Table 9).
Eighty-six percent of Salmonella Agona isolates (n=114) were fully susceptible for all antimicrobials tested. On the other hand, the multiresistance profile Ap Cm Ff St Su Tc Tsu was found in 2 strains. Resistance against Cef was found in 5 isolates.
Only 12.8% of Salmonella Blockley isolates (n=39) were fully resistant, and 28 isolates had profile Ap Nal Su Tc Tsu.
Most of Salmonella Derby strains (n=46) were sensitive(58.7%), but resistance profile St Su Tc was detected in 13 isolates. Cef resistance was found in one multi-resistant strain.
As for Salmonella Dublin isolates (n=39), 35.9% were found completely susceptible. Resistance against Su (41.0%), Cm (38.5%), Nal (33,3%) and St (28.2%) was remarkable.
Salmonella Enteritidis isolates (n=381) were susceptible for 81.9% of the isolates. As opposed to former years, Nal was the antimicrobial against which most resistance was found (15.0%). Also Ap resistance (3.1%) and one Cef resistant isolate (profile Ap Cef Nal) was noteworthy.
Almost all Salmonella Hadar (n=46) strains were resistant against Nal (97.8%), Tc (93.5%) and St (84.8%), most strains (84.8%) were resistant to all three antimicrobials. One sensitive isolate was identified. Strains were at maximum resistant to 4 antibiotics.
Most Salmonella Indiana strains had the profile Ap St Su Tc Tsu (62.2%). In addition, 32.1% had the profile Ap Su Tsu. One of the multi-resistant isolates was resistant against Enr.
Two-third of the Salmonella Infantis strains (n=115) were fully susceptible. Strains were mainly resistant against Ap (27.0%), Cef and Su (both 13.9%) and Nal (12.2%).
Although many of Salmonella London (n=25) isolates were fully sensitive (44.0%), multi-resistance profile Cm St Su Tc Tsu was detected in 28.0% of the isolates. In addition, Cef resistance was found in one strain.
As for Salmonella Paratyphi B var. Java (n=113), few strains were found sensitive (2.7%), and most resistance was found against Ap Nal Su Tsu (about 38%). In addition, Cef resistance is common (17.7%).
Only 29.9% of Salmonella Typhimurium isolates (n=368) were found susceptible; classic variant strains were found more often susceptible (31.7%) than Copenhagen variant isolates (26.5%). The multiresistance profile Ap St Tc Su was encountered in 38.2% of O5+, whereas this profile could be detected in 60.8% of O5- isolates. Cef resistance was detected in two Classic O5+ strains.
Seven Salmonella Virchow isolate (n=84) were susceptible to all antimicrobials tested. More

than half of the strains (51.2%) had resistance profile Ap Nal Su Tc Tsu. Sixteen Virchow isolates (19.0%) were resistant against Cef.

Table Antimicrobial susceptibility testing of S. Derby in Meat from poultry, unspecified - Monitoring - quantitative data [Dilution method]

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

	S. Derby
	Meat from poultry, unspecified - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	10

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	10	2						3	5				2									
Amphenicols																						
Chloramphenicol	10									8	2											
Cephalosporins																						
Ceftriaxon	10					10																
Fluoroquinolones																						
Ciprofloxacin	10		10																			
Quinolones																						
Nalidixic acid	10									7	3											
Trimethoprim	10					2	6						2									
Sulfonamides																						
Sulfonamide	10	2												3	2	3		2				
Aminoglycosides																						
Streptomycin	10	1									3	6	1									
Kanamycin	10								1	8	1											
Trimethoprim + sulfonamides	10	1			7	1			1				1									
Penicillins																						
Ampicillin	10							7	3													

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

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

	S. Enteritidis
	Meat from poultry, unspecified - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	54

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	54	16				1		5	30	2		1	5	1		9						
Amphenicols																						
Chloramphenicol	54							4	20	30												
Cephalosporins																						
Ceftriaxon	54		4		31	18							1									
Fluoroquinolones																						
Ciprofloxacin	54		50			4																
Quinolones																						
Nalidixic acid	54	4							4	28	18					4						
Trimethoprim	54	14				27	12		1				14									
Sulfonamides																						
Sulfonamide	54	16											1	5	21	11		16				
Aminoglycosides																						
Streptomycin	54	1							37	13	2	1		1								
Kanamycin	54								30	20	3	1										
Trimethoprim + sulfonamides	54	14		2	32	6							14									
Penicillins																						
Ampicillin	54	1				3	1	44	5							1						

Table Antimicrobial susceptibility testing of S. Ohio in Meat from poultry, unspecified - Monitoring - quantitative data [Dilution method]

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

	S. Ohio
	Meat from poultry, unspecified - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	10

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	10	2						3	5				1			1						
Amphenicols																						
Chloramphenicol	10									8	2											
Cephalosporins																						
Ceftriaxon	10				6	4																
Fluoroquinolones																						
Ciprofloxacin	10		10																			
Quinolones																						
Nalidixic acid	10									8	2											
Trimethoprim	10	1				2	7						1									
Sulfonamides																						
Sulfonamide	10	4													4	2	1	3				
Aminoglycosides																						
Streptomycin	10	1								6	2	1	1									
Kanamycin	10								2	7		1										
Trimethoprim + sulfonamides	10	1			6	3							1									
Penicillins																						
Ampicillin	10							5	5													

Table Antimicrobial susceptibility testing of S. Paratyphi B in Meat from poultry, unspecified - Monitoring - quantitative data [Dilution method]

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

	S. Paratyphi B Meat from poultry, unspecified - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	19

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	19	6							9	4			3		1	2						
Amphenicols																						
Chloramphenicol	19								4	12	2	1										
Cephalosporins																						
Ceftriaxon	19				1	13			2				3									
Fluoroquinolones																						
Ciprofloxacin	19		9		1	8	1															
Quinolones																						
Nalidixic acid	19	10								3	5	1				10						
Trimethoprim	19	3				9	7						3									
Sulfonamides																						
Sulfonamide	19	9													7	3	2	7				
Aminoglycosides																						
Streptomycin	19	19											3	8	3	5						
Kanamycin	19								5	12	2											
Trimethoprim + sulfonamides	19	3		1	12	3							3									
Penicillins																						
Ampicillin	19	14							2	2	1					14						

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from pig - Monitoring - quantitative data [Dilution method]

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

	S. Typhimurium
	Meat from pig - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	62

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	62	17						6	36	2	1		3	4	2	8						
Amphenicols																						
Chloramphenicol	62	14							11	34	3				1	13						
Cephalosporins																						
Ceftriaxon	62			1	45	14						1	1									
Fluoroquinolones																						
Ciprofloxacin	62		61			1																
Quinolones																						
Nalidixic acid	62	1							2	52	6	1				1						
Trimethoprim	62	19				24	19						19									
Sulfonamides																						
Sulfonamide	62	23											3	9	16	11	1	22				
Aminoglycosides																						
Streptomycin	62	25								3	22	12	1	8	5	11						
Kanamycin	62	2							21	30	9					2						
Trimethoprim + sulfonamides	62	18		5	31	7				1			18									
Penicillins																						
Ampicillin	62	30						23	9							30						

Table Antimicrobial susceptibility testing of Salmonella spp. in Meat from bovine animals - Monitoring - quantitative data [Dilution method]

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

	Salmonella spp.
	Meat from bovine animals - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	3

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	3							1	2													
Amphenicols																						
Chloramphenicol	3								3													
Cephalosporins																						
Ceftriaxon	3				2				1													
Fluoroquinolones																						
Ciprofloxacin	3		2		1																	
Quinolones																						
Nalidixic acid	3	1								2						1						
Trimethoprim	3					3																
Sulfonamides																						
Sulfonamide	3													1	2							
Aminoglycosides																						
Streptomycin	3	2									1			1		1						
Kanamycin	3								3													
Trimethoprim + sulfonamides	3			3																		
Penicillins																						
Ampicillin	3	2						1								2						

Table Antimicrobial susceptibility testing of Salmonella spp. in Meat from poultry, unspecified - in total - Monitoring - quantitative data [Dilution method]

	Salmonella spp.
	Meat from poultry, unspecified - in total - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	126

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

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	126	37				1		17	63	8		2	15	1	3	16						
Amphenicols																						
Chloramphenicol	126	5						5	28	78	9	1			2	3						
Fluoroquinolones																						
Ciprofloxacin	126		107		3	15	1															
Quinolones																						
Nalidixic acid	126	19							6	68	29	4				19						
Trimethoprim	126	31				56	38		1				31									
Sulfonamides																						
Sulfonamide	126	43											2	13	43	25	3	40				
Aminoglycosides																						
Streptomycin	126	33							37	21	18	17	6	12	7	8						
Kanamycin	126	1						1	45	65	11	3				1						
Trimethoprim + sulfonamides	126	30		6	72	17			1				30									
Cephalosporins																						
Ceftriaxon	126		4	3	51	62			2				4									
Penicillins																						
Ampicillin	126	26				3	1	78	17	1						26						

Table Antimicrobial susceptibility testing of Salmonella spp. in Meat from pig - quantitative data [Dilution method]

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

	Salmonella spp.
	Meat from pig
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	84

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	84	24						10	44	3	3	1	5	5	3	10						
Amphenicols																						
Chloramphenicol	84	14	2						16	49	3				1	13						
Fluoroquinolones																						
Ciprofloxacin	84	1	81			2				1												
Quinolones																						
Nalidixic acid	84	1							2	72	8	1				1						
Trimethoprim	84	25				34	22	3					25									
Sulfonamides																						
Sulfonamide	84	33											3	10	26	12	4	29				
Aminoglycosides																						
Streptomycin	84	28							1	5	30	20	2	9	5	12						
Kanamycin	84	2							27	43	12					2						
Trimethoprim + sulfonamides	84	25		6	39	14				1			24									
Cephalosporins																						
Ceftriaxon	84			2	54	26						1	1									
Penicillins																						
Ampicillin	84	34						36	13							34						

Table Breakpoints for antibiotic resistance testing of Salmonella in Food

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines		4	8	16						
Fluoroquinolones										
Ciprofloxacin		1	2	4						
Quinolones										
Nalidixic acid		16		32						
Aminoglycosides										
Gentamicin										
Macrolides										
Erythromycin										
Penicillins										
Ampicillin		8	16	32						

2.2. CAMPYLOBACTERIOSIS

2.2.1. General evaluation of the national situation

A. Thermophilic Campylobacter General evaluation

History of the disease and/or infection in the country

Campylobacter is a leading source of bacterial foodborne gastrointestinal diseases in humans in all parts of the world. It can also cause postinfectious complications as Guillain-Barré syndrome.
In 80% of the cases, the infection route of campylobacteriosis is food, but domestic animals including pets are also involved. The transmission of this pathogen to humans is mostly due to consumption of undercooked poultry, pork and beef, unpasteurized milk, contaminated drinking water, or contacts with the faeces of infected pets. This report will focus on Campylobacter jejuni and Campylobacter coli that are the main causes of enteritis in humans .
The contamination of poultry carcasses and meat with Campylobacter are monitored since 2000 by the Federal Agency for the Safety of the Food Chain. The rate of positive poultry samples is stable, but high. Chicken and layer meat have to be well cooked and cross-contamination should be avoided during preparation.

2.2.2. Campylobacter, thermophilic in foodstuffs

A. C.,thermophilic in food

Monitoring system

Sampling strategy

A monitoring programme was organised by the Federal Agency for the Safety of the Food Chain. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of carcasses and meat, were selected for this study. The samples assayed were carcasses and minced meat from pork, carcasses, cuts and meat preparation from chicken, and layer carcasses. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain.

Frequency of the sampling

Samples have been taken every week from the first to the 52nd week, except during the 30th week.

Type of specimen taken

Meat

Methods of sampling (description of sampling techniques)

Sampling of pork carcasses was done by means of swabs (4 areas from the same half carcass constituting 600 cm2 were putted in the same stomacher bag).
The carcass samples of broiler and layer consisted of 10g of neck skin. The other samples were about 200g of meat. 10g to 25g representative of the whole sample were weighted in the laboratory, and the detection of Campylobacter has been assessed in these quantities or dilutions: 25g for pork minced meat, 600 cm2 (pork carcasses), 0,01g for chicken carcasses, layer carcasses, and chicken meat preparation, and for chicken cuts, 0,1g and 25g.
No pooling has been done.

Definition of positive finding

A sample is considered to be positive after biochemical or genetic confirmation of one Campylobacter in the sample.

Diagnostic/analytical methods used

For detection of Campylobacter in meat samples or swabs the official Belgian SP-VG-M003 method following was used:
- selective enrichment on Preston at 42°C for 48 h,
- isolation on mCCDA at 42°C for 24 h - 120 h,
- confirmation of minimum 1 colony with miniaturised biochemical tests or by PCR typing.

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. coli	C. lari	C. jejuni	C. upsaliensis	thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus)										
fresh										
with skin										
- at retail	FASFC DIS821	Single	25g	41	6					6
- at cutting plant	FASFC TRA200	Single	1g	249	57					57
skinned										
- at retail	FASFC DIS822	Single	25g	36	10					10
- at slaughterhouse - animal sample	FASFC DPA019	Single	caeca	5606	3542					3542
- at slaughterhouse - animal sample - neck skin	FASFC DPA003	Single	0,01g	270	53					53
carcass										
- at retail	FASFC DIS820	Single	0,01g	77	3					3
Meat from turkey										
fresh										
- at slaughterhouse - animal sample - neck skin	FASFC DPA003	Single	0,01g	29	4					4
Meat from poultry, unspecified										
carcass										
- at retail	FASFC DIS819	Single	0,01g	57	12					12
meat preparation										
intended to be eaten cooked										

- at retail	FASFC DIS826	Single	0,01g	87	3					3
- at processing plant	FASFC TRA202	Single	0,01g	269	10					10
Meat from other poultry species										
fresh										
- at slaughterhouse - animal sample (1)	FASFC DPA020	Single	caeca	1222	1140					1140
- at slaughterhouse - animal sample - neck skin (2)	FASFC DPA004	Single	0,01g	64	7					7

(1) : Meat of boiling hens (boilers)
(2) : Meat of boiling hens (boilers)

Table Campylobacter in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. upsaliensis	C. lari	thermophilic Campylobacter spp., unspecified
Meat from pig										
minced meat										
intended to be eaten cooked										
- at retail	FASFC DIS823	Single	25g	155	1					1
- at processing plant	FASFC TRA303	Single	25g	288	2					2
carcass										
- at slaughterhouse - animal sample - meat	FASFC DPA002	carcass	destructive	261	17					17
- at slaughterhouse - animal sample - carcass swabs	FASFC DPA002	carcass	swab 600 cm2	433	31					31
Milk, cows'										
raw										
intended for direct human consumption	FASFC DPA 16	Single	25ml	173	1					
Live bivalve molluscs	FASFCDIS844806	Single	25g	98	11					11
Cheeses made from cows' milk										
soft and semi-soft										
made from raw or low heat-treated milk										
- at farm	FASFC DPA008	Single	25g	141	0					
- at processing plant	FASFC TRA133	Single	25g	37	0					

2.2.3. Campylobacter, thermophilic in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Frequency of the sampling

At slaughter

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughter

Organs:caeca

Methods of sampling (description of sampling techniques)

At slaughter

10 caeca pairs are pooled to one sample. 6 samples are taken of each examined flock. The caeca are emptied at the laboratory. The content is examined for Cambylobacter.

Case definition

At slaughter

A sample is positive if Campylobacter is detected.

Measures in case of the positive findings or single cases

Samples are taken for monitoring purposes only. No measures are taken in case of positive findings.

2.2.4. Antimicrobial resistance in Campylobacter, thermophilic isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from pigs

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated in the zoonosis monitoring program and originating from pork were sent to the Institute of Public Health for determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.
Antimicrobial Breakpoints(microg / ml)
Ampicillin 8 - 32
Tetracycline 4 - 16
Nalidixic acid 16 - 32
Ciprofloxacin 1 - 4
Erytromycin 1 - 8
Gentamycin 4 - 16
Campylobacter from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

From the C. coli isolates (43) from pork resistance was observed for all the antibiotics tested. In comparison with the C. coli isolates from poultry a slightly lower percentage resistance was observed except for erythromycin and gentamycin.

B. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from poultry

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated in the zoonosis monitoring program and originating from poultry were sent to the Institute Public Health for determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.
Antimicrobial Breakpoints(microg / ml)
Ampicillin 8 - 32

Tetracycline 4 - 16
Nalidixic acid 16 - 32
Ciprofloxacin 1 - 4
Erytromycin 1 - 8
Gentamycin 4 - 16
Campylobacter from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

From poultry or poultry products in total 222 Campylobacter strains were tested: Campylobacter jejuni (155) and Campylobacter coli (67). Overall the antibiotic resistance within C. coli was greater than for C. jejuni with a much higher percentage of resistance against ciprofloxacin, nalidixic acid and tertracycline for the C.coli strains in comparison with C. jejuni. In comparison with 2004, a higher resistance is observed for erythromycin. No resistance was observed for gentamycin for Campylobacter isolates from poultry meat.

Table Antimicrobial susceptibility testing of C. coli in Meat from poultry, unspecified - Monitoring - quantitative data [Dilution method]

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

	C. coli
	Meat from poultry, unspecified - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	67

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	67	55		1	4	3		2	1	1			9	9	9	28						
Fluoroquinolones																						
Ciprofloxacin	67	43	3	11	6		3	1		4	9	3	27									
Quinolones																						
Nalidixic acid	67	45					1	3	7	9	2			8	1	36						
Aminoglycosides																						
Gentamicin	67				1	7	38	16	5													
Macrolides																						
Erythromycin	67	6			1	11	20	22	6	1		2			1	3						
Penicillins																						
Ampicillin	67	25				4	9	10	4	8	4	3	5	5	1	14						

Table Antimicrobial susceptibility testing of C. coli in Meat from pig - Monitoring - quantitative data [Dilution method]

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

	C. coli
	Meat from pig - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	43

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	43	31	1		3	2		1	1	3	1	6	6	3	3	13						
Fluoroquinolones																						
Ciprofloxacin	43	20	4	8	6	3		1	1	2	3	2	12			1						
Quinolones																						
Nalidixic acid	43	23	2					2	6	7	1	2	2			21						
Aminoglycosides																						
Gentamicin	43	2	2			2	7	27	2		1					2						
Macrolides																						
Erythromycin	43	10	2			2	13	12	3	1	1	1				8						
Penicillins																						
Ampicillin	43	5	1		1	5	5	11	10	5				4		1						

Table Antimicrobial susceptibility testing of C. jejuni in Meat from poultry, unspecified - Monitoring - quantitative data [Dilution method]

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

	C. jejuni Meat from poultry, unspecified - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	139

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines	139	39	9	38	28	15	5	1	2	1	1	4	7	13	2	13						
Fluoroquinolones																						
Ciprofloxacin	139	33	19	52	21	7	2	1	4	1	1	2	29									
Quinolones																						
Nalidixic acid	139	38	1	1			3	25	46	18	6	1		1	1	36						
Aminoglycosides																						
Gentamicin	139					45	74	18	1	1												
Macrolides																						
Erythromycin	139	3			2	54	61	13	5	1		1	1			1						
Penicillins																						
Ampicillin	139	34	1	1	1	9	18	19	35	10	4	7	11	9	3	11						

Table Antimicrobial susceptibility testing of C. jejuni in Meat from other poultry species - Monitoring - quantitative data [Dilution method]

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

	C. jejuni Meat from other poultry species - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	16

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

Table Breakpoints used for antimicrobial susceptibility testing of Campylobacter in Food

Test Method Used

Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing

NCCLS

Campylobacter, thermophilic	Standard for breakpoint	Breakpoint concentration (microg/ml)			Range tested concentration (microg/ml)		disk content	breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines		4	8	16						
Fluoroquinolones										
Ciprofloxacin		1	2	4						
Quinolones										
Nalidixic acid		16		32						
Aminoglycosides										
Gentamicin		4	8	16						
Macrolides										
Erythromycin		0.5	4	8						
Penicillins										
Ampicillin		8	16	32						

2.3. LISTERIOSIS

2.3.1. General evaluation of the national situation

A. Listeriosis general evaluation

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

Listeria monocytogenes has become a major concern for the food industry and public health authorities. Ingestion of food contaminated with Listeria monocytogenes may cause either a serious invasive illness affecting people with altered or deficient immune responses, or a non-invasive febrile gastro-enteritis. Although the incidence of listeriosis is low, the high mortality rate, which often reaches as high as 30-40%, requires early diagnosis and appropriate antimicrobial therapy.
Listeriosis is transmitted to humans via contact with animals, cross-infection of foetus or newborn babies and foodborne infection . Listeria is ubiquitous and widely distributed in the environment (soil, vegetables, meat, milk, fish). All food associated with Listeria monocytogenes outbreaks were consumed without further processing or after minimal heat treatment, and many of them had a suitable environment for growth.

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

A monitoring programme was organised by the Federal Agency for the Safety of the Food chain. More than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of meat, were selected for this study.
The matrixes were minced meat of pork, beef and poultry, cooked ham, pâté, salami and smoked salmon.

Recent actions taken to control the zoonoses

General food hygiene rules are essential for the prevention of human listeriosis. As some persons are at high risk (pregnant women, immunocompromised people), they are advised not to eat certain categories of food with proven elevated risk of Listeria monocytogenes contamination, such as unpasteurized milk and butter, soft cheeses and ice cream made from unpasteurized milk, any soft cheese crust, smoked fish, pâté, cooked ham, salami, cooked meat in jelly, raw minced meat from beef, pork and poultry, steak tartar, raw fish and shellfish (oysters, mussels, shrimps), fish, meat and surimi salads, insufficiently rinsed raw vegetables, unpeeled fruit.

2.3.2. Listeria in foodstuffs

A. L. monocytogenes in food

Monitoring system

Sampling strategy

A monitoring programme was organised by the Federal Agency for the Safety of the Food Chain. More than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of carcasses and meat, were selected for this study. The samples assayed were minced meat from beef and pork, chicken meat preparation, cooked ham, paté, salami and smoked salmon. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain.

Frequency of the sampling

At the production plant

Every 1 weeks

At retail

Every 1 weeks

Type of specimen taken

At the production plant

Minced meat of pork, beef, chicken, cooked ham, salami, pate, smoked salmon

At retail

Minced meat of pork, beef, chicken, cooked ham, salami, pate, smoked salmon, chicken meat preparation

Methods of sampling (description of sampling techniques)

At the production plant

The samples were about 200g of meat. The detection of Listeria monocytogenes has been assessed in 1g for beef and pork minced meat and for salami, in 25g for ham, pate and smoked salmon.

At retail

The samples were about 200g of meat.
The detection of Listeria monocytogenes has been assessed in 0,01g for all samples.

Definition of positive finding

At the production plant

A sample is considered to be positive after confirmation of Listeria monocytogenes on chromogenic medium.

At retail

A sample is considered to be positive after confirmation of Listeria monocytogenes on chromogenic medium.

Diagnostic/analytical methods used

At the production plant

Other: Afnor validated VIDAS LMO2 followed by a chromogenic medium (Rapid L. mono or ALOA)

At retail

Other: Afnor validated VIDAS LMO2 followed by a chromogenic medium (Rapid L. mono or ALOA)

Control program/mechanisms

The control program/strategies in place

Controls are made in place by the Federal Agency in case of notification.

Notification system in place

Notification is mandatory since 1/3/2004 (Ministerial Decree on mandatory notification in the food chain of 22/1/2004). For Listeria monocytogenes, absence in 0,01g in ready-to-eat food putted on the market is mandatory. Laboratories have to inform the Federal Agency in case of a positive sample.

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Definition used	Units tested	=<100 cfu/g	>100 cfu/g	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g	L. monocytogenes - L. monocytogenes serovar 4b	L. monocytogenes - L. monocytogenes serovar 1/2a
Milk, cows'											
raw											
intended for direct human consumption	FASFC DPA016	Single	1g		164			6	6 in 1g	2	4
pasteurised milk	FASFC TRA115	Single	25g		105			0	0		
Milk, sheep's											
raw milk for manufacture											
intended for manufacture of raw or low heat-treated products	FASFC DPA011	Single	1g		7			0	0		
Milk, goats'											
raw											
intended for direct human consumption	FASFC DPA011	Single	1g		8			0	0		
Cheeses made from cows' milk											
soft and semi-soft											
made from raw or low heat-treated milk											
- at farm	FASFC DPA008	Single	0,01g		141			7	7 in 0,01g	6	1
- at processing plant	FASFC TRA133	Single	25g		39			1	1 in 25g	1	
made from pasteurized milk											
- at processing plant	FASFC TRA134	Single	25g		144			0	0		
- at retail	FASFC DIS818	Single	0,01g		185			0	0		
Dairy products (excluding cheeses)											
butter											

made from raw or low heat-treated milk											
- at farm	FASFC DPA009	Single	1g		184			12	12 in 1g		
made from pasteurized milk											
- at processing plant	FASFC TRA151	Single	25g		106			0	0		
ice-cream											
- at farm	FASFC DPA010	Single	1g		40			1	1 in 1g	1	
made from pasteurized milk											
- at processing plant	FASFC TRA160	Single	1g		51			0	0		
milk powder and whey powder	FASFC TRA123	Single	1g		13			0	0		

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Definition used	Units tested	=<100 cfu/g	>100 cfu/g	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g	L. monocytogenes - L. monocytogenes serovar 3a	L. monocytogenes - L. monocytogenes serovar 1/2b	L. monocytogenes - L. monocytogenes serovar 1/2c	L. monocytogenes - L. monocytogenes serovar 1/2a	L. monocytogenes - L. monocytogenes serovar 4b
Meat from pig														
meat products														
raw and intended to be eaten raw														
- at retail (1)	FASFC DIS817	Single	0,01g		119			0	0					
pâté														
- at retail (2)	FASFC DIS825	Single	0,01g		90			0	0					
- at processing plant	FASFC TRA301	Single	25g		286			4	4 in 25g				3	1
fermented sausages														
- at retail	FASFC DIS827	Single	0,01g		92			0	0					

- at processing plant	FASFC TRA302	Single	1g		254		10	10	1		8	1
cooked ham												
- at processing plant	FASFC TRA300	Single	25g		291		13	13 in 25g		1	12	
- at retail	FASFC DIS824	Single	0,01g		159		0	0				
minced meat intended to be eaten cooked												
- at retail	FASFC DIS823	Single	0,01g		155		2	2 in 0,01g				
- at processing plant	FASFC TRA303	Single	1g		283		29	29 in 1g				
Meat from bovine animals												
meat preparation intended to be eaten raw												
- at retail	FASFC DIS815	Single	0,01g		116		1	1 in 0,01g				
minced meat intended to be eaten raw												
- at retail	FASFC DIS816	Single	0,01g		171		2	2 in 0,01g				
- at processing plant	FASFC TRA304	Single	1g		284		19	19 in 1g	1	2	9	
Fish												
smoked **cold-smoked**												
- at processing plant	FASFC TRA400	Single	25g		145		23	23 in 25g	5	1	12	3
Infant formula												
dried	FASFC DIS803	Single	0,01g		80		0	0				
Bakery products												
pastry												
with egg filling	FASFC DIS105	Single	0,01g		118		0	0				

desserts containing raw eggs													
- at retail	FASFC DIS838	Single	0,01g		188		1	1 in 0,01g					
Fruits and vegetables													
precut													
ready-to-eat	FASFC DIS813	Single	0,01g		114		0	0					
Meat from poultry, unspecified													
meat preparation intended to be eaten cooked													
- at retail	FASFC DIS826	Single	0,01g		87		6	6 in 0,01g					
- at processing plant	FASFC TRA202	Single	0,01g		280		21	21 in 0,01g	1	1	2	2	5
Other processed food products and prepared dishes													
unspecified ready-to-eat foods													
- at retail	FASFC DIS830	Single	0,01g		370		0	0					
Vegetables													
non-precut													
- at retail	FASFC DIS841	Single	25g		56		0	0					
pre-cut ready-to-eat													
- at processing plant	FASFC TRA502	Single	1g		20		0	0					

(1) : Raw ham
(2) : Pâté

2.3.3. Listeria in animals

2.4. E. COLI INFECTIONS

2.4.1. General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

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

Zoonotic verotoxin producing E. coli may cause life-threatening diseases in young children or in immunocompromised or elderly people, i.e. hemorrhagic colitis, hemorrhagic uremic syndrome (HUS) and even death. E. coli O157 is the best known and most studied VTEC. Cattle are often indicated as the principal reservoir of VTEC, but are not clinically affected by zoonotic VTEC infection.

Infection of humans takes place via consumption of contaminated food, through contact with contaminated water, or by direct transmission of VTEC from infected humans or animals. Therefore, prevention mainly relies on hygienic measures.

2.4.2. Escherichia coli, pathogenic in foodstuffs

A. Verotoxigenic E. coli (VTEC) in food

Monitoring system

Sampling strategy

A monitoring programme was organised by the Federal Agency for the Safety of the Food Chain. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 100 retail trades representative of the Belgian production of carcasses and meat, were selected for this study. The samples assayed were carcasses, cuts and minced meat from beef. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain.

Frequency of the sampling

Samples have been taken every week from the first to the 52nd week, except during the 30th week.

Type of specimen taken

Meat

Methods of sampling (description of sampling techniques)

Sampling of beef carcasses was done by means of swabs (4 areas from the same half carcass constituting 1600 cm2 were putted in the same stomacher bag).
The samples were putted in a cool box and transported to a dispatching centre of the Federal Agency for the Safety of the Food Chain and the laboratory take them at the dispatching centre for analyse.
The other samples were about 200g of meat. The detection of enterohemorrhagic E. coli has been assessed in 1600 cm2 for beef carcasses and in 25g for beef minced meat and beef cuts.
No pooling has been done.

Definition of positive finding

A sample is considered to be positive after genetic confirmation of the pathogenicity of the 0157 E. coli in the sample.

Diagnostic/analytical methods used

For detection of Escherichia coli O157, the Belgian official SP-VG-M001 method, according to the ISO 16654 (2001) was used :
- pre-enrichment in m-TSB + novobiocin at 42°C for 7 hours,
- enrichment in CT-Mac Conkey at 37°C for 16-18 hours;
- immunoassay O157 (VIDAS ECO, bioMérieux),
- selective immunomagnetic enrichment (Dynabeads, Dynal or VIDAS ICE, bioMérieux),
- isolation on sorbitol-Mac Conkey and incubation at 42°C for 18 h,

- isolation and confirmation (agglutination of latex particles, Oxoid),
- search for genes encoding for virulence factors in national reference laboratory.

Preventive measures in place

Controls are made in place by the Federal Agency in case of notification.

Control program/mechanisms

The control program/strategies in place

Notification is mandatory since 1/3/2004 (Ministerial Decree on mandatory notification in the food chain of 22/1/2004). For enterohemorrhagic E. coli, absence in 25g in ready-to-eat food putted on the market is mandatory. Laboratories have to inform the Federal Agency in case of positive sample.

Table VT E.coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Escherichia coli, pathogenic	E. coli spp., unspecified	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC O157:H7
Meat from bovine animals								
fresh								
- at cutting plant	FASFC TRA305	Single	25g	307	3	1		2
minced meat								
intended to be eaten raw								
- at retail	FASFC DIS816	Single	25g	171	1			1
- at processing plant	FASFC TRA304	Single	25g	281	0			
meat preparation								
intended to be eaten raw								
- at retail	FASFC DIS815	Single	25g	116	0			
carcass								
- at slaughterhouse - animal sample - carcass swabs	FASFC DPA001	carcass	swabs	2554	28			28
Milk, cows'								
raw								
intended for direct human consumption	FASFC DPA016	Single	25ml	175	0			
Vegetables								
non-precut								
- at retail	FASFC DIS841	Single	25g	56	0			
pre-cut								
ready-to-eat								
- at processing plant	FASFC TRA502	Single	25g	20	0			
Cheeses made from cows' milk								

soft and semi-soft									
made from raw or low heat-treated milk									
- at farm	FASFC DPA008	Single	25g	141	0				
- at processing plant	FASFC TRA133	Single	25g	39	0				
Dairy products (excluding cheeses)									
butter									
made from raw or low heat-treated milk									
- at farm	FASFC DPA009	Single	25g	183	0				
Fruits and vegetables									
precut									
ready-to-eat	FASFC DIS813	Single	25g	114	0				

2.4.3. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

In case E. coli O157 is isolated from a carcass at the slaughterhouse (official zoonosis programme), the farm of origin is traced back. Faecal samples are taken by the competent authority from 10 percent of the animals aged between 6 months and 2 years, with a maximum of 20 animals. In addition, samples of the available feed and of dust are collected. If one of the faeces samples is positive for E. Coli O157, new faeces samples are taken from 10% of the animals aged between 6 months and 2 years, with a maximum of 20 samples. Of these new samples, all animals which had positive faecal samples the first time, are resampled.

Diagnostic/analytical methods used

Animals at farm

Bacteriological method: ISO 16654:2001

Animals at slaughter (herd based approach)

Bacteriological method: ISO 16654:2001

Measures in case of the positive findings or single cases

Hygienic and management measures are imposed on these farms during the period that the samples are analysed in the laboratory. The sale of not heat-treated milk or milk products is prohibited and animals can not be sold.
If results are positive, the animals with positive faeces samples are isolated and can only leave the farm, with permission of the competent authority, to be slaughtered. The sale of not heat-treated milk is prohibited. A resampling takes place after 6 weeks.

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

The faecal, feed and dust samples were enriched in mTSB and treated by immunomagnetic separation. Subsequently, the suspected colonies on CT-SMAC were latex agglutinated for the detection of E. coli O157. Confirmation of serotype (O group) was done by means of slow tube agglutination after heating of the bacterial cultures. Virulence factors were determined by PCR for toxin genes vt1 and vt2, and for eae (intimin) specific sequences.
A typical E. coli O157 isolate is defined as a strain isolated by immunomagnetic separation and O157 specific agglutination and confirmed by PCR as vt2 and eae positive. An atypical E. coli O157 had either no eae or vt gene.
Laboratory findings are available on clinical E. coli strains sent to the National Reference Laboratory for VTEC, animal health for analysis. A VTEC strain was identified as a VT1 or VT2 positive E. coli strain.
In 2003 only 4 herds were sampled following identification of E. coli O157 on carcasses in the

slaughterhouse. On three herds E. coli O157 VT2 eae was isolated and on one herd E. coli O157 without vt (atypical EHEC).
Of the 184 bovine E. coli strains from clinical cases analysed in 2003 at the National Reference Laboratory, only 6 were VTEC. Of these, 5 were of pathotype VT1 eae (known to be associated with diarrhea), and 1 was VT1.
In 2004 a total of 11 herds were monitored, after E. coli O157 was isolated at the surface of a carcass that was delivered at the slautherhouse. A total of 102 samples were taken from faeces, dust and feed (occasionally from water). From these, two herds were found positive (E. coli O157, VT2 EAE) and samples were taken a second time approximately six weeks later.
Finally, only on one herd E. coli O157 VT2 EAE was detected.

2.5. TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1. General evaluation of the national situation

A. Tuberculosis General evaluation

History of the disease and/or infection in the country

Zoonotic tuberculosis (Mycobacterium bovis).
Tuberculosis in humans caused by M. bovis is clinically indistinguishable from tuberculosis caused by M. tuberculosis.
In the past, the most important way of transmission of M. bovis for humans was the drinking of milk from infected cattle. Industrial heat treating production methods or pasteurisation of milk did stop this way of transmission.
Nowadays tuberculosis in humans caused by M. bovis is rare. In regions were M. bovis infections in cattle are largely eliminated, only few residual cases occur among elderly persons as a result of the reactivation of dormant M. bovis within old lesions. Also among migrants from high-prevalence countries, infections with M. bovis are diagnosed.
Agricultural workers may acquire infection by M. bovis by inhaling cough aerosols from infected cattle and may subsequently develop typical pulmonary or genito-urinary tuberculosis. Cervical lymphadenopathie, intestinal lesions, chronic skin tuberculosis (lupus vulgaris) and other nonpulmonary forms are also particularly common as clinical symptoms.

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

In 2002, 2 human cases of bovine tuberculosis were identified. Both patients were farmers that were found positive after the epidemiological investigation of the M. bovis infections in their cattle.
In 2003, 5 human cases of bovine tuberculosis were diagnosed. Molecular typing of strains isolated from cattle and human cases is on going in order to evaluate the presence of similar strains in both species.
Also in 2004, 5 human cases of bovine tuberculosis were diagnosed.

Recent actions taken to control the zoonoses

2005
The surveillance programme of tuberculosis is based on European Directive 64/432/EEC, which is implemented and adapted in the national legislation since 1963 and last modified by Royal Decree of 17 October 2002.
The control implies skin testing of animals at the occasion of trade and intensive testing of infected and contact farms in consequence of a confirmation of a bovine TB suspicion case (tracing-on and tracing-back of all contact animals).
Systematic post mortem examinations at the slaughterhouse are performed as well.
The Federal Agency for the Safety of the Food chain is informed about any doubtful or positive result of the skin test and may decide to re-examine (additional tests e.g. comparative tuberculine tests, interferon-gamma test) the animals or to kill them for additional analyses(test slaughter). In case a "TB suspect" lesion is detected, a sample is sent to the National Reference Laboratory for analysis. Consequently, if Mycobacterium bovis suspicion is confirmed by

analyses, all animals in the herd of origin are skin tested and a complete epidemiological investigation is made. The total herd is considered as the 'epidemiological unit'.
Isolation of M. bovis and biochemical testing is exclusively performed in the National Reference Laboratory where also IFN-gamma and molecular typing by means of RFLP, spoligotyping or more recently MIRU-VNTR are done to support the epidemiological investigations and to eventually prove the link between different cases.

Suggestions to the Community for the actions to be taken

2005
In case of a positive TB animal in a holding of a MS and this holding of origin did export bovines during the last two years to other countries , the exporting MS informs all countries who bought the animals to perform tests on these 'import' bovines and 'contact' bovines to eventually realise an early TB detection. If necessary, sanitary measures can be taken by the competent authority.
Monitoring of the type of strains circulating in each country could have a valuable impact on the understanding of the spread of new strains among the community.

2.5.2. Mycobacterium in animals

A. Mycobacterium bovis in Bovine Animals

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

Belgium is officially free from bovine tuberculosis since the 25th of June 2003 (Decision 2003/467/EC)

Free regions

All the regions are officially free of bovine tuberculosis for the reporting year.

Monitoring system

Sampling strategy

2005
Surveillance system.
The control of tuberculosis is based on European Directive 64/432/EEC, which is implemented and adapted in the national legislation since 1963 and last modified by Royal Decree of 17th of October 2002.
The control implies:
- skin testing of animals at the occasion of trade (purchase) by the veterinary practician responsible for the epidemiological surveillance on the holding (contract between farmer and veterinarian);
- intensive skin testing in case of an infected bovine on the holding and intensive testing of all 'contact' animals (tracing on and tracing back);
- systematic post mortem examinations at the slaughterhouse;
- transmission to the National Reference Laboratory of all of "TB suspec" lesions for analysis.
The Federal Agency for the Safety of the Food Chain is informed about any doubtful or positive result of the skin test and may decide to re-examine (additional tests e.g. comparative skin testing or interferon-gamma test) the animals or to kill them (test slaughter) for additional analysis. In case a "TB suspect" lesion is detected, a sample is sent to the reference laboratory for analysis. Consequently, if Mycobacterium bovis suspicion is confirmed by analyses, all animals in the herd of origin are skin tested, and a complete epidemiological investigation is made.
Isolation of M. bovis and biochemical testing is exclusively performed in the National Reference Laboratory where also IFN-gamma and molecular typing by means of RFLP, spoligotyping and more recently MIRU-VNTR are done.

Frequency of the sampling

Frequency of testing is depending on:
the introduction of new animals into a herd (mandatory examination at purchase)
the results of tuberculine testing
the detection of suspected bovines

the detection of infected bovines
the epidemiological investigation related to suspected or infected animals or herds
the follow-up testing of infected and/or eradicated herds.

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Tuberculin skin testing: single or comparative tests
Blood sampling: interferon-gamma tests

Case definition

A bovine is defined as infected with bovine tuberculosis if the animal is positive by skin testing or if Mycobacterium bovis is isolated by culture or confirmed by laboratory analysis.
A holding is defined as infected if Mycobacterium bovis was isolated from an animal of the holding.

Diagnostic/analytical methods used

- Simple skin test with bovine tuberculin
- Comparative skin test with bovine and avian tuberculin
- Ziehl-Neelsen coloration
- Culture for isolation
- Interferon-gamma
- PCR on lesions / organs
- PCR on culture
- RFLP typing
- Spoligotyping
- MIRU-VNTR

Vaccination policy

Vaccination is prohibited by Royal Decree of 17 October 2002.

Control program/mechanisms

The control program/strategies in place

National surveillance program by the Competent Authority (FASFC) on a compulsary legal base.

Recent actions taken to control the zoonoses

Isolation of M. bovis and biochemical testing is exclusively performed in the National Reference Laboratory where also IFN-gamma and molecular typing by means of RFLP, Spogilotyping or more recently MIRU-VNTR are done systematically to support the epidemiological investigations and to eventually prove the link between different cases.

Measures in case of the positive findings or single cases

2005
If M. bovis is isolated, all animals in the herd of origin are skin tested, the herd is considered as the epidemiological unit. A complete epidemiological investigation is made. By tracing-back and tracing-on all animals of 'contact' farms are examined by skin testing. If any doubtful or positive result of the skin test is detected, the FASFC may decide to re-examine the animals(additional tests e.g. comparative skin testing with avian and bovine tuberculin and/or Interferon-gamma testing) or to kill them (test slaughter) for additional analysis. In case a suspected lesion is identified, a sample is sent to the National reference laboratory for analysis. Consequently, if Mycobacterium bovis is isolated, all skin test positive animals during successive testing are compulsary slaughtered. If many bovines are reacting positive to skin testing, the FASFC can decide that all animals of the holding must be compulsory slaughtered. After stamping out, new restocked animals are followed up during 5 years with an annual skin testing programme.

Notification system in place

Animal Health Law of 24 March 1987 Chapter III and Royal Decree of 25 April 1988 (list of all notifiable animal diseases).

Results of the investigation

In 2001, a total of 23 infected herds were notified. In total 792 reactors corresponded to the intensive testing of infected and contact farms.
In 2002, a total of 13 infected herds were notified. A total of 799 animals reacted after tuberculination. Stamping out was performed in 6 herds.
In 2003, a total of 7 infected herds were notified. Stamping out was done in 5 herds. A total of 409 animals reacted after tuberculination. This number corresponds to the intensive testing of infected and contact farms. In total 3.799 herds and 337.260 animals were included in epidemiological investigations. The Federal Agency for the Safety of the Food Chain, the Competent Authority, instructed the slaughter of 1014 animals.
In 2004, a total of 8 infected herds were detected. In total 229 bovines were slaughtered in consequence of the stamping out of 3 infected herds.
In 2005, a total of 5 infected herds were detected. All these herds were eradicated by stamping out in execution of a TB sanitation plan. In total 752 animals were slaughtered. The carcasses of only 2 animals did have to be destroyed due to generalised TB lesions.

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

Number of infected herds since 2000
2000 : 24
2001 : 23
2002 : 13
2003 : 7
2004 : 8
2005 : 5

Additional information

2005
In 2005, 52 tissue samples were submitted to the Belgian National Reference Laboratory for Bovine Tuberculosis (Veterinary and Agrochemical Research Center). These samples (taken at the slaughter houses) originated from animals suspected of being infected with M. bovis, i.e. skin test reactors, animals in contact with M. bovis infected animals, or showing suspect TB lesions at post-mortem meat inspection. M. bovis was isolated by culture from 5 herds. PCR tests were applied on tissue samples allowing rapid confirmation of the infection of a herd.
The Veterinary and Agrochemical Research center performs routine IS6110 RFLP typing and spoligotyping of M. bovis field isolates. Since August 1995 and until November 2005, 233 outbreak herds had their isolates typed by both methods. More recently, MIRU-VNTR typing has also been performed in collaboration with Pasteur Institute, a department of the Science Institute of Public Health. All isolates typed by RFLP and spoligotyping were further analysed by MIRU-VNTR, resulting in a comprehensive database of the vast majority of M. bovis types circulating in Belgium since 1995. Between 1995 and 2005, 12 different genotypes have been observed. One lineage was obviously dominant and appeared in 48% of the infected herds and was mainly related to a re-emerge of bovine tuberculosis in the province of Liège in the years 1995-1996. The other serotypes are more uncommon and some of them sometimes reappear after several years of absence. Moreover, in 2004 two new lineages have been detected. This means that, in addition to a 'classical' circulation of bovine tuberculosis between herds, other ways of introduction of bovine tuberculosis in some herds can be suspected. Molecular typing by MIRU-VNTR is of precious help to lead an epidemiological investigation and to decide on appropriate mesures.

B. Mycobacterium bovis in farmed deer

Monitoring system

Sampling strategy

Sampling in case of suspect TB lesions during post-mortem examinations of "wild" and "farmed" deer.

Methods of sampling (description of sampling techniques)

TB suspect tissues, lymph nodes, lungs

Case definition

An animal is positive if Mycobacterium bovis is isolated by culture or confirmed by laboratory analysis.

Diagnostic/analytical methods used

- Ziehl-Neelsen coloration
- Culture for isolation
- Interferon-gamma
- PCR on lesions / organs
- PCR on culture

Control program/mechanisms

The control program/strategies in place

Monitoring is done by:
- systematic post-mortem examinations at the slaughterhouses (5857 in 2005)
- post-mortem examination at autopsie of hunted or accidented "wild" deer in the Universitary Centre of Liège, Veterinary Medecine Faculty (300 a year).
In case of suspect TB lesions, samples are sent to the National Reference Laboratory for additional analyses to confirm the suspicion.

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

No Mycobacterium bovis was detected by "hunted" or "farmed" deer.

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified	M. avium complex - M. avium subsp. avium
Zoo animals, all (1)	FASFC	animal	1	0				
Deer	FASFC	animal	2	0				
Wild boars	FASFC	animal	2	0				
Lamas	FASFC	animal	1	1				1
Monkeys	FASFC	animal	2	2	2			

(1) : Alpaga

Footnote

No cases of tuberculosis of these animal species were diagnosed after post-mortem examinations or analyses of "TB suspect" lesions.

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
BELGIQUE/BELGIE	42204	2492757	42199		5			380000	420000	191	51
Total	42204	2492757	42199	0	5	0	0	380000	420000	191	51

Footnote

Official free status by Dec 2003/467/EC, no more routine tuberculin testing is carried out, only intensive testing by purchase or tracing on and tracing back in case of an infected animal or herd and follow-up testing of an infected and/or eradicated herd. The positive results in the bacteriological analyses has resulted in the detection of 5 infected herds where a stamping out policy was realised.

Table Tuberculosis in farmed deer

Region	Total number of existing farmed deer		Free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
BELGIQUE/BELGIE	1799	14655	1799							2	0
Total	1799	14655	1799	0	0	0	0	0	0	2	0

Footnote

No routine tuberculin tests are carried out. All deer slaughtered at the slaughterhouses(5857)are controlled by a post-mortem inspection for the presence of suspect TB lesions. In case of a suspect lesion, samples are transmitted to the National Reference laboratory for further analyses.

2.6. BRUCELLOSIS

2.6.1. General evaluation of the national situation

2.6.2. Brucella in foodstuffs

Table Brucella in food

	Source of information	Sampling unit	Units tested	Total units positive for Brucella	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Milk, cows'								
raw milk for manufacture								
intended for manufacture of pasteurised/UHT products (1)	FASFC	pools bulk milk	80025	0				

(1) : Pools of bulk milk samples from 12734 dairy herds are analysed by a regular testing program.

2.6.3. Brucella in animals

A. Brucella abortus in Bovine Animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Belgium is officially free from bovine brucellosis since the 25th of June 2003 (Decision 2003/467/EC)

Free regions

Belgium is officially free of bovine brucellosis during the reporting year.

Monitoring system

Sampling strategy

Since Belgium is officially free from bovine tuberculosis, the eradication programme has been changed in a surveillance programme. Beef cattle older than 2 years are monitored once every three years by means of serological tests. The herds for serological examination are selected by geographical localisation. Dairy cattle are checked at least 4 times a year via tank milk (milk ring test).
Furthermore, all animals are serologically tested at trade (purchase).
Each abortion or premature birth in animals at risk is subject to compulsory notification to the Federal Agency for the Safety of the Food Chain, and testing for brucellosis is obligatory. Aborting females should be kept in isolation until the results of the investigation exclude Brucella infections.
Pooled tank milk is examined by means of the milk ring test.
For animals older than 2 years, serology (i.e. micro-agglutination as screening test; in case of a positive result, an indirect ELISA test is performed) is used if no sufficient milk ring tests are done (at least 4 ring tests a year).
Bacteriological examination is done when serological and/or epidemiological suspicion is present.
Allergic (brucellin) test may be carried out if serological cross-reactions are suspected. These tests are performed by the Federal Agency for the Safety of the Food Chain in collaboration with the National Reference Laboratory.
An animal is legally suspected of brucellosis in case of a positive ELISA. If, according to the epidemiology and the results of the skin test, an animal or herd is found to be at risk, a bacteriological investigation always takes place. Hence, a brucellosis animal is defined as an animal in which Brucella has been isolated, and a cattle holding is considered as an outbreak herd if one of its animals is bacteriologically positive for brucellosis.

Frequency of the sampling

Dairy cattle are checked at least 4 times a year by tank milk.
Beef cattle older than 2 years are monitored once every three years by means of serological tests. The herds for serological examination are selected by geographical localisation.

All cattle older than 1 year are tested at the moment of purchase.

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Blood sampling
Bulk milk sampling

Case definition

An animal is defined as infected if Brucella has been isolated.
A herd is defined as infected if one of its animals is bacteriollogically positive for brucellosis.

Diagnostic/analytical methods used

- Milk ring test on bulk milk samples
- Micro agglutination test
- Indirect ELISA
- Culture for isolation
- Brucelling skin testing(BST)

Vaccination policy

Vaccination is prohibited in Belgium since 1992.

Control program/mechanisms

The control program/strategies in place

National compulsory surveillance programme organised by the Competent Authority

Recent actions taken to control the zoonoses

2005
Annual serological follow-up of 'imported' bovines.

Measures in case of the positive findings or single cases

Dairy cattle: in case of a positive milk ring test all animals older than 2 years of the holding are serologically tested.
Beef cattle and dairy cattle: in case of a positive result in the micro-agglutination test the same blood sample is tested with an indirect ELISA to confirm. If this last test is also positive, the animal is considered to be infected and is compulsory slaughtered (test slaughter) for additional analyses to detect a Brucella infection.
Brucellin skin testing is sometimes performed as a confirmatory test before to decide test slaughter for further examinations.

Notification system in place

Animal Health Law of 24 March 1987 Chapter III, Royal Degree of 25 April 1988 (list of all notifiable diseases)

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

An intensified bovine brucellosis control programme started in Belgium in 1988. In case of active brucellosis, i.e. excretion of Brucella, the plan consisted in the culling of all animals of the infected herd (total depopulation). Culled bovines were compensated for based on the replacement value of the animals.
The annual herd prevalence notified at the year end was 1,13% in 1988 and has fallen below 0.01% since 1998. In March 2000, the last case of bovine brucellosis was identified. No infected herd was recognised in Belgium since then.
In case of positive serological reactors the Federal Agency for the Safety of the Food Chain instructed the test slaughter for additional analyses. These analyses could not confirm brucellosis. All these animals were "false positive serological reactors (FPSR)" to the micro-agglutination tests. To reduce the number of FPSR to be slaughtered, the micro-agglutination test has been used as for routine testing whereas the indirect Elisa is accepted as the confirmatory test. This approach avoids the undeserved test slaughter of false positive reacting animals.

Additional information

B. Brucella melitensis in Sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Belgium is officially free from B. melitensis (Decision 2001/292/EC).

Free regions

Belgium is officially free of ovine brucellosis during the reporting year.

Monitoring system

Sampling strategy

Serum samples taken in the framework of national monitoring for Visna-Maedi/CAE and at export were examined for Brucella melitensis specific antibodies by means of ELISA. Positive samples were subsequently tested in Rose Bengal and in complement fixation test.
Sheep and goats sera were tested for brucellosis by indirect ELISA (iELISA) at the National Reference Laboratory (Veterinary and Agrochemical Research Center). All positive samples in the ELISA were than tested by the Rose Bengal Test (RBT) and Complement Fixation Test (CFT) as confirmatory tests. Animals that were positive in the two confirmatory tests or that could not be analysed and/or interpreted in RBT and/or CFT were sampled a second time.
All brucellosis tests performed at VAR are officially accredited (ISO 17025).

In case of positive test results, a skin test should be performed on the seropositive animals and the congeneers. A positive skin test leads to the bacteriological investigation of the animal.

Type of specimen taken

Blood

Case definition

A sheep is defined as infected with brucellosis if positive in all three tests: the Elisa, the Rose Bengal test and the Complement Fixation test.

Diagnostic/analytical methods used

- Indirect ELISA
- Rose Bengal Test RBT
- Complement Fixation Test CFT
- Culture for isolation
- Brucellin skin test (BST)

Notification system in place

Animal Health Law of 24 March 1987 Chapter III and Royal Decree of 25 April 1988 (list of all notifiable animal diseases).

Results of the investigation

In 2001, 2002, 2003, 2004 and 2005 about 7 000 serum samples were tested at the National Reference Laboratory. In addition, serum samples from sheep for export were analysed. The results confirmed those of previous years, i.e. the absence of any epidemiological or bacteriological evidence of ovine brucellosis in Belgium.

C. Brucella melitensis in Goat

Status as officially free of caprine brucellosis during the reporting year

The entire country free

2005
Belgium is officially free of B. melitensis (Decision 2001/292/EC).

Free regions

2005
Belgium is officially free of caprine brucellosis during the reporting year.

Monitoring system

Sampling strategy

2005

Serum samples taken in the framework of national monitoring for Visna-Maedi/CAE and at export were examined for Brucella melitensis specific antibodies by means of ELISA.
Sheep and goats were tested for brucellosis by indirect ELISA(iELISA) at the National Reference Laboratory (Veterinary and Agrochemical Research Center). All positive samples in the ELISA were than tested by the Rose Bengal Test (RBT) and Complement Fixation Test (CFT) as confirmatory tests. Animals that where positive in the two confirmatory tests or that could not be analysed and/or interpreted in RBT and/or CFT were sampled a second time.
All brucellosis tests performed at VAR are officially accredited (ISO 17025)
In case of positive test results, a skin test should be performed on the seropositive animals and the congeneers. A positive skin test leads to the bacteriological investigation of the animal.

Case definition

2005
A goat is defined as infected with brucellosis if positive in all three tests: the Elisa, the Rose Bengal test and the Complement Fixation test.

Diagnostic/analytical methods used

2005
Complement Fixation Test CFT
Rose Bengal Test RBT
Indirect ELISA
Skin testing with brucellin
Culture for isolation

Notification system in place

2005
Animal Health Law of 24 March 1987 Chapter III and Royal Decree of 25 April 1988 (list of all notifiable animal diseases)

Results of the investigation

2005
In 2001, 2002, 2003, 2004 and 2005 about 1500 caprine serum samples were tested at the National Reference Laboratory. The results confirmed those of previous years, i.e. the absence of any epidemiological or bacteriological evidence of caprine brucellosis in Belgium.

D. B. suis in animal

Monitoring system

Sampling strategy

Serological screening for Brucella is done for breeding pigs that are gathered (at a fair for example), at artificial insemination centres and in animals intended for trade. The methods used are Rose Bengal test (RBT), Slow Agglutination test (SAT) according to

Wright, Complement Fixation test (CFT) and ELISA. Bacteriological examination for Brucella and Yersinia is done in case of positive serology.
Regularly, false positive serological reactions are reported. These are due to a Yersinia enterocolitica O9 infection and are confirmed by Yersinia enterocolitica 09 isolation in the absence of Brucella spp. isolation.
B. suis biovar 2 may be isolated from wild boars (Sus scrofa). The infection seems to be enzootic in wild boar in Europe. B. suis biovar 2, circulating among wild boars, shows only limited pathogenicity for human, if pathogenic at all.
The domestic pig population is free of brucellosis (last Brucella isolation in pigs in Belgium was in 1969). It is interesting to note that the Office International des Epizooties (http://www.oie.int) considers that the value of any brucellosis serological test in pigs is questionable.

Methods of sampling (description of sampling techniques)

Blood sampling
Tonsils
Spleen

Case definition

An animal is positive if Brucella suis is isolated by culture or typed by additional laboratory analyses.

Diagnostic/analytical methods used

Rose Bengal test RBT
Slow agglutination test according to Wright
Complement fixation test CFT
Indirect ELISA
Bacteriological examination

Control program/mechanisms

The control program/strategies in place

Regional monitoring programme.
Since 2002, an annual surveillance program is organized by the veterinary faculty of the University of Liège (Walloon Region funds) in collaboration with the National Reference Laboratory (Veterinary and Agrochemical Research Center) with the aim to analyse brucellosis in wild boars (Sus scrofa) and lagomorphs in the south of Belgium. Blood samples and organs of hunted and/or dead animals were analysed in order to follow the seroprevalence and to identify bacteriological isolates of Brucella in these species.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Wild boars	FASFC	animal	1	1			1	

Footnote

B. suis biovar 2 was isolated from this wild boar. The infection seems to be enzootic in wild boar in Europe. B. suis biovar 2 shows only limited pathogenicity for human, if pathogenic at all.

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk samples			Information about abortions			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds tested	Number of bovine herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals		Number of animals examined microbio logically	Number of animals positive microbio logically
																		Serologically	BST		
BELGIQUE/BELGIE	42204	2492757	42204	100	0	0	9823	579390	0	12734	0	3709	0	0	6918	80025	7	15	0	0	15
Total	42204	2492757	42204	100	0	0	9823	579390	0	12734	0	3709	0	0	6918	80025	7	15	0	0	15

Footnote

False positive serological reacting (FPSR) animals by agglutination (6.918) were finally negative by repeated serological analysis with agglutination and ELISA. Only 11 animals had to be mandatory slaughtered due to permanent positive results of serological tests. Bacteriological examination of all these animals was finally negative.

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

Region	Total number of existing ovine / caprine		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of animals	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbio logically	Number of animals positive microbio logically	Number of suspended herds
BELGIQUE/BELGIE	40654	326608	40654	0	0	0		7910	0					
Total	40654	326608	40654	0	0	0	0	7910	0	0	0	0	0	0

Footnote

11 animals with positive results at first analyses tested finally negative at second serological sampling and analyses with CFT, RBT and iELISA.

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

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

Y. enterocolitica is a relatively infrequent cause of diarrhea and abdominal pain. Infection with Y. enterocolitica occurs most often in young children. Common symptoms in children are fever, abdominal pain, and diarrhea, which is often bloody. Symptoms typically develop 4 to 7 days after exposure and may last 1 to 3 weeks or longer. In older children and adults, right-sided abdominal pain and fever may be the predominant symptoms, and may be confused with appendicitis. In a small proportion of cases, complications such as skin rash, joint pains or spread of bacteria to the bloodstream can occur. Only a few strains of Y. enterocolitica cause illness in humans. The major animal reservoir for Y. enterocolitica strains that cause human illness are pigs but other strains are also found in many other animals including rodents, rabbits, sheep, cattle, horses, dogs, and cats. In pigs, the bacteria are most likely to be found on the tonsils. Infection is most often acquired by eating contaminated food, especially raw or undercooked pork products. Drinking contaminated unpasteurized milk or untreated water can also transmit the infection.

2.7.2. Yersinia in foodstuffs

Table Yersinia spp. in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Yersinia	Y. enterocolitica	Yersinia unspecified	Y. enterocolitica - Y. enterocolitica O:3	Y. enterocolitica - Y. enterocolitica O:9
Meat from pig									
minced meat									
intended to be eaten cooked									
- at retail	FASFC DIS823	Single	1g	155	1	1			
- at processing plant	FASFC TRA303	Single	1g	293	2	2			

2.7.3. Yersinia in animals

Table Yersinia spp. in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia	Y. enterocolitica	Yersinia unspecified	Y. enterocolitica - Y. enterocolitica O:9	Y. enterocolitica - Y. enterocolitica O:3
Cattle (bovine animals)	FASFC	animal	9	9			9	
Pigs	FASFC	animal	3	0				

2.8. TRICHINELLOSIS

2.8.1. General evaluation of the national situation

A. Trichinellosis General evaluation

History of the disease and/or infection in the country

Since 1940, the Competent Authority did organise analysis for Trichinella in pigs at the slaughterhouses. The analysis is generalised since 1991. Trichinella has not been detected in carcasses of pigs and horses produced for human consumption in Belgium. One autochtonous human case, probably caused by a home raised wild boar occured in 1979.

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

Trichinellosis is virtually absent in Belgian domestic livestock. Since systematic controls of pigs and horses are done at slaughter (EU Directive 92/45/EEC) no positive case was found. The last outbreak in humans in Belgium occured in 1979 following the consumption of meat from wild boar.
Increased monitoring in the last decade has shown that Trichinella spp. still circulate amongst wildlife, although both the prevalence and the intensities of infection are low.
EU Directive requires that also wild boars hunted in the EU for commercial purpose are examined for Trichinella. In Belgium each year about 8000 sport-hunted wild boars are tested. Until now, only one animal, in 2004, originating from Mettet (province of Namur), was found to harbour a light infection. The larvae, isolated by artificial digestion were identified by PCR to be Trichinella britovi, a species previously not demonstrated in Belgium. T. britovi has sylvatic carnivores as main hosts. Even if wild boars are not the preferred host they can acquire the infection and consequently pass it to humans. Both T. spiralis and T. britovi have been associated with human infection.
The routine examination of wild boars devoted to the market has proved to be a good measure to protect the consumer against sylvatic trichinellosis. In addition, monitoring of infection through examining sentinel animals, such as the fox, is recommended to access the prevalence of trichinellosis and to follow trends in time. Serological examination might be an alternative for muscle digestion but needs further evaluation. An extra measure to protect the consumer is to eat meat of wild boar "well done", or to freeze the meat at -20°C for 4 weeks. An important measure to avoid spreading of the infection among wildlife is not to leave offal of animal carcasses in the field after skinning.

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

The last outbreak in humans in Belgium occured in 1979 following the consumption of meat from wild boar.

Recent actions taken to control the zoonoses

Increased monitoring of wildlife
Routine examination of wild boars destinated for human consumption
Monitoring of infection through examining sentinel animals such as the fox.

Consumption of wild boar meat after freezing at -20°C for 4 weeks.
Recommendation to travellers not to import raw meats of unknown origin and of susceptible animals, e.g. home made sausages, and not to consume meats of unknown quality abroad.

Suggestions to the Community for the actions to be taken

Considering the lasting negative results in pigs originating form industrial holdings, the creation of the status "Trichinella free Pig farm" could be implemented in some Member states.

2.8.2. Trichinella in animals

A. Trichinella in pigs

Monitoring system

Sampling strategy

General

Permanent surveillance of all slaughtered pigs at the slaughterhouses in implementation of Ministrial Decree of 18 November 1991.

Frequency of the sampling

General

Systematic Trichinella examinations of all slaughtered pigs.

Type of specimen taken

General

Diaphragm muscle, 5 gramme.

Methods of sampling (description of sampling techniques)

General

Pigs: 5 gramme of diaphragm muscle to be pooled

Case definition

General

An animal is considered positive in case of detection and identification of Trichinella larvae in the muscle sample.

Diagnostic/analytical methods used

General

Artificial digestion method of collective samples.
The analysis is done by artificial digestion: the magnetic stirrer method of pooled 100 gramme sample as described in Directive 77/96/EEC, 1 gramme per pig and 5 gramme per horse and wild boar.
Serology may be done in live pigs and for epidemiological studies and monitoring on wildlife.

Measures in case of the positive findings or single cases

Carcasses found positive are declared unfit for human consumption.

Notification system in place

Notification to the Federal Agency for the Safety of the Food chain is compulsory.

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

Since 1992, when the European Union Council Directive requires that wild boars (Sus scrofa) hunted in EU for commercial purpose should be examined for Trichinella, the infection has not been detected in wild boars from Belgium, despite serological evidence of the presence of anti-Trichinella antibodies in wildlife and previous reports of Trichinella larvae in this host species.
Nevertheless in November 2004, Trichinella larvae were detected in a wild boar hunted near Mettet, Namur province (Southern Belgium). Larvae were identified as Trichinella britovi by two different polymerase chain reaction methods. This is the first report of the identification of Trichinella larvae from Belgium at the species level. The detection of T. britovi in wildlife in Belgium is consistent with findings of this parasite in other European countries and confirms the need to test game meat for Trichinella to avoid its transmission to humans.

B. Trichinella in horses

Monitoring system

Sampling strategy

Permanent surveillance at the slaughterhouses

Frequency of the sampling

Every slaughtered animal is sampled.

Type of specimen taken

Diaphragm, tongue or masseter muscle.

Methods of sampling (description of sampling techniques)

Horse: 5 gramme of diaphragm (or tongue, or masseter) for routine diagnosis, analyses on pooled samples, 10 to 25 gramme for examination of individual samples

Case definition

An animal is considered positive in case of detection and identification of Trichinella larvae in the muscle sample.

Diagnostic/analytical methods used

Artificial digestion method of collective or individual samples.
The magnetic stirrer method for pooled sample digestion as described in Directive 77/96/EEC was used on samples of 5 gramme of muscle for horses.

Results of the investigation including the origin of the positive animals

No positive animals were detected

Control program/mechanisms

The control program/strategies in place

Ministrial Decree of 18 November 1991 imposes systematic Trichinella examination of all slaughtered pigs, horses and wild boar and other wildlife animals by artificial digestion method of muscle before marketing.

Notification system in place

Notification to the Federal Agency for the Safety of the Food Chain is compulsory.

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total animals positive for Trichinella	T. spiralis	Trichinella spp., unspecified
Pigs	FASFC	animal	10549454	0		
Solipeds, domestic						
horses	FASFC	animal	11267	0		
Wild boars						
wild	FASFC	hunted animal	11128	0		
Foxes	ITG	animal	52	0		
Badgers						
wild	ITG	animal	24	0		
Marten						
wild	ITG	animal	44	0		
Polecats						
wild	ITG	animal	52	0		
Falcons	ITG	animal	3	0		

2.9. ECHINOCOCCOSIS

2.9.1. General evaluation of the national situation

A. Echinococcus spp general evaluation

History of the disease and/or infection in the country

At the slaughterhouses, a small number of carcasses showing lesions of Echinococcus (cysts) are detected and notified to the Federal Agency for the Safety of the Food Chain. In case of positive findings, carcasses are partially or totally rejected and declared unfit for human consumption.

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

Echinococcosis is caused either by Echinococcus granulosus or Echinococcus multilocularis.
Echinococcus granulosus produces unilocular human hydatidosis. It is a small tapeworm (6 mm) that lives in the small intestine of domestic and wild canids. Sheep and cattle serve as intermediate hosts for the infection. Humans acquire infection by ingestion of typical taeniid eggs, which are excreted in the faeces of infected dogs: the oncospheres liberated from the eggs migrate via the bloodstream to the liver, lungs and other tissues to develop in hydatid cysts. Indigenous unilocular hydatidosis in man has been reported in Belgium.
Echinococcus multilocularis causes alveolar (multilocular) echinococcosis in humans.
Foxes and dogs are the definitive hosts of this parasite and small rodents the intermediate hosts. In the liver of rodents the invasive larval stage has a multi-compartimented appearance containing many protoscolices. Ingestion of the eggs by humans can result in the development of invasive cysts in the liver. In Belgium, the percentage of infected foxes varies with the region, with a decreasing rate from the South-East to the North-West: e.g 33% in the Ardennes, 13% in the Condroz region and 2% in Flanders. The endemic region is situated under the river Meuse, on the heights of the Ardennes.

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

Post mortem macroscopic examination is performed at the slaughterhouses in the domestic intermediate hosts: cattle, sheep, horses and pigs . Whole carcasses or parts are rejected in case Echinococcus granulosus cysts were found.

Recent actions taken to control the zoonoses

Consumption of berries is discouraged by warning messages, displayed to visitors of Parks and Woodlands.

2.9.2. Echinococcus in animals

Table Echinococcus spp. in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals)	FASFC	animal	836910	0			
Sheep	FASFC	animal	112771	34	34		
Goats	FASFC	animal	2585	0			
Pigs	FASFC	animal	10861234	0			
Solipeds, domestic	FASFC	animal	11542	0			

Footnote

Post-mortem examination is performed at the slaughterhouses in the Echinococcus domestic intermediate hosts: cattle, sheep, horses and pigs. Whole carcasses or parts are rejected in case Echinococcus granulosus cysts were found.

2.10. TOXOPLASMOSIS

2.10.1. General evaluation of the national situation

A. Toxoplasmosis general evaluation

History of the disease and/or infection in the country

The majority of grazing animals seems to be inapparent carriers of tissue cysts.

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

The majority of adult persons have acquired a degree of immunity to re-infection but can remain carrier.

Recent actions taken to control the zoonoses

Screening for toxoplasmosis during pregnancy is common.
Prevention of congenital toxoplasmosis by specific hygienic measures seems to have limited impact.

2.10.2. Toxoplasma in animals

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

Since the last indigenously acquired case of rabies occurred in Belgium in a bovine in July 1999, Belgium obtained the official status of rabies-free country in July 2001 according to the WHO recommendations.

Recent actions taken to control the zoonoses

Surveillance system and methods used.
Food animals with nervous symptoms are suspected of rabies and have to be notified to the Federal Agency for the Safety of the Food chain. Wildlife found dead or shot should also be declared to the Agency for further transmission for analyses to the Pasteur Institute, the National Reference laboratory for rabies.
Live suspected animals are killed and their brain is examined by immunofluorescence and virus cultivation in neuroblasts at the Pasteur Institute.
The high percentage of examinations of cattle is in consequence of the surveillance system for TSE in cattle: all suspected BSE cases were first examined for rabies. Rabies must be considered in the differential diagnosis of BSE, although the clinical course of rabies is usually quicker than the evolution of clinical nervous symptoms in case of BSE.
Vaccine baits (Raboral, Rhône-Mérieux) were dispersed for the oral vaccination of foxes. During last vaccination campaign in April and October 2003, a zone of approximately 1 800 km2 along the German border was covered by spreading 32 000 baits by means of a helicopter (17.78 baits per km2). Since there were no more cases of rabies for the last years, vaccination of foxes by baits was stopped (end of 2003).
In the south of the country, below the rivers Sambre and Meuse, vaccination of dogs and cats is compulsory. In addition, all pets staying on any Belgian public camping must be vaccinated.

2.11.2. Lyssavirus (rabies) in animals

A. Rabies in dogs

Monitoring system

Sampling strategy

The brain of animals with nervous symptoms suspected of rabies is examined by immunofluorescence and virus cultivation in neuroblasts at the Pasteur Institute, the National Reference Laboratory for rabies.

Frequency of the sampling

All suspected animals with clinical nervous symptoms.

Type of specimen taken

Organs/ tissues: brain

Diagnostic/analytical methods used

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

Vaccination policy

In the South of the country, below the rivers Sambre and Meuse, vaccination of dogs and cats is compulsory. In addition, all pets staying on any Belgian public camping must be vaccinated.
Since there were no more cases of rabies for the last years, oral vaccination of foxes by baits was stopped by the end of 2003.

Notification system in place

Animal Health Law of 24 March 1987 Chapter III and Royal Decree of 25 April 1988 (list of all notifiable animal diseases)
Notification of all laboratory confirmed cases.

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	unspecified lyssavirus
Cattle (bovine animals)	IPH Pasteur	animal	231	0	
Solipeds, domestic	IPH Pasteur	animal	1	0	
Dogs	IPH Pasteur	animal	10	0	
Cats	IPH Pasteur	animal	10	0	
Bats					
wild	IPH Pasteur	animal	32	0	
Foxes					
wild	IPH Pasteur	animal	117	0	
Badgers					
wild	IPH Pasteur	animal	3	0	
Marten					
wild	IPH Pasteur	animal	5	0	
Deer	IPH Pasteur	animal	5	0	
Squirrels	IPH Pasteur	animal	1	0	
Sheep and goats	IPH Pasteur	animal	106	0	

2.12. Q-FEVER

2.12.1. General evaluation of the national situation

A. Coxiella General evaluation

History of the disease and/or infection in the country

Only limited testing is done at individual animal level of genetic selected bulls of Artificial Insemination centers and for confirmation of clinical suspicion in case of an increased number of abortions of ruminants.

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

In 2005 all serological test results were negative.

2.12.2. Coxiella in animals

Table Coxiella in animal

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Coxiella	C. burnetii
Cattle (bovine animals)	FASFC	animal	blood	241	0	
Sheep	FASFC	animal	blood	7	0	
Goats	FASFC	animal	blood	1	0	

2.13. CYSTICERCOSIS, TAENIOSIS

2.13.1. General evaluation of the national situation

A. Cysticerci General evaluation

History of the disease and/or infection in the country

Taenia saginata:
2002 total 3.336 (3.317 lightly, 18 heavily contaminated)
2003 total 3.886 (3.859 lightly, 25 heavily contaminated)
2004 total 3.002 (2.981 lightly, 21 heavily contaminated)
2005 total 2.392 (2.376 lightly, 16 heavily contaminated)
Taenia solium (and Cysticercus cellulosae) is not autochtonous in Belgium.

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

Beside the visual inspection of the lesions, confirmation by PCR and serological examination is possible.
Usually the pathogenicity for humans is low.

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

Post-mortem, macroscopic examination of carcasses is routinely done in the slaughterhouse.
Lightly contaminated carcasses are treated by freezing at -10°C for 10 days before human consumption.

2.13.2. Cysticerci in animals

Table Cysticerci in animal

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Cysticerci	Cysticerci of Taenia saginata
Cattle (bovine animals)						
adult cattle over 2 years	FASFC	animal		523795	2389	2389
calves (under 1 year)	FASFC	animal		313115	3	3

2.14. SARCOCYSTOSIS

2.14.1. General evaluation of the national situation

A. Sarcocystis General evaluation

History of the disease and/or infection in the country

At the slaughterhouses, a small number of carcasses showing lesions of Sarcosporidiosis are detected and notified to the Federal Agency for the Safety of the Food chain. In case of positive findings, carcasses are totally rejected and declared unfit for human consumption.

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

Sarcocystis hominis (bovine as intermediate host) and Sarcocystis suihominis (porcine intermediate host) occur. Domestic carnivores are hosts of the adult stage.
Humans can be a definitive host for sarcosporidiosis by ingestion of infected meat or excreted oocysts and develop symptoms like diarrhoea, headache, eosinophilia, abortion, congenital disorder.
For human sarcosporidiosis there is no immunity development.
The majority of grazing animals are inapparent carriers of tissue cysts.

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

Carcasses are enterily condemned when lesions of sarcosporidiosis are apparent.
Number of total rejections of cattle in 2005: 14.

2.14.2. Sarcocystis in animals

Table Sarcocystis in animal

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Sarcocystis	S. hominis
Cattle (bovine animals)						
adult cattle over 2 years	FASFC	animal		523795	13	13
calves (under 1 year)	FASFC	animal		313115	1	1

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ESCHERICHIA COLI, NON-PATHOGENIC

3.1.1. General evaluation of the national situation

A. E. coli general evaluation

Recent actions taken to control the zoonoses

Surveillance system: in case E.coli O157 was isolated from a carcass at the slaughterhouse (official zoonosis programme), the farm of origin was traced back.
Recommendations to control the zoonoses:
At the herd:
- testing of animals for E. coli O157 prior to transport and slaughter
- hygiene and management measures at the farm, cleaning and desinfection
- faecal sampling repeatedly in the epidemiological unit from a representative number of animals of different age.

At the slaughterhouse:
- logistic slaughtering of positive animals
- positive carcasses will be destinated for heat-treated products
- hygiene measures during slaughter of positive animals
- cleaning and desinfection after such slaughter

3.1.2. Escherichia coli, non-pathogenic in foodstuffs

A. E. coli in food

Monitoring system

Frequency of the sampling

Antimicrobial resistance in Escherichia coli as indicator organism isolated from meat and meat products.
In 2005, 472 E. coli strains isolated from poultry meat (148), pork (86) and beef (238) in the framework of the monitoring program between September and December 2005 were tested for their antimicrobial susceptibility.

Diagnostic/analytical methods used

Antimicrobial susceptibility testing was performed by the disk diffusion method (Kirky-Bauer) following NCCLS recommendations.
The following antimicrobials were tested ampicillin, ceftiofur, tetracycline, ciprofloxacin, trimethoprim, neomycin, nalidixic acid, chloramphenicol, florphenicol, gentamycin, streptomycin, sulfonamides and apramycin.

Results of the investigation

Resistance was observed against tetracycline (24%) sulphonamides (24%), ampicillin (20%), streptomycin (17%) and trimethoprim (16%). Especially, in the poultry strains a high degree of resistance was observed for these antimicrobials in comparison with those isolated in pork and beef. Resistance against ceftiofur was found in 3% of the E. coli strains originating from broilers and beef. Ciprofloxacin resistance was observed in 1% of the E. coli strains. No resistance was found for neomycin, florphenicol, gentamycin and apramycin.

Additional information

The screening for antibiotic resistance in E. coli from food was possible by the financial support of the Belgian Antibiotic Policy Coordination Committee (BAPCOC).

Table Escherichia coli, non-pathogenic in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Escherichia coli, non-pathogenic	E. coli
Meat from pig						
carcass (1)	FASFC DPA002	carcass	swab	443	19	19
- at slaughterhouse - animal sample - meat	FASFC DPA002	carcass	destructive	260	2	2

(1) : At slaughterhouse

Footnote

E. coli non-pathogenic as indicator organism for hygiene of the slaughtering process, analyses of samples obtained at the slaughterhouses by two different sampling techniques.

Table Escherichia coli, non-pathogenic in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Escherichia coli, non-pathogenic	E. coli
Meat from bovine animals						
carcass (1)	FASFC	carcass	swabs	2562	29	29

(1) : At slaughterhouse.

Footnote

E. coli non-pathogenic as indicator organism for hygiene of the slaughtering process, analyses of samples obtained at the slaughterhouses by swabs of the carcasses.

3.1.3. Antimicrobial resistance in Escherichia coli, non-pathogenic isolates

Table Antimicrobial susceptibility testing of E. coli in food

n = Number of resistant isolates

	E. coli							
	Meat from broilers (Gallus gallus)		**Meat from other poultry species**		**Meat from pig**		**Meat from bovine animals**	
Isolates out of a monitoring programme	yes				yes		yes	
Number of isolates available in the laboratory	148				86		238	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines	148	57			86	18	238	38
Amphenicols								
Chloramphenicol	148	10			86	6	238	10
Florfenicol	148				86		238	
Cephalosporins								
Ceftiofur	148	4			86		238	5
Fluoroquinolones								
Ciprofloxacin	148	4			86	1	238	2
Quinolones								
Nalidixic acid	148	41			86	2	238	5
Trimethoprim	148	37			86	13	238	26
Sulfonamides								
Sulfonamide	148	55			86	13	238	46
Aminoglycosides								
Streptomycin	148	36			86	16	238	29
Gentamicin	148				86		238	
Neomycin	148				86		238	
Apramycin	148				86		238	
Penicillins								
Ampicillin	148	55			86	9	238	30

4. FOODBORNE OUTBREAKS

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

A. Foodborne outbreaks

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

In Belgium different authorities are dealing with food-borne outbreaks:
- The Federal Agency for the Safety of the Food chain FASFC deals with safety of foodstuffs, epidemiological investigation on foodstuffs and animal health issues in case of a food-borne outbreak.
- The Communities (Flemisch, French and German speaking Community) are dealing with "person related" matters as human health, Public Health Medical Inspectors are carrying out an epidemiological investigation in case of a food-borne outbreak.
- The Scientific Institute of Public Health IPH (National reference laboratory on Food-borne Outbreaks) analyses all suspected food samples, collects all data on food-borne outbreaks and gives scientific support to the FASFC officers and the Public Health Inspectors.
A national "Platform Food-borne outbreaks", approved by the National Conference of Ministers of Public Health, was created to advance data exchange between different competent authorities on food safety, animal health and public health.
Data in this report came from the Federal Agency for the Safety of the Food Chain, the Flemish Community , the sentinel laboratories network for human microbiology, and the Federal Reference Centres for Food borne outbreaks, for Clostridium botulinum, for Salmonella and Shigella and for Listeria.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

During 2005, a total of 105 outbreaks of food borne infections and intoxications were recorded in Belgium. More than 613 people were ill, at least 53 persons were hospitalised. However not all outbreaks were notified and for many outbreaks data are incomplete.

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

Only 20 % of the outbreaks were due to Salmonella (n=21), with Enteritidis as predominant serovar (40%), a marked decrease compared to the situation in 2004 when still 53 % of the outbreaks were due to Salmonella (serovar Enteritidis 55%). The serovars Infantis, Paratyphi B var Java and Tyhimurium were also isolated. Not in every outbreak of Salmonella the serovar was recorded. Thermotolerant Campylobacters were responsible for 4% of the outbreaks.

B. cereus was the causative agent in only one outbreak (1% of the cases) and Staphylococcus aureus was the cause in 4% of the cases. Other agents were C. Giardia (n=1), C. perfringens in combination with S.aureus, and Yersinia enterocolitica O:3 in combination of Salmonella.
In 70% of the outbreaks no causative agent could be identified. This very high percentage of cases with an unknown causative agent may be due to a more consistent reporting, the decrease of Salmonella in the identified outbreaks, and analytical problems to detect norovirus in most kinds of foodstuffs.
In 8 % of the outbreaks, preparations with raw eggs were identified as the source of the illness, which means a considerable decrease because in 2004, 36% of outbreaks where associated with egg consumption.
Meat or meat based products became more important and were responsible for 25% of the cases, an increase of 6% in comparison with 2004.
Striking was the appearance of pita as incriminated food in 10% of the cases, and also Chinese meals in 8% of the cases. Both fish (including shell fish) and sandwiches were each responsible for 7% of the outbreaks. Surprisingly potatoes (mostly French fries) provoked 7 % of outbreaks. In Belgium sandwiches and also French fries are usually served with mayonnaise or other sauces which may have been more contaminated than the bread or the fried potatoes but not always mentioned in the outbreak report.

Descriptions of single outbreaks of special interest

A national outbreak of Salmonella Ohio
During the summer of 2005, there has been a significant increase in registration of Samonella enterica serovar Ohio infections in the Belgian population ($p<0.01$).
During the period of the 1st July to the 13th of September 2005, 60 strains of S. Ohio isolated in clinical laboratories have been reported to the National Reference Center for Salmonella in Brussels. The peak (35 isolates) was observed in the third week of July. All human strains caused self-limiting gastroenteritis. With regard to the population, both sexes (32 males and 28 females) and all age groups (3 children aged < 5 years, 3 children 5-14, 32 adults 15-64 years and 22 adults >65 years) were infected.
The isolates were detected in almost all the regions of Belgium but a cluster of patients was identified around the city of Brussels.
At the same time, an increase of this serovar was also observed in the Salmonella isolates sampled during the monitoring program of the Agency for the Safety of the Food Chain. The samples containing S. Ohio were of pork origin suggesting that this species was responsible for the outbreak of the disease. PFGE typing confirmed the clonal relationship between the human isolates and those isolated from pork products. Further epidemiological investigations showed that one slaughterhouse was involved. In that slaughterhouse the carcasses were contaminated during the evisceration process by contaminated equipment and uncontrolled environmental conditions.

Control measures or other actions taken to improve the situation

Logistic slaughtering is applied for poultry which means that poultry with a Salmonella-free certificate are slaughtered before other poultry.
The vaccination of laying hens against salmonellosis, that started in 2003 on a voluntary base is now almost complete.

Table 12. Foodborne outbreaks in humans

Causative agent	General outbreak	Family outbreak	Total Number in persons			Source			Type of evidence	Location of exposure	Contributing factors
			ill	died	in hospital		Suspected	Confirmed			
1	2	3	4	5	6	7			8	9	10
Unknown	73		284	0	18	all kinds of food					
Salmonella - S. Enteritidis(1)		x	2	0	0	unknown			Salmonella in stool		
Salmonella - S. Enteritidis(2)	x		3	0	0	ice cream	x		Salmonella isolated from stool		
Salmonella - S. Enteritidis(3)		x	3	0	0	minced meat balls	x		Salmonella Enteritidis isolated from stool	at home	
Salmonella - S. Enteritidis(4)	x		37	0	0	mayonaise		x	Salmonella isolated from food and stool, perfect match PFGE profiles	hotel	insufficient refrigeration capacity
Salmonella - S. Enteritidis(5)		x	2	0	0	eggs	x		Salmonella isolated from stool		
Salmonella - S. Enteritidis(6)	x		10	0	0	tiramisu		x	Salmonella isolated from tiramisu, eggs and human stool. perfect match of PFGE profiles	barbecue	
Salmonella - S. Enteritidis(7)		x	2	0	0	Unknown			Salmonella in stool		
Salmonella - S. Enteritidis(8)		x	2	0	0	unknown			Salmonella isolated from stool		
Bacillus - B. cereus(9)	x		6	0	0	chinese meal		x	B.cereus in rice	take away chinese restaurant	refrigerated desk at 15Â°C
Staphylococcus - S. aureus(10)	x		4	0	1	chicken durum and lamb durum		x	Staphylococcus toxine C and D in both	pita shop	
Staphylococcus - S. aureus(11)		x	2	0	0	all kinds of food			.aureus and C.perfringens isolated from food		
Staphylococcus - S. aureus(12)	x		22	0	22	all food		x	S.aureus in food and prsence of toxin	barbecue	poor hygiene, no respect of cold chain
Staphylococcus - S. aureus(13)	X		11	0	0	shrimps		x	S.aureus in shrimps	restaurant	
Salmonella - S. Infantis(14)	x		3	0	1	Durum pita	X		Salmonella isolated from stool	pita shop	

Salmonella - S. Ohio(15)	x		60	0	0	pork		x	Salmonella isolated from human stool, pork, carcasses and slaughterhouse equipment	at home	contamination of slaughterhouse environment and equipment
Salmonella - S. Typhimurium(16)		x	2	0	0	Unknown			Salmonella in stool		
Salmonella - S. Paratyphi B var. Java(17)	x		50	0	0	chicken and pork		x	Salmonella Paratyphi B var Java and Yersinia enterocolitica O3 isolated from meat	barbecue	
Campylobacter, thermophilic - thermophilic Campylobacter spp., unspecified(18)	x		15	0	5	spaghetti sauce	x		Campylobacter isolated from stool in 4 children	youth camp	
Campylobacter, thermophilic - thermophilic Campylobacter spp., unspecified(19)	x		3	0	0	chinese meal	x		Campylobacter in stool	restaurant	
Campylobacter, thermophilic - thermophilic Campylobacter spp., unspecified(20)	x		15	0	0	chicken	x		Campylobacter in stool	camp	
Campylobacter, thermophilic - thermophilic Campylobacter spp., unspecified(21)	x		4	0	0				Campylobacter isolated from stool		
Giardia - Giardia spp., unspecified(22)			2								
Toxins - Toxins, unspecified(23)	x		32	0	0	pork mince,mashed potatoes	x		clinical picture	youth camp	
Salmonella - Salmonella spp., unspecified(24)	x		64	0	4	sandwiches		x	salmonella and B;cereus isolated from sandwiches, Salmonella isolated from stool	picknick	no respect of cold chain
Salmonella - Salmonella spp., unspecified(25)		x	3	0	0	Pizza	X		Salmonella isolated from stool		
Salmonella - Salmonella spp., unspecified(26)		x	3	0	0	eggs	x		Salmonella in stool		
Salmonella - Salmonella spp., unspecified(27)	x		15	0	0	potato croquettes	x		salmonella isolated from stool	elderly nursing home	
Salmonella - Salmonella spp., unspecified(28)	x		2	0	0	spaghetti	x		Salmonella isolated from stool	restaurant	bad hygiene
Salmonella - Salmonella spp., unspecified(29)	x		3	0	0	Scampi, rice, vegetables	x		Salmonella isolated from stool	restaurant	
Salmonella - Salmonella spp., unspecified(30)		x	3	0	0	chocolate mousse	x		Salmonella in stool		

Salmonella - Salmonella spp., unspecified(31)		x	2	0	0	mayonaise, chocolate	x		Food negative, Salmonella isolated in stool	at home	
Salmonella - Salmonella spp., unspecified(32)	x		2	0	0	minced meat	x		Food negative, Salmonella isolated in stool		

(1) : 11/6/05-7500
(2) : 20/6/2005-9000
(3) : 1/04/2005-2460
(4) : 27/7/2005-8620
(5) : 18/04/05-6010
(6) : 17/4/2005-3960
(7) : 20/6/05-7700
(8) : 1/9/2005-7540
(9) : 12/9/2005-9450
(10) : 14/11/2005-9140
(11) : 14/11/2005-3700 combined with C.perfringens
(12) : 24/7/05-2930
(13) : 23/12/04-9000
(14) : 29/9/2005-9000
(15) : sporadic outbreak
(16) : 20/6/2005-7700
(17) : 1/02/2005-3530
combined with Yersinia enterocolitica O3
(18) : 26/7/2005-3950
(19) : 1/04/2005-6234
(20) : 1/10/2005-3950
(21) : 23/8/2005-6230
(22) : 12/9/2005-9000
(23) : 5/8/2005-4950
(24) : 1/10/2005-4750
combinated with B.cereus
(25) : 1/8/2005-9050
(26) : 1/7/2005-9050
(27) : 14/1/2005-8020
(28) : 18/02/2005-3000
(29) : 8/8/2005-1000
(30) : 1/7/2005-3930
(31) : 28/4/2005-1000
(32) : 26/4/2005-7500