ZOONOSES MONITORING

GERMANY

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

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

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

IN 2006

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Germany**
Reporting Year: **2006**

Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
Bundesinstitute for Risk Assessment (BfR)	PO Box 33 0013 D 14191 Berlin Federal institution independent from political influences, place of national reporting officer	Zoonoses data from food, animals and feed reported by the laender authorities
National Veterinary Reference Laboratories in the BfR Salmonella	Federal Institute for Risk Assessment	Salmonella, Campylobacter, E. coli VTEC, Trichinella: antimicrobial resistance, phage types and (clin.) serotyping and species identification
Friedrich Loeffler - Institute	Institute for Epidemiology, Seestr. 55, D 16868 Wusterhausen	Rabies, Brucellose, Tuberculosis and Salmonellosis in animals
Robert Koch Institute	Robert Koch Institute, Nordufer 20, D 13353 Berlin (Federal Institution)	human foodborne outbreak data

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

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

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1. ANIMAL POPULATIONS

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

A. Information on susceptible animal population

Sources of information:

Official animal count Nov 2006, Bundesministerium fuer Ernaehrung, Landwirtschaft und Verbraucherschutz

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

Dairy cows and heifers includes all female breeding stock >1 year of age.
Meat production includes all animals >1 year of age not included in "dairy cows and heifers"

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

The number of cattle and pigs decreased in most production groups (-1.9% in cattle, -0.6% in pigs). The number of holdings decreased more rapidly (-4% in cattle, -8.9% in pigs).

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

In cattle, herd sizes differ substantially between the eastern part of Germany (dairy herds with approximately 250 cows), northwestern Germany (dairy herds with 50 to 60 cows) and southern Germany (smaller herd sizes).

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 holdings	Year*	Number of herds or flocks	Year*
Cattle (bovine animals)	dairy cows and heifers	6590800	2006			102200	2006		
	meat production animals	2163600	2006			45400	2006		
	calves (under 1 year)	3922400	2006						
	in total	12676700	2006	3353963	2005	171900	2006		
Gallus gallus (fowl)	broilers	56762500	2005			9800	2005		
	laying hens	36157100	2005			77600	2005		
Goats	in total			15174	2005				
Pigs	breeding animals	2511300	2006			29300	2006		
	in total	26820600	2006	47878548	2005	83000	2006		
Sheep	in total	2642400	2005	1009358	2005	30300	2005		
Solipeds, domestic	horses - in total			9630	2005				
Turkeys	in total	10611100	2005			2500	2005		

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. Salmonellosis in humans

2.1.3. Salmonella in foodstuffs

A. Salmonella spp. in eggs and egg products

Monitoring system

Sampling strategy

cf. Salmonella sp. in food

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

The number of examinations of eggs for human consumption reported was lower than the recommendations for these examinations by the National Reference Laboratory on The Epidemiology of Zoonoses according the confidence-evaluations respecting the results of the previous years. In 2006, the Salmonella rate has not significantly increased to 0.59 % of samples collected under the sampling plan (2005: 0.51 %).
As before, S. Enteritidis was at the top of Salmonella detection in samples of eggs for human consumption collected under the sampling plan within the official food control. In 2006, the relative share of S. Enteritidis was 88 % of Salmonella (2005: 94 %). In the egg shell investigations 0.39 % of the samples (2005: 0.41 %) were positive with 91 % S. Enteritidis within the Salmonella (2005: 93 %). From egg yolk, S. Enteritidis could be isolated as 0.06 % (2005: 0.03 %). Thus, the proportion of cases of Salmonella detection in yolk was lower than 20 % of that in eggshells.

B. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

cf. Salmonella sp. in food

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

Poultry meat: In 2006, the total rate of positive samples collected under the sampling plan within the official food control has not significantly increased to 10,97 % (2005: 9.61 %). The rate in broilers has not significantly decreased to 9,99 % (2005: 10.28 %).
Particularly S. Enteritidis was detected considerably less frequently than in the previous year (in broilers: 0.78 %, 2005: 1.87 %). The share of S. Typhimurium increased to 1.64 % (2005: 1.08 %). S. Paratyphi B, mostly as var. Java, was isolated from broilers in 0.93 % of samples (2005: 0.57 %).
Regarding meat products containing poultry meat, the reports received from the Laender revealed an

increase of the Salmonella rate to 2.13 % (2005: 1.77 %). Poultry meat prepared for processing in the kitchen was also included in the examinations. For 2005, 419 (2005: 314) examinations were reported from 12 Laender, of which 10.74 % (2005: 10.83 %) proved to be Salmonella-positive. Among these, S. Enteritidis was detected in 5 cases (1,2%), S. Typhimurium in 2 cases and S. Paratyphi B var. Java in 4 cases.

C. Salmonella spp. in turkey meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

cf. Salmonella sp. in food

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

The Salmonella rates in meat from other poultry ranged much higher: ducks 14.75 % (2005: 17,48 %), geese 12,50 % (2005: 10.14 %) and turkeys 9.96 % (2005: 6.78 %). In the meat of ducks the prevalence has decreased, but in meat of geese and turkeys the prevalence has increased. S. Typhimurium was isolated less frequently from the meat of ducks and turkeys. In turkeys S. Hadar was the most frequent serovar (3.82 %), followed by S. Saintpaul (1,64 %) and S. Typhimurium (1,27 %). S. Enteritidis was isolated only in meat of ducks in one case.

D. Salmonella spp. in pig meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

cf. Salmonella sp. in food

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

In the reports for bacteriological meat examination (Bakteriologische Fleischuntersuchungen - BU) in 2006 in the context of examinations at slaughterhouses, all reasons for conducting examinations have been summarized. The results of bacteriological meat examinations in meat animals were positive in 0.94 % of all samples (2005: 0.72 %). The Salmonella rate detected in samples of carcasses of swine has slightly decreased (0.86 %; 2005: 0.96 %). Among isolates from slaughtered swine, S. Typhimurium was preponderant again (56 % of Salmonella). S. Enteritidis was isolated in 2 cases only, i.e. in 3 % of Salmonella detected. In bacteriological meat examinations, Salmonella rates were found to be more or less stable compared with those of the preceding year. The prevalence in swine was lower than total of the bacteriological meat examinations and has shown a small decrease.
ELISA examinations of meat juice from swine at slaughter revealed a presence of Salmonella titres in 9.28 % of slaughtered animals (2005: 6.35 %). For 2006, three (in 2005: four) Laender reported on this examination strategy for more than 20,000 pigs. Development of the system was based on the Danish model and aims at sanctions for the swine fattening establishments affected which consist of

scaled measures, with the objective of reducing the Salmonella contamination on an intermediate-term basis. The number of examinations reported were lower than in he previous year, and the percentage of positive reactions increased.
The results of Salmonella testing of food samples collected under the sampling plan within the official food control are presented. Pork meat was examined slightly more frequently than in the previous year (2101 samples, 2005: 1831). Salmonella were detected in 2.86 % of samples (2005: 3.22 %). The resulting confidence interval is 2.14 % - 3.57 % (95 % confidence; 2005: 2.41 % - 4.03 %), which based on data comparable with those of the previous year has indicated no significant decrease (calculation according to SPOORENBERG, 1996, modified). Again, S. Typhimurium was isolated most frequently from pork (58% of Salmonella). S. Enteritidis was not isolated from pork as in the preceding year.
In comminuted raw meat (not with the Minced Meat Regulations: intended to be eaten cooked) of pork an increase of the Salmonella rate was found (2.91 %; 2005: 1.43 %). Comminuted raw meat according to the Minced Meat Regulations (intended to be eaten raw) showed a not singificant higher share of 3.98 % (2005: 2.86 %), and raw meat products according to the Minced Meat Regulations showed a slight decrease with a share of 2.48 % (2005: 2.53 %).
Only a few Salmonella findings (not S.Enteritidis or S.Typhimurium) were made in heat-stabilized meat products of pork ('cooked, ready-to-eat': 5 cases, 0,44%; 2005: no case). Salmonella were isolated from only 0,76 % (2005: 1.52 %) of stabilized meat products made from pork (2004: 0.82 %) with primarily S.Typhimurium.

E. Salmonella spp. in bovine meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

cf. Salmonella sp. in food

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

At meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling distributed evenly throughout the year

Diagnostic/ analytical methods used

At meat processing plant

Bacteriological method: ISO 6579:2002

At retail

Bacteriological method: ISO 6579:2002

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

In the reports for bacteriological meat examination (Bakteriologische Fleischuntersuchungen - BU) in the context of examinations at slaughterhouses, all reasons for conducting examinations have been summarized. The results of bacteriological meat examinations in all meat animals were positive in 0.94 % of all BU samples (2005: 0.72 %). Examination results in samples of carcasses of cattle (0.97 % Salmonella-positive, 2005: 0.49 %) were signifintly higher than the results of the last year and in contrast to the previous years, higher than the total of the bacteriological meat examinations of all animals. Among isolates from slaughtered cattle, S.Anatum was again the most found serovar (0,28%), S. Typhimurium was found in 8 of more than 10,000 samples (0.08%, 7.8 % of Salmonella, 2005: 0.06%). S. Enteritidis was isolated in 5 cases only, i.e. in 0.05 % of Salmonella detected (2005: 0,07%). In bacteriological meat examinations, Salmonella rates were found to have increased in cattle compared with those of the preceding year.
The detection rate in beef decreased not signifantly to 0.31 % (2005: 1.10 %) in samples according to the sampling plan within the official food control. Similar to the previous year, only a few (2) Salmonella isolates were obtained from beef. S. Typhimurium and a group B-Serovar were isolated in one case each. S. Enteritidis was not isolated from beef.
Comminuted raw meat according to the Minced Meat Regulations (intended to beeaten raw) show a share of positives of 0.88 % (2005: 0.62 %) with S. Typimurium and S. Dublin in two cases each, and S. Derby and group B-Serovar in one case each. In raw meat products according to the Minced Meat Regulations made from beef two cases with S. Typimurium were detected.
One Salmonella finding was made from beef in heat treated meat products ('cooked, ready-to-eat') and no findings were made in stabilized meat products.

F. Salmonella spp. in food

Monitoring system

Sampling strategy

Examinations at the slaughterhouse: Bacteriological meat examinations (BU) in accordance with Annex 1 to the Regulations on Meat Hygiene (FLHVO) are ordered when certain suspicions arise during slaughter, when parts that should undergo meat examination are missing or when the examination is delayed or no longer possible. The procedure for the performance of bacteriological meat examinations is set out in the General administrative provisions on the performance of official examinations according to the Meat Hygiene Act (VwVFIHG), Federal Gazette No. 238a, 23 December 1986.
Foods: Samples of foods on the market are regularly collected and examined by official food control staff (5 samples per 1,000 inhabitants) for bacterial contamination in accordance with the Official Collection of Methods of Examination under Art. 64(1) of the Food and Feed Code (LFGB) (up to 2004: Art. 35 of the Foods and Other Commodities Act (LMBG). Sampling is performed in accordance with Art. 10 and 11 of the General administrative provisions on the principles for carrying out the official monitoring of food and wine law provisions (AVV-RUEb) and is undertaken in a risk-oriented manner. The methods to be used according to Art. 64(1) of the Foods and Other Commodities Act, e.g. for Salmonella, largely correspond

to those described in ISO 6579.

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from broilers (Gallus gallus)								
fresh	offical food control with sampling plan	single	25g	1402	136	11	23	102
Meat from turkey								
fresh		single	25g	562	59		7	52
Meat from duck	offical food control with sampling plan	single	25g	122	18	1	3	14
Meat from geese	offical food control with sampling plan	single	25g	56	7		2	5
Meat from poultry, unspecified								
fresh	Poultry meat, total, offical food control with sampling plan	single	25g	2288	264	23	36	205
meat preparation								
intended to be eaten raw	Poultry meat, total, offical food control with sampling plan	single	25g	419	45	5	2	38
meat products								
unspecified, ready-to-eat	Poultry meat, total, offical food control with sampling plan	single	25g	892	19		1	18

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Milk, cows'								
raw (1)	offical food control with sampling plan	single	25g	219	0			
intended for direct human consumption (2)	offical food control with sampling plan	single	25g	229	0			
raw milk for manufacture								
intended for manufacture of pasteurised/ UHT products	offical food control with sampling plan	single	25g	558	0			
pasteurised milk	offical food control with sampling plan	single	25g	915	0			
Cheeses made from cows' milk								
soft and semi-soft	offical food control with sampling plan	single	25g	493	0			
made from raw or low heat-treated milk	offical food control with sampling plan	single	25g	100	2			2
made from pasteurised milk	offical food control with sampling plan	single	25g	2941	0			
Cheeses made from goats' milk	offical food control with sampling plan	single	25g	140	0			
Cheeses made from sheep's milk	offical food control with sampling plan	single	25g	102	0			
Dairy products (excluding cheeses)								
ice-cream	offical food control with sampling plan	single	25g	10338	0			

(1) : Raw milk selled at farm with recommendation for a heating of 10 min.
(2) : certified raw milk

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Meat from pig								
fresh	offical food control with sampling plan	single	25g	2101	60		33	27
minced meat								
intended to be eaten raw	offical food control with sampling plan	single	25g	1055	42		30	12
intended to be eaten cooked	offical food control with sampling plan	single	25g	206	6		4	2
meat preparation								
intended to be eaten cooked	offical food control with sampling plan	single	25g	1089	27		15	12
meat products								
cooked, ready-to-eat	offical food control with sampling plan	single	25g	1143	5			5
fermented sausages (2)	offical food control with sampling plan	single	25g	1720	13		9	4
Meat from bovine animals								
fresh	offical food control with sampling plan	single	25g	638	2		1	1
minced meat								
intended to be eaten raw	offical food control with sampling plan	single	25g	681	6		2	4
intended to be eaten cooked	offical food control with sampling plan	single	25g	178	2	1	1	
meat preparation								
intended to be eaten cooked	offical food control with sampling plan	single	25g	30	2		2	
meat products								

cooked, ready-to-eat (1)	offical food control with sampling plan	single	25g	190	1			1
fermented sausages	offical food control with sampling plan	single	25g	69	0			
Meat from sheep								
fresh	offical food control with sampling plan	single	25g	123	0			
Meat from horse								
fresh	offical food control with sampling plan	single	25g	30	0			
Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos)								
fresh	offical food control with sampling plan	single	25g	3871	82	5	42	35

(1) : contents also chemical preserved products
(2) : contents also chemical preserved products

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Eggs								
table eggs	official food control with sampling plan	single	25g	4761	28	23	1	4
- at packing centre	official food control with sampling plan	single	25g	646	0			
- at retail	official food control with sampling plan	single	25g	3419	28	23	1	4
shell	official food control with sampling plan	single	25g	3334	13	10	1	2
- at retail	official food control with sampling plan	single	25g	2363	13	10	1	2
white	official food control with sampling plan	single	25g	575	0			
- at retail	official food control with sampling plan	single	25g	493	0			
yolk	official food control with sampling plan	single	25g	3356	2	2		
- at retail	official food control with sampling plan	single	25g	2385	2	2		
Egg products	official food control with sampling plan	single	25g	2053	0			
Crustaceans	official food control with sampling plan	single	25g	785	9			9
Fruits and vegetables								
precut	official food control with sampling plan	single	25g	609	0			
Infant formula								

dried								
intended for infants below 6 months (1)	official food control with sampling plan	single	25g	690	0			
Fish								
- in total (2)	official food control with sampling plan	single	25g	3939	10			10
(fish cuts)	official food control with sampling plan	single	25g	1169	6			6
Fishery products, unspecified								
cooked (3)	official food control with sampling plan	single	25g	738	0			
ready-to-eat								
(stabilized products)	official food control with sampling plan	single	25g	1303	0			

(1) : 'childrens food'
(2) : inkl. marine animals and products
(3) : mostly smoked fish products

2.1.4. 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)

According to the Regulations on Salmonella in Chicken, the competent authorities are to be informed of the detection of S. Enteritidis and S. Typhimurium in chicken breeding flocks and hatcheries. The results obtained under these Regulations have been included in the reports submitted by the federal Laender.
The reports received from the federal Laender on Salmonella isolates in hens are evaluated and are used for the zoonoses trend report. The number of breeding flocks for laying hens reported increased compared with the previous year.

Vaccination policy

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

Vaccination of Laying hen raising flocks against S. Typhimurium and S. Enteritidis is mandatory for herds >250 hens (Verordnung zum Schutz gegen bestimmte Salmonelleninfektionen beim Haushuhn). Vaccination of breeding flocks and smaller raising flocks can be ordered by the competent authorities.

Laying hens flocks

According to the Regulations on Salmonella in Chicken, vaccination is mandatory for young hens reared for purposes of egg production for human consumption.

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

Salmonella were detected in 0.7 % (2005: 0.9 %) of the 2606 breeding flocks in their laying phase examined.
These were only detected in the meat production lines. As in the previous years, no Salmonella were detected in the parent lines of laying hens.
During their production period 1.4 % of the laying hen herds examined were positive for Salmonella, which is similar to the data of 2005 (1.3 %).

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)

According to the Regulations on Salmonella in Chicken (Verordnung zum Schutz gegen bestimmte Salmonelleninfektionen des Haushuhns) the competent authorities are to be informed on the detection of S. Enteritidis and S. Typhimurium in chicken breeding flocks and hatcheries. The results obtained under these Regulations have been included in the reports submitted by the federal Länder.
The reports received from the federal Länder on Salmonella isolates in hens are used for the zoonoses trend report.

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

Only one isolation of S. Enteridis was reported for the parent herds.
Broiler parent lines in the laying phase were examined by 4 Länder. Salmonella were isolated in 0.82 % (2005: 1.06 %) of flocks.
14.5 % (2005: 20 %) of the broiler flocks in the fattening period examined were Salmonella-positive .

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)

There is no official monitoring system on farm level. The data presented are derived from the reports of the federal Laender and include samples that were taken for various reasons.
Since Oct 2006 a baseline study on the prevalence of Salmonella in Turkeys based on Commission decision 2006/ 662/ EG and technical specification SANCO/ 2083/ 2006 is carried out. Results will be reported in the framework of the baseline study elsewhere.

Notification system in place

There is no notification system in place.

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

For turkeys, the number of flocks reported to be positive was similar to the previous year. While the number of reported examinations doubled. S. Enteritidis and S. Typhimurium represented only a small minority of the positive samples.

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

Monitoring system

Sampling strategy

Breeding flocks

There is no official monitoring system in place. Data are derived from examinations carried out for various reasons.

Notification system in place

There is no notification system in place.

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

The proportion of positive herds among the tested herds was similar to 2005 and lower than 2004. The number of examined herds dropped substantially. Three of the 4 isolates were S. Typhimurium.

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

Monitoring system

Sampling strategy

Breeding flocks

There is no official monitoring system in place. Samples are mostly taken according to the farm policy.

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

Overall, the proportion of positive herds among the tested herds has increased. However, a specification whether these were breeding or fattening herds is not available. S. Typhimurium was the predominant serotype, accounting for nearly half of the isolates.

F. Salmonella spp. in pigs

Monitoring system

Sampling strategy

Breeding herds

There is no official monitoring system in place. Data are derived from samples taken for various reasons.
The data presented here are based solely on bacteriological examinations carried out for various reasons. Serological data are not included
Starting with Oct 2006 a baseline survey on the prevalence of salmonella in fattening pigs based on Commission decision 2006/ 668/ EC is conducted. This will include 2639 samples collected at 80 slaughterhouses. The sampling frame was determined using stratified random sampling. The sample will cover about 80 % of the German fattening pig production.
Results of the survey will be reported within the framework of the baseline study coordinated by EFSA.

Notification system in place

There is no notification system in place.

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

There was an increase in the proportion of positive herds compared to 2004 and 2005. However, the proportion of positive samples for individual pigs did not differ from 2005. The majority of isolates were S. Typhimurium (80 % or more in all subgroups). The proportion of positive samples was higher in fattening than in breeding pigs.

G. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

According to Regulation on Protection against Salmonellosis in Cattle from 6 January 1972 and 14 November 1991 (BGBl. I S. 2118)

Type of specimen taken

Animals at farm

Other: Faecal samples, organs from diseased or dead animals.

Methods of sampling (description of sampling techniques)

Animals at farm

Faecal samples, organs from diseased or dead animals.

Animals at slaughter (herd based approach)

Organs from animals in case of suspicion of salmonellosis.

Case definition

Animals at farm

Bovine salmonellosis is present if i) faecal samples taken at an interval of eight to fifteen days and, irrespective of the order of results, the presence of Salmonella has been detected by bacteriological examination in at least three of these samples or ii) manifestations of the disease indicating salmonellosis have been detected by clinical or pathological-anatomical examinations and the presence of Salmonella by bacteriological methods of examination.

Vaccination policy

Prophylactic and metaphylactic vaccination using live or inactivated vaccines are optional.
There are several vaccines licensed for use in cattle. In cases of salmonellosis caused by serotypes that are not covered by the licensed vaccines herd specific vaccines produced by authorized companies are

also in use.

Other preventive measures than vaccination in place

Good Farming Practices and Good Hygienic Practices

Control program/ mechanisms

The control program/ strategies in place

According to Regulation on Protection against Salmonellosis in Cattle from 6 January 1972 and 14 November 1991 (BGBl. I S. 2118)

Measures in case of the positive findings or single cases

According to Regulation on Protection against Salmonellosis in Cattle from 6 January 1972 and 14 November 1991 (BGBl. I S. 2118)

Notification system in place

Officially confirmed outbreaks of salmonellosis in cattle are notified in the National Animal Disease Reporting System (TSN) since 1995.

Results of the investigation

Notification of 120 outbreaks of bovine salmonellosis in cattle in Germany.
see also: Methner, U. Bovine salmonellosis in Germany, Animal Health report 2006, Friedrich Loeffler Institute, Germany

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

The number of reports on examinations for Salmonella in cattle herds was in the range of the last year. A higher proportion of positive herds for adult cattle is consistent with the result of the last year. S. Typhimurium predominated in both age groups, followed by S. Dublin, while S. Enteritidis was only identified in single occasions.

H. Salmonella spp. in animal

Monitoring system

Sampling strategy

The investigation of farm animals are mostly in the responsibility of the farmers in respect of hygiene control of their facilities. Some animal breeding companies or agricultural aggregations have own monitoring systems.
Salmonella findings in cattle are reportable under the Regulations on Bovine Salmonellosis as part of the law on animal epidemics. The major part of the examinations of farm animals were conducted in cattle. Often, other (farm) animal species are included in the examinations of the cattle herds involved.
Additionally, the veterinarian control of animals before slaughter are a source of official samplings.

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

Salmonella Enteritidis and S. Typhimurium phage types in animals
Data of the National Reference Laboratory for Salmonella (BfR) on Salmonella isolates submitted by the laender laboratories.
The most important sources of S. Enteritidis (SE) in animals and food were fowl (Gallus gallus) with 21 %, broiler meat (32 %) and and eggs (84 %). Salmonella Typhimurium (ST) was the dominating serovar in pigs (73 %), pig meat (50 %), cattle (55 %), bovine meat (53 %) and minced meat (53 %) in 2005.
Salmonella Enteritidis
The dominating phage type of S. Enteritidis from fowl (Gallus gallus), broiler meat and eggs was PT4 with a prevalence of 63 %, 51 % and 55 % respectively. In the ranking PT4 was followed by a group of phage types including PT8, PT21, PT6 and PT1. These phage types differ in this prevalence from those, which could only be detected sporadically, in single cases, or with a higher prevalence in one source only (see table 4.18 and 4.30). The results obtained from the monitoring of laying hens confirmed the dominance of the phage type PT4 (68 %).
Although the prevalence of SE in pigs (1 %) and cattle (10 %) is low the limited number of PT4 isolates was the dominating phage type (60 %, 67 % respectively).
Resistance, especially multiresistance, could not be observed frequently and if at all in PT4 and PT1.
Salmonella Typhimurium
As in the previous years DT104 was the dominating phage type in cattle (73 %), pig (48 %), pig meat (40 %), bovine meat (41 %) and minced meat (49 %) in 2005. In the ranking DT193 (pigs, cattle and minced meat) and DT208, DT12 and DT193 (pig meat) followed.
In fowl (Gallus gallus) and in the monitoring of laying hens DT 104 was dominating too (32 %, 59 % respectively) at a limited number of isolates (28 and 29 isolates respectively).
DT104 was characterised by a typically fivefold resistance with the ability to pick up further resistances. In cattle (100 %), pigs (99 %), fowl (89 %), turkey (100 %), monitoring laying hens (100 %), bovine meat (100 %), pig meat (95 %) and minced meat (93 %) DT 104 was multiresistant against 2 to 10 of the seventeen antimicrobial agents tested.

I. Salmonella spp. in animal - Gallus gallus (fowl) - broilers - sampling in framework of broiler baseline study

Monitoring system

Sampling strategy

A one-year survey, as described in Decision 2004/ 665/ EC, was started in October 2005 and continued until September 2006.
Objective sampling was applied using a multi-stage approach to get a representative sample of the population of holdings of broilers with a capacity of at least 5000 birds in the total territory of Germany. To achieve this, in a first step the number of holdings to be selected was determined stratified for region and holding size on the level of the Laender. This was repeated in each Land. There, the number of holdings to be sampled by the local authority was fixed. Finally, the holdings were randomly selected from the registry available there. Sampling was performed at the farm by an official veterinarian.
Within the holdings selected, one flock of the holding was sampled.
Flocks were sampled with the last three weeks before slaughter

Frequency of the sampling

Animals at farm

Other: On the selected holdings, one flock was sampled once in the study period, that is once a year. The aim of the study was to detect an annual prevalence of 50% by 95% confidence level and 5% accuracy.

Type of specimen taken

Animals at farm

Other: For each flock, five faecal samples were used for analysis

Methods of sampling (description of sampling techniques)

Animals at farm

Faecal samples were collected by boot swabs (5 pairs)

Case definition

Animals at farm

A flock was considered positive if at least one out of the five samples tested was positive.

Diagnostic/ analytical methods used

Animals at farm

Other: The method as recommended by CRL Salmonella has been applied. The procedure to prepare the sample was as described in the technical specifications SANCO/ 34/ 2004 rev.3 .

Vaccination policy

Usually, broiler flocks are not vaccinated, but breeding flock may be vaccinated.

Measures in case of the positive findings or single cases

No special measures were taken in the context of the survey.

Results of the investigation

Results of the survey have been published by EFSA. In Germany, 377 herds were included in the analysis, with an estimated prevalence of 15.0 %.

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

The outcome of the survey will be used to fix a target for reduction and to assess the progress of the control strategy, which has to be implemented.

Additional information

The report on the baseline study has been published by EFSA:
"Report of the task force on zoonoses data collection on the analysis of the baseline survey on the prevalence of Salmonella in broiler flocks of Galls gallus, in the EU, 2005-2006", The EFSA Journal (2007), 98, 1-85.

Table Salmonella in breeding flocks of Gallus gallus

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Other serotypes
Gallus gallus (fowl)								
parent breeding flocks for egg production line								
day-old chicks	Official report of the Laender	flock	64	0				
during rearing period	Official report of the Laender	flock	3	0				
during production period	Official report of the Laender	flock	22	0				
parent breeding flocks for meat production line								
day-old chicks	Official report of the Laender	flock	61	0				
during rearing period	Official report of the Laender	flock	8	0				
during production period	Official report of the Laender	flock	2201	18	1			17
parent breeding flocks, unspecified								
day-old chicks	Official report of the Laender	flock	11	0				
during rearing period	Official report of the Laender	flock	118	5	1	4		
during production period	Official report of the Laender	flock	405	0				

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Other serotypes
Gallus gallus (fowl)								
laying hens								
day-old chicks	Official report of the Laender	animal	536	0				
during rearing period	Official report of the Laender	animal	277	4	3			1
during production period	Official report of the Laender	animal	10143	114	86	7		21
- at farm	Official report of the Laender	flock	2764	39	11	10		18
broilers								
day-old chicks	Official report of the Laender	flock	328	7	7			
during rearing period	Official report of the Laender	flock	1238	180	4			176
Ducks	Official report of the Laender	animal	2590	163	11	20	22	110
breeding flocks	Official report of the Laender	animal	20	2			1	1
meat production flocks	Official report of the Laender	animal	79	2		2		
Geese	Official report of the Laender	animal	247	6	2	2		2
breeding flocks	Official report of the Laender	animal	3	0				
meat production flocks	Official report of the Laender	animal	30	2		2		
Turkeys	Official report of the Laender	animal	31085	45		10	17	18
breeding flocks	Official report of the Laender	animal						
meat production flocks	Official report of the Laender	animal	30384	18			17	1

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Other serotypes
Pigeons	Official report of the Laender	animal	3262	226	1	203	16	6
Psittacidae								
- in total - Clinical investigations	Official report of the Laender	animal	938	14		10	4	
Birds								
wild								
- in total	Official report of the Laender	animal	3910	26	2	10	3	11

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Other serotypes
Cattle (bovine animals)	Official report of the Laender	herd	3877	228	5	130	61	32
calves (under 1 year)	Official report of the Laender	herd	606	40	1	21		18
adult cattle over 2 years	Official report of the Laender	herd						
unspecified								
- in total	Official report of the Laender	animal	128512	4546	512	1632	119	2283
dairy cows	Official report of the Laender	herd	306	52	1	23	2	26
Sheep	Official report of the Laender	herd	300	15		1	13	1
Goats	Official report of the Laender	herd	76	0				
Pigs	Official report of the Laender	herd	1763	145	2	100	28	15
breeding animals	Official report of the Laender	animal	480	9		7		2
fattening pigs	Official report of the Laender	animal	2661	99	2	82	3	12
- in total	Official report of the Laender	animal	19720	685	6	511	55	113
Solipeds, domestic	Official report of the Laender	animal	1783	17		9		8
Rabbits								
farmed	Official report of the Laender	animal	982	4		3	1	
Zoo animals, all	Official report of the Laender	animal	1569	47	3	6	25	13
Fish								
farmed								
- at farm - Monitoring	Official report of the Laender	animal	606	2				2
Deer								

farmed								
- in total	Official report of the Laender	animal	121	0				

2.1.5. Salmonella in feedingstuffs

A. Salmonella spp. in feed

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

a. Domestic and Common Market: In carnivore feeds, less Salmonella were found in the samples with 1.86% positive samples (2005: 3.98%). S. Typhimurium was isolated in nearly a quarter of positive samples of carnivore feed. Additionally, S. Typhimurium was detected in animal meal in 3 of 5 positive samples.
The Salmonella rate in oil extraction grits fell to 3.39 % (2005: 3.83 %). Rapeseed showed 6.81% positive cases (2005: 6.33%). In the case of soybeans the Salmonella contamination remained more or less the same at 2.06% (2005: 1.92%).
Cereal, grit and flour showed a further reduction in Salmonella contamination to 0.14% (1 positive sample) of the samples (2005: 0.26%).
Salmonella was detected in pelleted mixed feed, feed for cattle and poultry in individual cases. In pelleted mixed feed without specifications Salmonella were found in 8.63% of the samples (2005: 1.35%). The detection rate reported for chicken feed was 1.24% (2005: 1.10%). S. Typhimurium and S. Enteritidis could not be found in mixed feedstuffs in 2006.
b. Imports from third countries: Imported feeds of animal origin were mainly imported as fish meal as in the previous years.
Fish meal was imported as meal and in loose form to Bremen and Hamburg. 5.5% of the fish meal consignments tested positive for Salmonella (2005: 9.9%). 6.9% of the 279,985 imported tonnes proved to be Salmonella positive, i.e. 19,296 tonnes. The contamination has reduced over the previous year. The main amounts of imports have originated from Peru and Chile. 4-5% of the consignments from Chile and Peru were found to contain Salmonella, nearly similar to the previous year. Salmonella could be detetected also in imports from Morocco and Mexico. S. Typhimurium and S. Enteritidis could not be found in fish meal imports 2006.
Carnivore feed has shown an increased Salmonella detection rate with 8.66% (2005: 3.85%); in one case S.Typhimurium could be isolated (0.3%).

Additional information

Random samples of feeds of animal origin are regularly examined by the official laboratories of the federal Laender in accordance with the Regulations on Feed Production. Examinations for Salmonella are also frequently conducted in this context. Prior to import, feeds of animal origin and other products of animal origin are examined on a random sample basis according to the provisions and sampling as stipulated in the former Annex 12 to the Regulations on the Protection of the Domestic Market against Epizootics (Binnenmarkt-TierseuchenschutzVO) regarding also (EC) 1774/ 2002. In the case of processed animal protein at least 25 individual samples are collected from batches of up to 250 tonnes and 5 extra samples for every additional 50 tonnes.

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of land animal origin								
dairy products	official reports of the laender	single	25	77	0			
meat meal (1)	official reports of the laender	single	25	401	5		3	2
bone meal (2)	official reports of the laender	single	25	210	1			1
greaves (3)	official reports of the laender	single	25	142	15			15
blood meal (4)	official reports of the laender	single	25	302	0			
animal fat (5)	official reports of the laender	single	25	24	0			
Feed material of marine animal origin								
fish meal	official reports of the laender	single	25	35	0			
(border control)	official reports of the laender	batch	25	733	40			40
Compound feedingstuffs for fur animal (6)	official reports of the laender	batch	25	349	29		1	28

(1) : materials produced according to 1774/ 2002/ EC Art. 4
(2) : materials produced according to 1774/ 2002/ EC Art. 6
(3) : materials produced according to 1774/ 2002/ EC Art. 6
(4) : incl. products
(5) : materials produced according to 1774/ 2002/ EC Art. 4
(6) : import border control, material for all carnivores

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified
Feed material of cereal grain origin								
barley derived	official reports of the laender	single	500g	83	0			
wheat derived	official reports of the laender	single	500g	293	0			
maize (1)	official reports of the laender	single	500g	162	0			
other cereal grain derived	official reports of the laender	single	500g	3	0			
Feed material of oil seed or fruit origin								
groundnut derived	official reports of the laender	single	500g	1	0			
rape seed derived	official reports of the laender	single	500g	367	25			25
palm kernel derived	official reports of the laender	single	500g	90	1			1
soya (bean) derived	official reports of the laender	single	500g	389	8			8
sunflower seed derived	official reports of the laender	single	500g	59	2			2
linseed derived	official reports of the laender	single	500g	31	0			
- in total	official reports of the laender	single	500g	929	36			36
Silage	official reports of the laender	single	500g	97	1			1

(1) : incl. derived

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified
Compound feedingstuffs for cattle								
final product	Official report of the Laender	single	500	197	0			
Compound feedingstuffs for pigs								
final product	Official report of the Laender	single	500	513	0			
Compound feedingstuffs for poultry (non specified)								
final product	Official report of the Laender	single	500	1941	24			24
Pet food								
dog snacks (pig ears, chewing bones)	Official report of the Laender	single		2199	41	12		29

2.1.6. Salmonella serovars and phagetype distribution

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

Table Salmonella serovars in animals

Serovars		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry		All animals		Turkeys	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	3575	341	685	461	114	151				812	45	
Number of isolates serotyped	N=	3532	305	644	432	114	111	0	0	0	377	28	0
Number of isolates per type													
S. Agona				2								1	
S. Anatum		1	31	1	6		2				24		
S. Anatum var. 15		226		1									
S. Blockley												1	
S. Brandenburg		219	15	3	2								
S. Choleraesuis				1									
S. Derby		8	4	22	34						4		
S. Dublin		201	16		1								
S. Enteritidis		77	28	6	7	86	40				63		
S. Give		173		2									
S. Goldcoast		423											
S. Hadar		1										3	
S. Havana		3											
S. Infantis		221	11	4	8	8	18				6		
S. Kalamu				1									
S. Kottbus												6	
S. Lexington		25											

S. Livingstone			2		5							
S. London	11		27	10						2		
S. Manhattan											3	
S. Mbandaka			1		2							
S. Montevideo	57											
S. Newport	2		1									
S. Ohio	201	17		5	1							
S. Panama			5									
S. Potsdam			1									
S. Senftenberg	6											
S. Teddington			2									
S. Typhimurium	1461	163	511	297	7	15				250	10	
S. Virchow					2							
S. Paratyphi B var. Java						13						
S. group B	59	14	31	48		9				17		
S. enterica subsp. arizonae (1)			3									
S. group D	8		1									
S. group E	70											
S. Gallinarum					2							
S. group D1	1											
S. group C1	3		1	2		10				4	1	
S. group C2			1								3	
S. group B, monophasic strain	6											
Other serotypes	69		14									
S. enterica subsp. enterica		6		12	1	4				7		

(1) : incl. diarizonae

Footnote

(*) M : Monitoring, C : Clinical
Gallus gallus: Laying hens

Table Salmonella serovars in food

Serovars		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin		Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos)		Meat from poultry, unspecified - in total	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=	2	28	60		136						82		264	
Number of isolates serotyped	N=	2	25	57	150	118	172	0	0	0	0	77	0	208	0
Number of isolates per type															
S. Agona														1	
S. Anatum				1	2	8	7					1		13	
S. Blockley						2								3	

S. Bovismorbificans			1								2			
S. Brandenburg			1								1			
S. Bredeney					1								4	
S. Canada					1								1	
S. Derby		1	9	20	1	1					9		1	
S. Enteritidis		3		1	11	45					5		23	
S. Eppendorf					1								1	
S. Hadar				2	1	1							23	
S. Indiana					5	8							10	
S. Infantis		1	2	2	15	23					2		20	
S. Isangi					2								2	
S. Kentucky					1								1	
S. Kiambu					3								3	
S. Kottbus											1		2	
S. Limete													1	
S. Livingstone			1		5						1		5	
S. London			2								2			
S. Manhattan													1	
S. Mbandaka													1	
S. Minnesota													1	
S. Newport													3	
S. Ohio		5			6	10							5	
S. Panama													1	
S. Potsdam											1			
S. Rissen											1			
S. Saintpaul					2								9	
S. Schwarzengrund					2								2	
S. Thompson					1								2	
S. Typhimurium	1	11	33	98	23	14					42		36	
S. Virchow			1		4						1		4	
S. Wingrove													1	
S. Paratyphi B var. Java				1	13	39							7	

S. group B	1	4	6	21	5	22					7		5	
S. group E													2	
S. group C1					5								7	
S. group C2													1	
Not typeable (1)											1			
Other serotypes													6	
S. enterica subsp. enterica, rough				3		2								

(1) : rough form

Footnote

(*) M : Monitoring, C : Clinical

Table Salmonella Enteritidis phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=		28	2	7		40		
Number of isolates phagetyped	N=	0	28	2	7	0	40	0	0
Number of isolates per type									
PT 1			1		0		1		
PT 4			8	1	2		27		
PT 6			0		0		2		
PT 8			14	1	4		3		
PT 14b			4		0		0		
PT 21			0		1		7		
RDNC			1		0		0		

Footnote

(*) M : Monitoring, C : Clinical
Isolates voluntary send in to the national reference laboratory for Salmonella

Table Salmonella Enteritidis phagetypes in food

Phagetype		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=		3		1		45				
Number of isolates phagetyped	N=	0	3	0	1	0	45	0	0	0	0
Number of isolates per type											
PT 1							1				
PT 4			1		1		28				
PT 8			2				6				
PT 21							5				
Not typable							2				
RDNC							2				
PT 4a							1				

Footnote

(*) M : Monitoring, C : Clinical
Isolates voluntary send in to the national reference laboratory for Salmonella

Table Salmonella Typhimurium phagetypes in animals

Phagetype		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=		163	30	297		15		
Number of isolates phagetyped	N=	0	163	30	297	0	15	0	0
Number of isolates per type									
DT 7					4				
DT 8					2		1		
DT 9			7		0		3		
DT 12			5		3		1		
DT 66					3				
DT 104l			51	8	95		2		
DT 120			8	1	21				
DT 193			5	1	28				
DT 208					3				
U 302			0	1	6				
Not typable					4				
DT 40			2		1				
DT 41					1				
DT 104c			0		1				
U 310			1		0				
DT 195			1		1				
DT 17			0		7				

DT 1		4	1	0		2		
DT 2		1		2		3		
DT 104H		1		0				
DT 59				1				
DT 15		3		0				
RDNC		45	9	55		3		
DT 104b low		29	9	59				

Footnote

(*) M : Monitoring, C : Clinical
Isolates voluntary send in to the national reference laboratory for Salmonella

Table Salmonella Typhimurium phagetypes in food

Phagetype		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Other poultry		Other products of animal origin	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=		11		98		14				
Number of isolates phagetyped	N=	0	11	0	98	0	14	0	0	0	0
Number of isolates per type											
DT 12					3						
DT 46			0		0		1				
DT 104l			2		21		1				
DT 120			0		8		1				
DT 193			1		14		2				
DT 208					2						
U 302					2						
Not typable			1		1						
DT 41					1						
DT 193a					1						
U 310					1						
DT 194					2						
DT 195					1						
DT 15a					1						

DT 186				1						
DT 17				1						
DT 63				1						
RDNC		2		15		8				
DT 104b low		4		20		1				
DT 28				2						
DT 140		1		0						

Footnote

(*) M : Monitoring, C : Clinical
Isolates voluntary send in to the national reference laboratory for Salmonella

2.1.7. Antimicrobial resistance in Salmonella isolates

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

A. Antimicrobial resistance in Salmonella in cattle

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

Cattle
The resistance level of Salmonella serovars from cattle decreased from 69 % in 2004 to 52 % in 2005. This decrease was observed in the most prevalent serovar S. Typhimurium (from 96 % in 2004 to 85 % in 2005). In addition, this correlates with a lower prevalence of DT104 isolates (73 %), which were multiresistant in both years (100 %).

B. Antimicrobial resistance in Salmonella in pigs

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

Pig
In 2005 there was no significant difference in the resistance level (83 %) of Salmonella serovars from pigs compared to 2004. In addition, the percentage of multiresistant (resistant against more than four antimicrobials) isolates increased from 47 % to 56 % in 2005 (see table 4.26). The predominating resistant serovar S. Typhimurium (representing over 70 % of all isolates from pigs) was responsible for the resistance level observed. Multiresistance could frequently be detected especially in phage types DT104 as well as DT193, U302 and RDNC.

C. Antimicrobial resistance in Salmonella in poultry

Laboratory used for detection for resistance

Antimicrobials included in monitoring

In addition to the table, the following antimicrobial agents are tested: Amoxicillin clavulanic acid, Spectinomycin and Colistin

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

Fowl (Gallus gallus)
The resistance level is influenced by the number and percentages of particular serovars, which could be detected in fowl and which are different from those observed in pigs and cattle. Fourteen of the twenty two serovars observed harboured one or more resistance determinants, with S. Paratyphi B d-tartrate positive, S. Typhimurium and S. Albany as the predominating ones. The resistance level increased from 40 % in 2004 to 44 % in 2005 including the number of resistant isolates against two to four antimicrobials (see table 4.26). Resistance to nalidixic acid increases from 10 % in 2004 to 23 % in 2005.
Turkey

The resistance level of all Salmonella serovars detected decreased from 75 % in 2004 to 65 % in 2005, which is due to a decrease in multiresistant S. Typhimurium isolates from 30 % to 9 %. In addition, the prevalence of multiresistant isolates of different other serovars like S. Saintpaul, S. Heidelberg, S. Montevideo decreased too. The percentage of nalidixic acid resistant isolates remained constant at a relatively high level oft 17 %, which is mainly associated with S. Saintpaul isolates. Nalidixic acid resistance was always associated with a decreased fluoroquinolone susceptibility from >= 0.125 µg/ ml.

Laying hens (Monitoring)

The resistance level was relatively low (9 %) in comparison to fowl and turkey isolates. This is correlated to a high percentage of S. Enteritidis isolates (65 %), which exhibit in middle Europe substantially lower resistance levels and multiple resistances than S. Typhimurium. However, it is noteworthy, that four percent of the S. Enteritidis isolates were nalidixic acid resistant and showed a reduced ciprofloxacin susceptibility (<=0.25 µg/ ml). Multiresistance could be detected at a prevalence of 66 % in S.Typhimurium isolates especially in phage type DT104 (94 %).

Broiler (Monitoring

In the first quarter of the broiler monitoring study 48 Salmonella strains could be isolated, which showed a resistance level of 40 % against the seventeen antimicrobial agents tested. Especially S. Paratyphi B d-tartrate pos., S. Infantis, S. Typhimurium and S. Anatum harboured between two and ten different antimicrobial resistance determinants. The resistance against the quinolone nalidixic acid (23 %) is comparable with the value, which could be observed in fowl (Gallus gallus) in 2005 (see table 4.26).

D. Antimicrobial resistance in Salmonella in foodstuff derived from cattle

Laboratory used for detection for resistance

Antimicrobials included in monitoring

In addition to the table, the following antimicrobial agents are tested: Amoxicillin clavulanic acid, Spectinomycin and Colistin

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

Bovine meat

The limited number of isolates (32) allowed a limited evaluation of the resistance level in this food category only. Sixty six percent of the isolates were resistant. As in cattle the serovar S. Typhimurium (53 %) could frequently be detected in bovine meat and was in 94 % of the cases multiresistant (see table 4.16).

E. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Laboratory used for detection for resistance

Antimicrobials included in monitoring

In addition to the table, the following antimicrobial agents are tested: Amoxicillin clavulanic acid, Spectinomycin and Colistin

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

Pig meat
Like in pigs the resistance level in pig meat was strongly determined by the presence of S. Typhimurium (59 %), which was to 79 % drug resistant. There was an overall decrease in the resistance level from 69 % (2004) to 62 % in 2005, which was strongly determined by a decrease of multiresistant isolates (see table 4.16) from 37 % in 2004 to 25 % in 2005.

F. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Laboratory used for detection for resistance

Antimicrobials included in monitoring

In addition to the table, the following antimicrobial agents are tested too: Amoxicillin clavulanic acid, Spectinomycin and Colistin

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

Broiler meat
The resistance level of Salmonella serovars isolated from broiler meat decreased from 44 % in 2004 to 38 % in 2005. This is correlated with an increased detection of S. Enteritidis isolates (from 16 % in 2004 to 32 % in 2005), which showed a substantially lower resistance level than S. Typhimurium (2004/ 2005, 9 %/ 13 %). In addition, a decreased isolation rate of S. Typhimurium (from 23 % in 2004 to 7 % in 2005) could be observed but with a higher resistance level in 2005 (80 %) as in 2004 (70 %). A decreased number of nalidixic acid resistant isolates could be detected in 2005 (16 %) in comparison to 2004 (39 %).
Turkey meat
The resistance level of Salmonella serovars in turkey meat decreased in 2005 but remained at a high level (78 %). The predominating serovars were S. Typhimurium, S. Saintpaul, S. Hadar, S. Heidelberg and S. group B (4,(5),12:i:-), which covered 60 % of the serovars detected and 70 % of the resistant isolates. The level of nalidixic acid resistance was stable on a high level (39 % in 2004 and 40 % in 2005).

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	S. Anatum																					
	Cattle (bovine animals)																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	31																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	31	0							30	1												
Amphenicols																						
Chloramphenicol	31	0								15	16											
Florfenicol	31	0								30	1											
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	31	0					26	5														
Fluoroquinolones																						
Ciprofloxacin	31	0	31																			
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	31	0								31												
Sulfonamides																						
Sulfonamide	31	1											4	6	20	0	1					
Trimethoprim	31	0								31												
Aminoglycosides																						
Streptomycin	31	0								2	21	8										
Gentamicin	31	0						31														
Neomycin	31	0							31													
Kanamycin	31	0								31												
Penicillins																						
Ampicillin	31	0						28	3													
Trimethoprim + sulfonamides	31	0						31														

Footnote

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	S. Derby																					
	Pigs																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	34																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	34	4							27	2	1	0	4									
Amphenicols																						
Chloramphenicol	34	1								1	25	7	0	1								
Florfenicol	34	0								3	28	3										
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	34	0					10	21	3													
Fluoroquinolones																						
Ciprofloxacin	34	0	29	2	0	1	2															
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	34	3								28	3	0	0	0	3							
Sulfonamides																						
Sulfonamide	34	5											17	10	2	0	5					
Trimethoprim	34	4								30	0	0	4									
Aminoglycosides																						
Streptomycin	34	5								5	18	6	1	4								
Gentamicin	34	0						32	2													
Neomycin	34	1							33	0	0	0	1									
Kanamycin	34	1								33	0	0	0	1								
Penicillins																						
Ampicillin	34	5						23	6	0	0	0	5									
Trimethoprim + sulfonamides	34	0						30	0	0	4											

Footnote

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Table Antimicrobial susceptibility testing of S. Derby 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																						
	S. Derby																					
	Meat from pig																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	20																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	19	1							12	6	0	0	1									
Amphenicols																						
Chloramphenicol	20	0								1	13	6										
Florfenicol	20	0								4	13	3										
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	20	0					5	15														
Fluoroquinolones																						
Ciprofloxacin	20	0	17	3																		
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	20	0								20												
Sulfonamides																						
Sulfonamide	20	1											9	5	5	0	1					
Trimethoprim	20	0								20												
Aminoglycosides																						
Streptomycin	20	1									13	6	0	1								
Gentamicin	20	0						20														
Neomycin	20	0							20													
Kanamycin	20	0								20												
Penicillins																						
Ampicillin	20	0						15	5													
Trimethoprim + sulfonamides	20	0						20														

Footnote

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Table Antimicrobial susceptibility testing of S.Enteritidis in animals

n = Number of resistant isolates	S. Enteritidis							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	no		no		no		no	
Number of isolates available in the laboratory	28		7		40		4	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	28	1	7	0	40	0	4	0
Amphenicols								
Chloramphenicol	28	0	7	0	40	0	4	0
Florfenicol	28	0	7	0	40	0	4	0
Cephalosporins								
Ceftiofur	28	0	7	0	40	0	4	0
Fluoroquinolones								
Ciprofloxacin	28	0	7	0	40	0	4	0
Enrofloxacin	28	0	7	0	40	0	4	0
Quinolones								
Nalidixic acid	28	0	7	0	40	0	4	0
Sulfonamides								
Sulfonamide	28	1	7	0	40	0	4	0
Trimethoprim	28	0	7	0	40	0	4	0
Aminoglycosides								
Streptomycin	28	1	7	0	40	0	4	0
Gentamicin	28	0	7	0	40	0	4	0
Neomycin	28	0	7	0	40	0	4	0
Kanamycin	28	0	7	0	40	0	4	0
Penicillins								
Ampicillin	28	1	7	0	40	0	4	0
Trimethoprim + sulfonamides	28	0	7	0	40	0	4	0
Fully sensitive	28	27	7	7	40	40	4	4
Resistant to 1 antimicrobial	28	0						
Resistant to 2 antimicrobials	28	0						
Resistant to 3 antimicrobials	28	0						
Resistant to 4 antimicrobials	28	1						
Resistant to >4 antimicrobials	28	0						

Footnote

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Table Antimicrobial susceptibility testing of S. Enteritidis in Gallus gallus (fowl) - broilers - 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																					
	Gallus gallus (fowl) - broilers																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	40																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	40	0							38	2												
Amphenicols																						
Chloramphenicol	40	0							1	8	31											
Florfenicol	40	0							1	36	3											
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	40	0					19	21														
Fluoroquinolones																						
Ciprofloxacin	40	0	40																			
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	40	0								37	3											
Sulfonamides																						
Sulfonamide	40	0											4	26	10							
Trimethoprim	40	0								40												
Aminoglycosides																						
Streptomycin	40	0								40												
Gentamicin	40	0						40														
Neomycin	40	0							40													
Kanamycin	40	0								40												
Penicillins																						
Ampicillin	40	0						35	5													
Trimethoprim + sulfonamides	40	0						40														

Footnote

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Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from poultry, unspecified - 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																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	45																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	45	0							41	4												
Amphenicols																						
Chloramphenicol	45	0							2	11	30	2										
Florfenicol	45	0							2	34	9											
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	45	0					22	20	3													
Fluoroquinolones																						
Ciprofloxacin	45	0	39	1	1	3	1															
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	45	4								38	3	0	0	0	4							
Sulfonamides																						
Sulfonamide	45	0											3	32	10							
Trimethoprim	45	0								45												
Aminoglycosides																						
Streptomycin	45	0								43	2											
Gentamicin	45	0					45															
Neomycin	45	0						45														
Kanamycin	45	0							45													
Penicillins																						
Ampicillin	45	0						37	7	1												
Trimethoprim + sulfonamides	0	0																				

Footnote

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Table Antimicrobial susceptibility testing of S. Hadar in Turkeys - 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. Hadar
	Turkeys
Isolates out of a monitoring programme	no
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																						
Tetracyclin	43	43											43									
Amphenicols																						
Chloramphenicol	43	3								36	4	0	0	3								
Florfenicol	43	0							9	29	4	1										
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	43	0					22	19	2													
Fluoroquinolones																						
Ciprofloxacin	43	0	42	1																		
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	43	0								42	1											
Sulfonamides																						
Sulfonamide	43	11											14	18	0	0	11					
Trimethoprim	43	6								37	0	0	6									
Aminoglycosides																						
Streptomycin	43	43											2	41								
Gentamicin	43	3						40	0	0	0	1	2									
Neomycin	43	1							42	0	0	0	1									
Kanamycin	43	1								40	1	1	0	1								
Penicillins																						
Ampicillin	43	17						23	3	0	0	0	17									
Trimethoprim + sulfonamides	43	0						37	0	0	6											

Footnote

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Table Antimicrobial susceptibility testing of S. Infantis in Gallus gallus (fowl) - broilers - 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. Infantis																					
	Gallus gallus (fowl) - broilers																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	18																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	18	7							10	1	0	0	7									
Amphenicols																						
Chloramphenicol	18	0								5	12	1										
Florfenicol	18	0								8	10											
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	18	0					7	10	1													
Fluoroquinolones																						
Ciprofloxacin	18	0	11	0	0	2	5															
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	18	7								11	0	0	0	0	7							
Sulfonamides																						
Sulfonamide	18	8											2	8	0	0	8					
Trimethoprim	18	0								18												
Aminoglycosides																						
Streptomycin	18	6								3	7	2	6									
Gentamicin	18	0						18														
Neomycin	18	0							18													
Kanamycin	18	0								18												
Penicillins																						
Ampicillin	18	1						15	1	1	0	0	1									
Trimethoprim + sulfonamides	18	0						18														

Footnote

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Table Antimicrobial susceptibility testing of S. Infantis in Meat from poultry, unspecified - 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. Infantis																					
	Meat from poultry, unspecified																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	23																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	23	10							10	3	0	0	10									
Amphenicols																						
Chloramphenicol	23	0								8	11	4										
Florfenicol	23	0								11	10	2										
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	23	1					8	10	4	0	1											
Fluoroquinolones																						
Ciprofloxacin	23	0	11	0	0	1	7	4														
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	23	12								11	0	0	0	0	12							
Sulfonamides																						
Sulfonamide	23	11												11	1	0	11					
Trimethoprim	23	2								21	0	0	2									
Aminoglycosides																						
Streptomycin	23	9								8	4	2	6	3								
Gentamicin	23	0						23														
Neomycin	23	1							21	1	0	1										
Kanamycin	23	1								22	0	0	0	1								
Penicillins																						
Ampicillin	23	2						14	7	0	0	0	2									
Trimethoprim + sulfonamides	0	0																				

Footnote

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Table Antimicrobial susceptibility testing of S. Saintpaul in Turkeys - 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. Saintpaul																					
	Turkeys																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	18																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	18	8								10	0	0	8									
Amphenicols																						
Chloramphenicol	18	2									6	10	2									
Florfenicol	18	0								5	1	12										
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	18	0					2	4	9	3												
Fluoroquinolones																						
Ciprofloxacin	18	6	5	0	0	1	0	6	6													
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	18	13								5	0	0	0	0	13							
Sulfonamides																						
Sulfonamide	18	18															18					
Trimethoprim	18	5								13	0	0	5									
Aminoglycosides																						
Streptomycin	18	15									2	1	5	10								
Gentamicin	18	2						5	0	0	11	2										
Neomycin	18	1							17	0	0	0	1									
Kanamycin	18	3								5	0	0	10	3								
Penicillins																						
Ampicillin	18	18											18									
Trimethoprim + sulfonamides	18	0						13	0	0	5											

Footnote

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Table Antimicrobial susceptibility testing of S.Typhimurium in animals

n = Number of resistant isolates	S. Typhimurium							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	no		no		no		no	
Number of isolates available in the laboratory	163		297		15		13	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	163	112	297	230	15	2	13	3
Amphenicols								
Chloramphenicol	163	70	297	127	15	2	13	2
Florfenicol	163	66	297	115	15	2	13	2
Cephalosporins								
Ceftiofur	163	0	297	0	15	0	13	0
Fluoroquinolones								
Ciprofloxacin	163	0	297	1	15	0	13	0
Quinolones								
Nalidixic acid	163	1	297	12	15	2	13	0
Sulfonamides								
Sulfonamide	163	119	297	248	15	6	13	3
Trimethoprim	163	21	297	80	15	0	13	1
Aminoglycosides								
Streptomycin	163	115	297	240	15	4	13	3
Gentamicin	163	1	297	13	15	0	13	0
Neomycin	163	5	297	44	15	0	13	1
Kanamycin	163	5	297	44	15	0	13	1
Penicillins								
Ampicillin	163	101	297	240	15	2	13	3
Trimethoprim + sulfonamides	163	21	297	80	15	0	13	1
Fully sensitive	163	40	297	38	15	5	13	10
Resistant to 1 antimicrobial	163	6	297	9	15	7	13	0
Resistant to 2 antimicrobials	163	2	297	6	15	0	13	0
Resistant to 3 antimicrobials	163	6	297	20	15	1	13	0
Resistant to 4 antimicrobials	163	22	297	37	15	0	13	1
Resistant to >4 antimicrobials	163	87	297	187	15	2	13	2
Number of multiresistant S. Typhimurium DT104								
with penta resistance	81	0	154	1	2	0	3	0
resistant to other antimicrobials	81	81	154	153	2	2	3	3

Footnote

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	S. Typhimurium																					
	Cattle (bovine animals)																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	163																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	163	112							47	4	0	1	111									
Amphenicols																						
Chloramphenicol	163	70							1	22	67	3	0	70								
Florfenicol	163	66							1	69	21	6	15	51								
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	163	0					54	101	7	1												
Fluoroquinolones																						
Ciprofloxacin	163	0	151	9	1	1	1															
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	163	1								145	16	1	0	0	1							
Sulfonamides																						
Sulfonamide	163	119											7	14	19	4	119					
Trimethoprim	163	21								141	1	0	21									
Aminoglycosides																						
Streptomycin	163	115								12	27	9	4	111								
Gentamicin	163	1						161	1	0	0	1										
Neomycin	163	5							157	1	0	0	5									
Kanamycin	163	5								157	1	0	0	5								
Penicillins																						
Ampicillin	163	101						48	13	1	0	0	101									
Trimethoprim + sulfonamides	163	0						142	0	0	21											

Footnote

Isolates voluntary send in to the national reference laboratory for Salmonella

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	S. Typhimurium																					
	Pigs																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	297																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	297	230							63	4	0	2	228									
Amphenicols																						
Chloramphenicol	297	127								16	142	12	0	127								
Florfenicol	297	115							2	113	55	12	24	91								
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	297	0					110	158	29													
Fluoroquinolones																						
Ciprofloxacin	297	1	255	27	3	1	5	5	1													
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	297	12								249	30	6	0	0	12							
Sulfonamides																						
Sulfonamide	297	248											4	27	17	1	248					
Trimethoprim	297	80								216	1	0	80									
Aminoglycosides																						
Streptomycin	297	240								16	29	12	5	235								
Gentamicin	297	13						277	2	0	5	7	6									
Neomycin	297	44							249	3	1	0	44									
Kanamycin	297	44								249	4	0	0	44								
Penicillins																						
Ampicillin	297	240						47	8	2	0	0	240									
Trimethoprim + sulfonamides	297	0						216	1	0	80											

Table Antimicrobial susceptibility testing of S. Typhimurium 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																						
	S. Typhimurium																					
	Meat from pig																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	98																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	98	67							29	2	0	0	67									
Amphenicols																						
Chloramphenicol	98	31								14	52	1	0	31								
Florfenicol	98	31								47	19	1	5	26								
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	98	0					40	51	7													
Fluoroquinolones																						
Ciprofloxacin	98	0	91	5	1	0	1															
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	98	1								90	7	0	0	0	1							
Sulfonamides																						
Sulfonamide	98	63											4	22	9	0	63					
Trimethoprim	98	15								83	0	0	15									
Aminoglycosides																						
Streptomycin	98	55								7	31	5	2	53								
Gentamicin	98	0						95	1	0	2											
Neomycin	98	1							97	0	0	0	1									
Kanamycin	98	1								94	3	0	0	1								
Penicillins																						
Ampicillin	98	58						32	7	1	0	0	58									
Trimethoprim + sulfonamides	98	0						82	1	0	15											

Footnote

Isolates voluntary send in to the national reference laboratory for Salmonella

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	S. Typhimurium																					
	Meat from bovine animals																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	11																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	11	8							3	0	0	0	8									
Amphenicols																						
Chloramphenicol	11	3								1	7	0	0	3								
Florfenicol	11	3								5	3	0	0	3								
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	11	0					5	6														
Fluoroquinolones																						
Ciprofloxacin	11	0	9	2																		
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	11	0								9	2											
Sulfonamides																						
Sulfonamide	11	8												2	1	0	8					
Trimethoprim	11	4								7	0	0	4									
Aminoglycosides																						
Streptomycin	11	8									3	0	0	8								
Gentamicin	11	0						11														
Neomycin	11	2							9	0	0	0	2									
Kanamycin	11	2								9	0	0	0	2								
Penicillins																						
Ampicillin	11	8						2	1	0	0	0	8									
Trimethoprim + sulfonamides	11	0						7	0	0	4											

Footnote

Isolates voluntary send in to the national reference laboratory for Salmonella

Table Antimicrobial susceptibility testing of S. Paratyphi B var. Java in Meat from poultry, unspecified - 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 var. Java																					
	Meat from poultry, unspecified																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	39																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	39	14							22	3	0	0	14									
Amphenicols																						
Chloramphenicol	39	1							6	18	14	0	0	1								
Florfenicol	39	0							6	22	11											
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	39	1					9	26	3	0	1											
Fluoroquinolones																						
Ciprofloxacin	39	0	8	2	2	10	16	1														
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	39	27								10	2	0	0	0	27							
Sulfonamides																						
Sulfonamide	39	16											22	1	0	0	16					
Trimethoprim	39	39											39									
Aminoglycosides																						
Streptomycin	39	29										10	22	7								
Gentamicin	39	0						38	0	0	1											
Neomycin	39	1							38	0	0	1										
Kanamycin	39	1								38	0	0	0	1								
Penicillins																						
Ampicillin	39	15						17	7	0	0	0	15									
Trimethoprim + sulfonamides	39	0						12	10	1	16											

Table Antimicrobial susceptibility testing of Salmonella in animals

n = Number of resistant isolates	Salmonella spp.							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	no		no		no		no	
Number of isolates available in the laboratory	338		457		149		141	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	338	124	457	306	149	41	141	91
Amphenicols								
Chloramphenicol	338	73	457	142	149	6	141	7
Florfenicol	338	69	457	126	149	2	141	2
Cephalosporins								
Ceftiofur	338	0	457	0	149	0	141	0
Fluoroquinolones								
Ciprofloxacin	338	0	457	2	149	2	141	6
Quinolones								
Nalidixic acid	338	1	457	20	149	32	141	17
Sulfonamides								
Sulfonamide	338	132	457	318	149	32	141	42
Trimethoprim	338	23	457	102	149	18	141	22
Aminoglycosides								
Streptomycin	338	130	457	311	149	37	141	68
Gentamicin	338	1	457	16	149	1	141	5
Neomycin	338	7	457	56	149	1	141	5
Kanamycin	338	7	457	56	149	2	141	7
Penicillins								
Ampicillin	338	112	457	305	149	18	141	62
Trimethoprim + sulfonamides			457	102	149	17	141	22
Fully sensitive	338	197	457	109	149	85	141	38
Resistant to 1 antimicrobial	338	11	457	24	149	24	141	12
Resistant to 2 antimicrobials	338	2	457	10	149	2	141	40
Resistant to 3 antimicrobials	338	7	457	23	149	11	141	8
Resistant to 4 antimicrobials	338	29	457	67	149	3	141	2
Resistant to >4 antimicrobials	338	92	457	224	149	24	141	41

Footnote

Isolates voluntary send in to the national reference laboratory for Salmonella

Table Antimicrobial susceptibility testing of Salmonella spp. in food

n = Number of resistant isolates	Salmonella spp.							
	Meat from bovine animals		**Meat from pig**		**Meat from broilers (Gallus gallus)**		**Meat from other poultry species**	
Isolates out of a monitoring programme	no		no		no			
Number of isolates available in the laboratory	28		176		230			
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	28	12	176	97	230	46		
Amphenicols								
Chloramphenicol	28	10	176	33	230	3		
Florfenicol	28	3	176	31	230	0		
Cephalosporins								
Ceftiofur	28	0	176	1	230	3		
Fluoroquinolones								
Ciprofloxacin	28	0	176	0	230	0		
Quinolones								
Nalidixic acid	28	0	176	3	230	50		
Sulfonamides								
Sulfonamide	28	10	176	92	230	44		
Trimethoprim	28	4	176	25	230	54		
Aminoglycosides								
Streptomycin	28	11	176	82	230	45		
Gentamicin	28	0	176	0	230	0		
Neomycin	28	4	176	3	230	11		
Kanamycin	28	4	176	3	230	12		
Penicillins								
Ampicillin	28	10	176	79	230	29		
Trimethoprim + sulfonamides	28	4	176	25	230	30		
Fully sensitive	28	15	176	69	230	140		
Resistant to 1 antimicrobial	28	3	176	14	230	18		
Resistant to 2 antimicrobials	28	0	176	4	230	4		
Resistant to 3 antimicrobials	28	0	176	4	230	10		
Resistant to 4 antimicrobials	28	1	176	37	230	19		
Resistant to >4 antimicrobials	28	9	176	48	230	39		

Footnote

Isolates voluntary send in to the national reference laboratory for Salmonella

Table Breakpoints for antibiotic resistance testing in Animals

Test Method Used

Disc diffusion

Agar dilution

Broth dilution

E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	CLSI	8	16	16	2	64				
Florfenicol	NCCLS	8	16	16	2	64				
Tetracyclines										
Tetracyclin	CLSI	4	8	8	2	32				
Fluoroquinolones										
Ciprofloxacin	NCCLS Bovine	0.25	1	1	0.03	4				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI	16		16	4	128				
Trimethoprim	CLSI	8		8	4	32				
Sulfonamides										
Sulfonamide	CLSI	256		256	32	512				
Aminoglycosides										
Streptomycin		8	16	16	4	16				
Gentamicin	CLSI	4	8	8	1	32				
Neomycin		4	8	8	2	32				
Kanamycin	CLSI	16	32	32	4	64				
Trimethoprim + sulfonamides	CLSI	2		2	19	152				
Cephalosporins										
Ceftiofur	NCCLS Bovine	2	4	4	0.5	8				
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI	8	16	16	1	32				

Footnote

CLSI see M100-S16
NCCLS see M31-A2
Bovine Ciproflaxacin taken from enroflaxacin

Table Breakpoints for antibiotic resistance testing in Food

Test Method Used

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

Standards used for testing

- NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	CLSI	8	16	16	2	64				
Florfenicol	NCCLS	8	16	16	2	64				
Tetracyclines										
Tetracyclin	CLSI	4	8	8	2	32				
Fluoroquinolones										
Ciprofloxacin	NCCLS Bovine	0.25	1	1	0.03	4				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI	16		16	4	128				
Trimethoprim	CLSI	8		8	4	32				
Sulfonamides										
Sulfonamide	CLSI	256		256	32	512				
Aminoglycosides										
Streptomycin		8	16	16	4	16				
Gentamicin	CLSI	4	8	8	1	32				
Neomycin		4	8	8	2	32				
Kanamycin	CLSI	16	32	32	4	64				
Trimethoprim + sulfonamides	CLSI	2		2	19	152				
Cephalosporins										
Ceftiofur	NCCLS Bovine	2	4	4	0.5	8				
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI	8	16	16	1	32				

Footnote

CLSI see M100-S16
NCCLS see M31-A2
Bovine Ciproflaxacin taken from enroflaxacin

Table Breakpoints for antibiotic resistance testing in Feedingstuff

Test Method Used
Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing
NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	CLSI	8	16	16	2	64				
Florfenicol	NCCLS	8	16	16	2	64				
Tetracyclines										
Tetracyclin	CLSI	4	8	8	2	32				
Fluoroquinolones										
Ciprofloxacin	NCCLS Bovine	0.25	1	1	0.03	4				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI	16		16	4	128				
Trimethoprim	CLSI	8		8	4	32				
Sulfonamides										
Sulfonamide	CLSI	256		256	32	512				
Aminoglycosides										
Streptomycin		8	16	16	4	16				
Gentamicin	CLSI	4	8	8	1	32				
Neomycin		4	8	8	2	32				
Kanamycin	CLSI	16	32	32	4	64				
Trimethoprim + sulfonamides	CLSI	38		38	19	152				
Cephalosporins										
Ceftiofur	NCCLS Bovine	2	4	4	0.5	8				
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI	8	16	16	1	32				

Footnote

CLSI see M100-S16
NCCLS see M31-A2
Bovine Ciproflaxacin taken from enroflaxacin

2.2. CAMPYLOBACTERIOSIS

2.2.1. General evaluation of the national situation

2.2.2. Campylobacteriosis in humans

2.2.3. Campylobacter in foodstuffs

A. Campylobacter spp. in food

Monitoring system

Sampling strategy

For 2006, results of Campylobacter detection in the most important foods obtained in examinations of samples collected under the sampling plan within the official food control were reported from most of the Laender.

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

As in 2005, Campylobacter detection was mainly possible in poultry meat with 31.89 % of samples tested positive (2005: 34.01 %). The result of broiler meat investigations showed the highest Campylobacter rate, namely 38.98 % (2005: 42.13 %). Hence, a slight, but not significant decrease was again observed in this group of foods, which was examined most frequently.
In meat from turkeys, Campylobacter was detected in 17.90 % (2005: 15.13 %) of samples. In contrast, meat products containing poultry meat exhibited decreased Campylobacter rates (6.08 %; 2005: 8.38 %).
Red meat was examined less frequently than in the previous year. In pork, Campylobacter was detected in 0.69 % of samples (2005: 0.51 %).
From Campylobacter-positive foods, mainly C. jejuni and C. coli were isolated. From poultry meat, C. jejuni was isolated nearly in two thirds of cases again. In poultry meat, also C. lari was detected in 1 case. In 2006 C. coli was detected mainly in poultry meat and products of it.
In raw milk ex farm, C. jejuni and C. coli were identified in 1.00 % of cases (2005: 0.47 %). From Fish, seafood and their products no Campylobacter findings could be made. As in the earlier years, all milk food groups proved to be Campylobacter-negative.

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)	official food control with sampling plan	single	25g	1121	437	86		306		45
Meat from turkey	official food control with sampling plan	single	25g	391	70	13	1	38		18
Meat from duck	official food control with sampling plan	single	25g	6	3	1		2		
Meat from poultry, unspecified										
meat preparation										
intended to be eaten cooked	official food control with sampling plan	single	25g	24	7	3		4		
meat products										
raw and intended to be eaten raw	official food control with sampling plan	single	25g	181	11			3		8

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	official food control with sampling plan	single	25g	290	2	2				
Meat from bovine animals	official food control with sampling plan	single	25g	43	0					
Meat from sheep	official food control with sampling plan	single	25g	10	0					
Meat from other animal species or not specified	official food control with sampling plan	single	25g	35	0					
Milk, cows'										
raw (1)	official food control with sampling plan	single	25g	201	2	1	1			
intended for direct human consumption (2)	official food control with sampling plan	single	25g	105	2	2				
raw milk for manufacture										
intended for manufacture of pasteurised/ UHT products	official food control with sampling plan	single	25g	505	0					

Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos)										
meat products (3)	official food control with sampling plan	single	25g	555	3	3				
minced meat										
intended to be eaten cooked	official food control with sampling plan	single	25g	47	1		1			

(1) : raw milk selled at farm with recommendation to heat for 10 min.
(2) : certified milk
(3) : raw meat products

2.2.4. Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Diagnostic/ analytical methods used

At slaughter

Other: modified ISO 10272

Vaccination policy

no

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

The proportion of positive animals was lower than last year.

B. Campylobacter spp. in animal

Monitoring system

Sampling strategy

Investigation on Campylobacter in animals are performed, if typical symptoms are observed, which may mean that any animal epidemic has broken out. Especially in cases of stillborn animals, submission of expelled or dead foetuses, or parts of the stillborn animals and of placental parts are examinated.
In many regions investigation in farms will be performed, if Campylobacter could be found in products of these animals. Additionally, after foodborne outbreaks investigations in farm are usualy done.

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

Campylobacter in chicken was reported by 10 Laender. 26.8 % of the tested animals were positive.
The proportion of positive animals in broilers was similar to the overall prevalence in chicken (22.5 %)
Of 20250 cattle tested for Campylobacter for various reasons, 3,0 % were positive, which is less than in the year before. The proportion was substantially higher in calves (5.2 %) than in dairy cows (0.03 %).
In Swine, 16.5 % of the examined animals were positive for Campylobacter, which is more than last year (11.7 %).

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. lari	C. upsaliensis	thermophilic Campylobacter spp., unspecified	Campylobacter spp., unspecified	C. fetus	C. sputorum
Cattle (bovine animals)	Official report of the Laender	animal	20250	603	90	20	4			145	34	310
dairy cows	Official report of the Laender	animal	3891	2	1				1			
calves (under 1 year)	Official report of the Laender	animal	229	12	7	5						
Sheep	Official report of the Laender	animal	304	4	3						1	
Goats	Official report of the Laender	animal	57	3		3						
Pigs	Official report of the Laender	animal	1570	259	12	187			44	16		

Solipeds, domestic	Official report of the Laender	animal	65	0									
Gallus gallus (fowl)	Official report of the Laender	animal	2517	675	264	315					96		
broilers													
- at farm	Official report of the Laender	animal	365	82	3						79		
Dogs	Official report of the Laender	animal	430	30	17	8				1	4		
Cats	Official report of the Laender	animal	218	3	3								

2.2.5. Antimicrobial resistance in Campylobacter isolates

Table Antimicrobial susceptibility testing of Campylobacter in animals

n = Number of resistant isolates	Campylobacter spp., unspecified					
	Gallus gallus (fowl)		**Cattle (bovine animals)**		**Pigs**	
Isolates out of a monitoring programme	yes				no	
Number of isolates available in the laboratory	95				236	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines						
Tetracyclin	95	37			236	154
Fluoroquinolones						
Ciprofloxacin	95	50			236	55
Quinolones						
Nalidixic acid	95	49			236	46
Aminoglycosides						
Gentamicin	95	0			236	0
Macrolides						
Erythromycin	95	2			236	16
Penicillins						
Ampicillin	95	36			236	12
Fully sensitive		30				45
Resistant to 1 antimicrobial		12				125
Resistant to 2 antimicrobials		11				29
Resistant to 3 antimicrobials		29				31
Resistant to 4 antimicrobials		12				6
Resistant to >4 antimicrobials		1				

Footnote

species investigated in
pigs: Campylobacter coli
Gallus gallus: C.jejuni
national reference laboratory for Campylobacter

Table Antimicrobial susceptibility testing of Campylobacter in food

n = Number of resistant isolates

Campylobacter spp., unspecified

	Meat from other poultry species		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)	
Isolates out of a monitoring programme								no
Number of isolates available in the laboratory								17
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin							17	6
Fluoroquinolones								
Ciprofloxacin							17	6
Quinolones								
Nalidixic acid							17	6
Aminoglycosides								
Gentamicin							17	0
Macrolides								
Erythromycin							17	2
Penicillins								
Ampicillin							17	6
Fully sensitive								6
Resistant to 1 antimicrobial								3
Resistant to 2 antimicrobials								4
Resistant to 3 antimicrobials								2
Resistant to 4 antimicrobials								1
Resistant to >4 antimicrobials								1

Footnote

Isolates voluntary send in to the national reference laboratory for Campylobacter

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to	Campylobacter spp., unspecified
	Gallus gallus (fowl)
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	95

Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	95	37			37	9	4	2	2	2	2	0	17	13	7							
Fluoroquinolones																						
Ciprofloxacin	95	49		1	8	18	12	6	0	1	0	12	18	19								
Quinolones																						
Nalidixic acid	95	49							25	13	5	3	14	27	8							
Aminoglycosides																						
Gentamicin	95	0				3	22	66	3	1												
Macrolides																						
Erythromycin	95	2				3	31	29	22	8	0	0	0	0	0	2						
Penicillins																						
Ampicillin	95	31				5	6	8	8	24	5	3	5	7	12	12						

Footnote

species: Campylobacter jejuni

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	Campylobacter spp., unspecified																					
	Pigs																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	236																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	236	154			24	8	19	4	1	6	8	12	44	95	14	1						
Fluoroquinolones																						
Ciprofloxacin	236	53		1	49	73	53	5	1	1	7	28	13	5								
Quinolones																						
Nalidixic acid	236	46							78	91	15	6	10	34	2							
Aminoglycosides																						
Gentamicin	236	0				1	32	161	42													
Macrolides																						
Erythromycin	236	17				1	4	43	131	35	5	1	0	0	1	15						
Penicillins																						
Ampicillin	236	12				6	14	58	36	83	24	3	0	8	3	1						

Footnote

species: Campylobacter coli
Isolates voluntary send in to the national reference laboratory for Campylobacter

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to	Campylobacter spp., unspecified Meat from poultry, unspecified
Isolates out of a monitoring programme	no
Number of isolates available in the laboratory	17

Antimicrobials:	N	n	<=0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Tetracyclines																						
Tetracyclin	17	5			8	2					1	1	1	2	2							
Fluoroquinolones																						
Ciprofloxacin	17	6			1	6	4					1	3	2								
Quinolones																						
Nalidixic acid	17	6							6	5				4	2							
Aminoglycosides																						
Gentamicin	17	0					4	13														
Macrolides																						
Erythromycin	17	2					3	6	5	1						2						
Penicillins																						
Ampicillin	17	6						2	1	5	3			1	2	3						

Footnote

Isolates voluntary send in to the national reference laboratory for Campylobacter

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

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

Standards used for testing

- NCCLS

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin		1		2	0.125	256				
Fluoroquinolones										
Ciprofloxacin		0.5		1	0.03	64				
Quinolones										
Nalidixic acid		16		32	0.25	256				
Aminoglycosides										
Gentamicin		8		16	0.125	256				
Macrolides										
Erythromycin		2		4	0.25	256				
Penicillins										
Ampicillin		4		8	0.125	256				

Footnote

Campylobacter jejuni
Different Breakpoints for C.coli
Ampicillin <= 8 - > 16
Gentamicin <=1 - > 2
Erythromycin <= 8 - > 16

Table Breakpoints used for antimicrobial susceptibility testing in Food

Test Method Used

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

Standards used for testing

- NCCLS

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin		8		16	0.125	256				
Fluoroquinolones										
Ciprofloxacin		2		4	0.03	64				
Quinolones										
Nalidixic acid		16		16	0.25	256				
Aminoglycosides										
Gentamicin		8		16	0.125	256				
Macrolides										
Erythromycin		4		8	0.25	256				
Penicillins										
Ampicillin		16		32	0.125					

2.3. LISTERIOSIS

2.3.1. General evaluation of the national situation

2.3.2. Listeriosis in humans

2.3.3. Listeria in foodstuffs

A. L. monocytogenes in food

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

In 2006, Listeria monocytogenes was detected in numerous categories of food again by means of samples collected under a sampling plan within the official food control.
Compared with the previous year, red meat showed a not significant increase in the share of positive samples among those collected under the sampling plan (3.73 %; 2005: 3.11 %). L. monocytogenes was reported for meat of cattle, pork, sheep, and game in 2005.
Comminuted raw meat complying with the Minced Meat Regulations (intended to be eaten raw) showed a significantly increased share of L. monocytogenes (15.96 %; 2005: 10.39 %).
Raw meat products were found positive in 18.36 % of samples (2005: 10.50 %), this means a significant increase for raw meat products.
Stabilized meat products showed a decrease of L. monocytogenes contamination to 9.43 % of samples (2005: 10.43 %). In heat-treated meat products ('cooked, ready-to-eat'), the share of 2.00 % of positive samples was nearly the same as in the previous year (2005: 1.88 %). According to these data, the frequency of detection of L. monocytogenes in stabilized meat products was four times as high as that in heat-treated meat products (2005: five times).
In poultry meat, L. monocytogenes was detected in 7.47 % of samples (2005: 8.79 %), with less than half the number of samples examined compared to the previous year.
Detection rates in fish, seafood and products made from these were still high with a significant increase to 9.25 % (2005: 6.65 %). In same way, increased detection rates were found in stabilised fish products at 13.45 % (2005: 6.95 %). A nearly same share as in the previous year of L. monocytogenes was detected in heat-treated (smoked) fish products at 8.95 % (2005: 9.29 %).
L. monocytogenes was only found in 0.93 % (2005: 4.41 %) of samples of certified milk. From raw milk sold at farm, an increased share of L. monocytogenes was reported at 1.46 % (2005: 0.86 %). Delicatessen salads showed an increase to 6.74 % (2005: 3.47 %).

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

It appears that in meat and meat products, contamination with L. monocytogenes takes place after the slaughtering process and during subsequent storage and/ or onward treatment. L. monocytogenes has continued to be widespread thus involving a risk to the health of consumers, in particular immunocompromized persons and pregnant women. It has been recommended for a long time already that these groups of persons should not consume raw meat products.
Since the survey on zoonoses for 2000 the queries submitted to the Laender have included quantitative results for Listeria. Quantitative examinations for L. monocytogenes have been performed since the early 1990ies (BGA-recommendations, 1991; BgVV, 2000). Quantitative examinations have been stated as the positive share of the samples examined by the Laender under the

sampling plan within the official food control.
In 2006, bacterial counts exceeding 10^2 cfu/ g were mainly detected in the categories of samples collected under the sampling plan in meat and products incl. poultry meat and fish and products.

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g	> detection limit but =< 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Milk, cows' (1)	official food control with sampling plan	single	1g	183	24		24	
raw								
intended for direct human consumption (2)	official food control with sampling plan	single	1g	27	0			
pasteurised milk	official food control with sampling plan	single	25g	157	74		74	
Cheeses made from cows' milk								
soft and semi-soft								
made from pasteurised milk	official food control with sampling plan	single	25g	324	55		55	
hard								
made from pasteurised milk	official food control with sampling plan	single	25g	1372	272		266	6
Cheeses made from goats' milk								
hard								
made from pasteurised milk	official food control with sampling plan	single	25g	120	8		7	
Cheeses made from sheep's milk								
hard								
made from pasteurised milk	official food control with sampling plan	single	25g	89	7		7	
Dairy products (excluding cheeses)								
butter	official food control with sampling plan	single	25g	10	0			

(1) : raw milk selled at farm with recommendation to heat for 10 min.
(2) : certified milk

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g	> detection limit but =< 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Meat from pig								
fresh	official food control with sampling plan	single	1g	355	7		4	3
meat products								
cooked, ready-to-eat	official food control with sampling plan	single	25g	875	128		126	2
fermented sausages (1)	official food control with sampling plan	single	1g	947	91		89	2
Meat from bovine animals								
fresh	official food control with sampling plan	single	1g	111	1		1	
Fish								
smoked	official food control with sampling plan	single	25g	700	136		122	14
(stabilized products)	official food control with sampling plan	single	1g	1322	339		303	36
raw								
(cuts)	official food control with sampling plan	single	1g	572	67		67	
Crustaceans								
unspecified	official food control with sampling plan	single	1g	376	123		123	
Meat from poultry, unspecified								
- in total	official food control with sampling plan	single	1g	260	6		5	1
Dairy products (excluding cheeses)								

ice-cream	official food control with sampling plan	single	25g	519	89		89	
Ready-to-eat salads	official food control with sampling plan	single	25g	475	258		256	2

(1) : all stabilized meat products

2.3.4. Listeria in animals

A. L. monocytogenes in animal

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

The detection rate in chicken was comparable to those of the previous year. In cattle 2.2 % of the animals were found positive (2005: 4.6 %). The proportion of positive samples remained low in swine and horses. In goats and sheep, the proportion of samples positve for L. monocytogenes was further reduced (2.4 and 1.5 vs. 7.12 % and 6.25 % in 2005, respectively).

Table Listeria in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria spp.	L. monocytogenes	Listeria spp., unspecified
Cattle (bovine animals)	Official report of the Laender	animal	6243	138	138	
dairy cows	Official report of the Laender	animal	1947	21	21	
Sheep	Official report of the Laender	animal	4249	64	64	
Goats	Official report of the Laender	animal	709	17	17	
Pigs	Official report of the Laender	animal	3310	9	9	
Gallus gallus (fowl)	Official report of the Laender	animal	2170	5	5	
Solipeds, domestic						
- at farm - Clinical investigations	Official report of the Laender	animal	2090	12	12	
Cats	Official report of the Laender	animal	1011	0		
Dogs	Official report of the Laender	animal	1543	0		

2.4. E. COLI INFECTIONS

2.4.1. General evaluation of the national situation

2.4.2. E. Coli Infections in humans

2.4.3. Escherichia coli, pathogenic in foodstuffs

A. Verotoxigenic E. coli (VTEC) in food

Monitoring system

Sampling strategy

The inquiries by means of questionnaires about E. coli VTEC/ STEC addressed to the Laender referred to the detection of E. coli in which the toxin-producing potential had been examined by means of SLT-PCR, ELISA or cytotoxin testing. The results obtained for samples tested under a sampling plan are shown. In 2006 as in the previous years, VTEC testing was mainly performed by means of the BgVV-Dessau method.

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

Higher numbers of samples collected under the sampling plan within the official food control were available only for the categories of red meat, comminuted raw meat according to the Minced Meat Regulations, stabilised meat products and raw milk ex farm. In these categories, the number of tests were partly enhanced compared with the previous year.
In 2006, VTEC/ STEC was detected not significantly less frequently in red meat (5.21 % of samples collected under the sampling plan; 2005: 6.73 %). The highest VTEC/ STEC rates were found in game exhibiting a share of 10 % of samples that tested positive (2005: 15 %).
VTEC was detected in 5.89 % of samples of comminuted raw meat according to the Minced Meat Regulations (intended to be eaten raw: 2005: 6.41 %). More detections of VTEC/ STEC were reported in 2006 from stabilized meat products (1.79 %; 2005: 0.25 %, 1 case), with VTEC O8, O22 and O91:H-. There was no case of VTEC detection in soft cheese made from raw milk (2005: one case). From cheeses made from raw milk of other animals than cow VTEC O113 and O76 were isolated.
E. coli VTEC/ STEC was detected in 2006 mainly in untreated or stabilised foods.

Table VT E. coli in food (Part A)

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Escherichia coli, pathogenic	E.coli, pathogenic, unspecified	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified	Verotoxigenic E. coli (VTEC) - VTEC O91	Verotoxigenic E. coli (VTEC) - VTEC O2	Verotoxigenic E. coli (VTEC) - VTEC O8	Verotoxigenic E. coli (VTEC) - VTEC O21	Verotoxigenic E. coli (VTEC) - VTEC O22	Verotoxigenic E. coli (VTEC) - VTEC O113	Verotoxigenic E. coli (VTEC) - VTEC O59	Verotoxigenic E. coli (VTEC) - VTEC O146	Verotoxigenic E. coli (VTEC) - VTEC O150	Verotoxigenic E. coli (VTEC) - VTEC O110	Verotoxigenic E. coli (VTEC) - VTEC O26
Meat from broilers (Gallus gallus)	official food control with sampling plan	single	25g	4	0															
Meat from turkey	official food control with sampling plan	single	25g	7	0															
Meat from pig	official food control with sampling plan	single	25g	148	1		1													
minced meat																				

intended to be eaten raw	official food control with sampling plan	single	25g	8	0														
Meat from bovine animals	official food control with sampling plan	single	25g	177	8		8												1
minced meat																			
intended to be eaten raw	official food control with sampling plan	single	25g	33	0														
Meat from sheep	official food control with sampling plan	single	25g	36	4		4												
Milk, cows'																			
raw (1)	official food control with sampling plan	single	25g	324	2		2												
intended for direct human consumption (2)	official food control with sampling plan	single	25g	148	2		2												
raw milk for manufacture																			
intended for manufacture of pasteurised/ UHT products	official food control with sampling plan	single		977	10		10							1	1	1	1		

Vegetables	official food control with sampling plan	single	25g	179	0														
Cheeses, made from unspecified milk or other animal milk																			
(made from raw milk)	official food control with sampling plan	single	25g	37	6		6							1					
Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos)																			
minced meat																			
intended to be eaten raw																			
- in total	official food control with sampling plan	single	25g	611	36		36							1			1		
meat products																			
stabilized products, unspecified	official food control with sampling plan	single	25g	1006	18		18			1		4		1					
Meat from wild game - land mammals	official food control with sampling plan	single	25g	121	12		12								1	1	1		1	

(1) : raw milk selled at farm with recommendation to heat for 10 min.
(2) : certified milk

Table VT E. coli in food (Part B)

	Verotoxigenic E. coli (VTEC) - VTEC O174	Verotoxigenic E. coli (VTEC) - VTEC O4	Verotoxigenic E. coli (VTEC) - VTEC O153	Verotoxigenic E. coli (VTEC) - VTEC O179	Verotoxigenic E. coli (VTEC) - VTEC O102	Verotoxigenic E. coli (VTEC) - VTEC O76
Meat from broilers (Gallus gallus)						
Meat from turkey						
Meat from pig						
minced meat						
intended to be eaten raw						
Meat from bovine animals		1				
minced meat						
intended to be eaten raw						
Meat from sheep						
Milk, cows'						
raw (1)						
intended for direct human consumption (2)						
raw milk for manufacture						

intended for manufacture of pasteurised/ UHT products										
Vegetables										
Cheeses, made from unspecified milk or other animal milk										1
(made from raw milk)										
Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos)										
minced meat										
intended to be eaten raw										
- in total		1						1		
meat products										
stabilized products, unspecified										
Meat from wild game - land mammals					1		1			

(1) : raw milk selled at farm with recommendation to heat for 10 min.
(2) : certified milk

2.4.4. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

9 Laender reproted data on examinations for VTEC in cattle.

Results of the investigation

The proportion of positive cattle for VTEC was low (0.13 %). It was slightly higher for calves (1.0 %) than for dairy cattle (0.12%). A comparison to the data of 2005 is not valid because of the far broader database.

B. Verotoxigenic E. coli (VTEC) in animal

Monitoring system

Sampling strategy

Examinations were substantially extended compared to 2005.

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

The dramatic increase in the number of examined samples was associated with a decrease in the proportion of positive samples. Positive samples were found in farm animals but not in horses, poultry and companion animals.

Table VT E. coli in animals (Part A)

	Source of information	Sampling unit	Units tested	Total units positive for Escherichia coli, pathogenic	E.coli, pathogenic, unspecified	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified	Verotoxigenic E. coli (VTEC) - VTEC O141	Verotoxigenic E. coli (VTEC) - VTEC O21	Verotoxigenic E. coli (VTEC) - VTEC O76	Verotoxigenic E. coli (VTEC) - VTEC O55	Verotoxigenic E. coli (VTEC) - VTEC O146	Verotoxigenic E. coli (VTEC) - VTEC O136	Verotoxigenic E. coli (VTEC) - VTEC O179	Verotoxigenic E. coli (VTEC) - VTEC O139	Verotoxigenic E. coli (VTEC) - VTEC O22	Verotoxigenic E. coli (VTEC) - VTEC O91	Verotoxigenic E. coli (VTEC) - VTEC O88	Verotoxigenic E. coli (VTEC) - VTEC O1
Cattle (bovine animals)	Official report of the Laender	animal	34065	42		42						2		1	2		1	1	1	1
calves (under 1 year)	Official report of the Laender	animal	682	7		7														
dairy cows	Official report of the Laender	animal	1613	2		2														
Sheep	Official report of the Laender	animal	217	1		1					1									
Goats	Official report of the Laender	animal	84	7		7				1										

Pigs	Official report of the Laender	animal	3308	80		80	3		2							2				
Solipeds, domestic	Official report of the Laender	animal	66	0																
Poultry, unspecified	Official report of the Laender	animal	111	0																
Dogs	Official report of the Laender	animal	576	0		0														
Cats	Official report of the Laender	animal	648	0		0														
Other animals	Official report of the Laender	animal	197	3		3							1							

Table VT E. coli in animals (Part B)

	Verotoxigenic E. coli (VTEC) - VTEC O28	Verotoxigenic E. coli (VTEC) - VTEC O9
Cattle (bovine animals)	1	
calves (under 1 year)		
dairy cows		
Sheep		
Goats		1
Pigs		
Solipeds, domestic		
Poultry, unspecified		
Dogs		
Cats		
Other animals		

2.5. TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1. General evaluation of the national situation

2.5.2. Tuberculosis, Mycobacterial Diseases in humans

2.5.3. Mycobacterium in animals

A. Mycobacterium bovis in bovine animals

Notification system in place

Tuberculosis is a notifiable disease according to "Verordnung zum Schutz gegen die Tuberkulose des Rindes" of 20. March 1997.

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

Due to the long lasting control policy, tuberculosis in cattle remains a rare event in Germany.

B. Mycobacterium bovis in farmed deer

Monitoring system

Frequency of the sampling

Farmed deer are generally subject to meat inspection according to German legislation. Samples for laboratory analysis will only be collected in case of clinical suspicion.

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium spp.	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified	M. avium complex
Sheep	Official report of the Laender	animal	782	2			2	
Goats	Official report of the Laender	animal	49	0				
Pigs	Official report of the Laender	animal	1430	70			19	51
Zoo animals, all	Official report of the Laender	animal	148	20			5	15
Gallus gallus (fowl)								
- at farm	Official report of the Laender	animal	5678	67			24	43
Cattle (bovine animals)								
- at farm	Official report of the Laender	animal	7675	41	3		31	7
Solipeds, domestic								
- at farm - Clinical investigations	Official report of the Laender	animal	53	0				

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/ 432/ EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests (*)	Number of animals tested			
DEUTSCHLAND	171900	12676700		0	5	0.003					
Total	171900	12676700	0	0	5	0.003		0	0	0	0

(*) Legend:

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

2.6. BRUCELLOSIS

2.6.1. General evaluation of the national situation

2.6.2. Brucellosis in humans

2.6.3. Brucella in foodstuffs

2.6.4. Brucella in animals

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella spp.	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Pigs (1)	Official report of the Laender	animal	24472	20			1	19
Sheep								
- at farm - Clinical investigations	Official report of the Laender	animal	48806	4				4
Goats								
- at farm - Clinical investigations	Official report of the Laender	animal	6558	2				2
Solipeds, domestic								
- at farm - Clinical investigations	Official report of the Laender	animal	674	0				
Cattle (bovine animals)								
- in total - Monitoring	Official report of the Laender	animal	637762	5				5

(1) : bacteriological examination

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 microbiologically	Number of animals positive microbiologically
																				Serologically	BST		
DEUTSCHLAND	171900	12676700	171900	100	0	0																	
Total	171900	12676700	171900	100	0	0	0	0	0		0	0	0		0	0	0	0	0	0	0	0	0

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

Region	Total number of existing ovine / caprine		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of herds	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbiologically	Number of animals positive microbiologically	Number of suspended herds
DEUTSCHLAND		2560300			1	0			1					
Total	0	2560300	0	0	1	0	0	0	1	0	0	0	0	0

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

2.7.2. Yersiniosis in humans

2.7.3. Yersinia in foodstuffs

A. Y. enterocolitica in food

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

In food samples collected under the sampling plan, Yersinia enterocolitica (Y.e.) was detected in 2006 mainly in pork. There was an increase in the number of samples collected under the sampling plan. In pork, Y.e. was found in 10 % of these samples (2005: 15 %). As in the previous year, Y.e. was detected in raw meat products in 2006 only in single cases (2005: 1 case). Y.e. O:3 was detected only in pork in one of 15 samples collected under the plan.

Table Yersinia in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Yersinia spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified
Meat from pig										
fresh	official food control with sampling plan	single	25g	149	15	15		1		14
minced meat	official food control with sampling plan	single	25g	36	1	1				1
meat products	official food control with sampling plan	single	25g	11	1	1				1
Meat from bovine animals										
fresh	official food control with sampling plan	single	25g	7	0					
Milk, cows'										
raw (1)	official food control with sampling plan	single	25g	1	0					
intended for direct human consumption (2)	official food control with sampling plan	single	25g	98	0					

(1) : raw milk selled at farm with recommendation to heat for 10 min.
(2) : certified milk

2.7.4. Yersinia in animals

A. Yersinia enterocolitica in pigs

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

The proportion of positve samples in pigs was higher than in 2005 (3.0 vs. 0.7 %.

Table Yersinia in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. enterocolitica - O:9	Y. enterocolitica - O:3	Y. enterocolitica - unspecified
Cattle (bovine animals)	Official report of the Laender	animal	8038	19	19			2	17
Sheep	Official report of the Laender	animal	3776	5	5			5	
Goats	Official report of the Laender	animal	615	1	1			1	
Pigs	Official report of the Laender	animal	3587	108	108			103	5
Solipeds, domestic	Official report of the Laender	animal	2136	6	6			6	
Dogs	Official report of the Laender	animal	1627	9	9			5	4
Cats	Official report of the Laender	animal	1037	0					

Footnote

Data are based on investigation of Yersinia enterocolitica, only

2.8. TRICHINELLOSIS

2.8.1. General evaluation of the national situation

2.8.2. Trichinellosis in humans

2.8.3. Trichinella in animals

A. Trichinella in pigs

Number of officially recognised Trichinella-free holdings

none

Categories of holdings officially recognised Trichinella-free

none

Officially recognised regions with negligible Trichinella risk

none

Monitoring system

Sampling strategy

General

Samples are collected during meat inspection

Frequency of the sampling

General

Each animal has to be tested

Type of specimen taken

General

diaphragm pillar

Methods of sampling (description of sampling techniques)

General

Artificial digestion (magnetic stirrer method, trichomatic 35); trichinoscopic examination

Case definition

General

Meat which contains Trichinella muscle larva(e)

Diagnostic/ analytical methods used

General

Confirmation of isolate by Multiplex PCR

Control program/ mechanisms

Recent actions taken to control the zoonoses

Not relevant zoonoses: routine meat inspection: reporting/ notification

Suggestions to the Community for the actions to be taken

not relevant

Measures in case of the positive findings or single cases

carcass subjected to destroy cases including the contingency plan in place: destroy positive carcass, trace back to the farm where positive animal came from

Notification system in place

yes (see above)

Results of the investigation including description of the positive cases and the verification of the Trichinella species

Fattening pigs not raised under controlled housing conditions in integrated production system

Breeding sows and boars

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

Positive findings are very rare in Germany (in 2003 1 pos. pig out of 42 Mio. slaughtered). Investigation are including description of the positive cases and the verification of the Trichinella species
Data on meat inspection are collected by the Statistisches Bundesamt and will only be available for the last year by October of this year.
However, there was an outbreak of Trichinellosis in one Land that was caused by a domestic pig kept in a private household.
In 2005, 44.97 Mill. pigs were examined with no positive finding for Trichinella.

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

no relevance

Additional information

Last human trichinellosis outbreak due to autochthonous infection in pig occurred in 1982, 2006 due to a pig kept outdoors.

B. Trichinella in horses

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

As in 2005, none of the samples from horses examined for Trichinella was positive.

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. spiralis	Trichinella spp., unspecified	T. pseudospiralis
Solipeds, domestic	Official report of the Laender	animal	1796	0			
Wild boars							
wild	Official report of the Laender	animal	85719	3	3		
Foxes	Official report of the Laender	animal	1359	1			1
Badgers	Official report of the Laender	animal	31	0			
Raccoons	Official report of the Laender	animal	153	0			

2.9. ECHINOCOCCOSIS

2.9.1. General evaluation of the national situation

2.9.2. Echinococcosis in humans

2.9.3. Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus spp.	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals)	Official report of the Laender	animal	540	0			
Sheep	Official report of the Laender	animal	538	0			
Goats	Official report of the Laender	animal	9	0			
Pigs	Official report of the Laender	animal	75332	0			
Solipeds, domestic	Official report of the Laender	animal	19	0			
Dogs	Official report of the Laender	animal	204	0			
Cats	Official report of the Laender	animal	96	2			2
Foxes	Official report of the Laender	animal	3605	906		869	37

2.10. TOXOPLASMOSIS

2.10.1. General evaluation of the national situation

2.10.2. Toxoplasmosis in humans

2.10.3. Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma gondii
Cattle (bovine animals)	Official report of the Laender	animal	461	0
Sheep	Official report of the Laender	animal	552	174
Goats	Official report of the Laender	animal	26	0
Pigs	Official report of the Laender	animal	648	0
Solipeds, domestic	Official report of the Laender	animal	62	0
Dogs	Official report of the Laender	animal	216	1
Cats	Official report of the Laender	animal	435	5

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

Zoonotic disease involving Rabies – Cases reported
Animal species: foxes, wildlife, domestic animals
Sampling strategy: 8 foxes per 100km² and year with special emphasis on indicator animals (animals being rabid, showing abnormal behaviour, road kills, animals found dead etc.)
Frequency of the sampling: permanent sampling (all year round)
Type of specimen taken: brain tissue (cortex, hippocampus, cerebellum, medulla oblongata)
Case definition: A case of Rabies in definitive hosts is defined as a detection of rabies virus antigen or the isolation of rabies virus in the brain of the respective animal.
Diagnostic/ analytical methods used: Fluorescent Antibody Test (FAT), Rabies Tissue Culture Infection Test (RTCIT), Reverse Transcriptase Polymerase Chain Reaction (RT_PCR), Real-time PCR
Vaccination policy: oral rabies vaccination of foxes (ORV) in endemic areas
Other preventative measures than vaccination in place: voluntary vaccination of pets and other domestic animals, complementary hunting
Control programme/ mechanisms:
The control programmes/ strategies in place: ORV
Recent actions taken to control the zoonoses: ORV
Suggestions to the Community for the actions to be taken: none
Measures in case of the positive findings or single cases: ORV
Notification system in place: Rabies is a notifiable disease
Results of the investigation: 12 rabies cases in 2006 (see table)
Investigations of the human contacts with the positive cases

2.11.2. Rabies in humans

A. Rabies in humans

Reporting system in place for the human cases

notifiable

Case definition

A case of Rabies in a human is defined as a detection of rabies virus antigen and/ or the isolation of rabies virus in the brain (post mortem diagnosis) or by detection of rabies virus in secretions or excretions (ante mortem diagnosis) in relation with clinical symptoms
Diagnostic/ analytical methods used Fluorescent Antibody Test (FAT), Rabies Tissue Culture Infection Test (RTCIT), Reverse Transcriptase Polymerase Chain Reaction (RT_PCR), Real-time PCR

Notification system in place

notifiable

Results of the investigation

4 cases

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

In 2005, a total of 4 human rabies cases due to organ transplantation (including donor) were detected, of which the donor was shown to have got infected in India in October 2004.

Relevance as zoonotic disease

moderate

2.11.3. Lyssavirus (rabies) in animals

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	unspecified Lyssavirus	European Bat Lyssavirus - unspecified	classical rabies virus (genotype 1)
Cattle (bovine animals)		animal	95	0			
Sheep		animal	50	0			
Goats		animal	13	0			
Pigs		animal					
Solipeds, domestic		animal	31	0			
Dogs		animal	123	0			
Cats		animal	417	0			
Bats							
wild	mandatory reports	single	70	9	9		
Foxes							
wild	mandatory reports	single	13763	3	3		
Raccoon dogs							
wild		animal	147	0			
Raccoons							
wild		animal	152	0			
Wolves							
wild		animal					
Badgers							
wild		animal	147	0			
Marten							
wild		animal	391	0			
Wild boars							
wild		animal	88	0			
Deer							
wild							
roe deer		animal	477	0			
red deer		animal	9	0			
fallow deer		animal	8	0			

Other animals		animal	283	0			

2.12. Q-FEVER

2.12.1. General evaluation of the national situation

2.12.2. Coxiella (Q-fever) in animals

Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling unit	Units tested	Total units positive for Coxiella burnetii
Cattle (bovine animals)	Official report of the Laender	herd	1611	220
unspecified				
- at farm	Official report of the Laender	animal	11397	998
Sheep	Official report of the Laender	animal	1425	96
Goats	Official report of the Laender	animal	227	17

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ESCHERICHIA COLI, NON-PATHOGENIC

3.1.1. General evaluation of the national situation

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

Table Antimicrobial susceptibility testing of E. coli in animals

n = Number of resistant isolates	E. coli							
	Cattle (bovine animals)		**Pigs**		**Gallus gallus (fowl)**		**Turkeys**	
Isolates out of a monitoring programme	no		no		no		no	
Number of isolates available in the laboratory	1		7		50		0	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	1	0	7	5	50	19		
Amphenicols								
Chloramphenicol	1	0	7	1	50	1		
Florfenicol	1	0	7	0	50	1		
Cephalosporins								
Ceftiofur	1	0	7	0	50	9		
Fluoroquinolones								
Ciprofloxacin	1	0	7	2	50	4		
Quinolones								
Nalidixic acid	1	0	7	4	50	22		
Sulfonamides								
Sulfonamide	1	0	7	3	50	12		
Trimethoprim	1	0	7	3	50	6		
Aminoglycosides								
Streptomycin	1	0	7	2	50	8		
Gentamicin	1	0	7	0	50	2		
Neomycin	1	0	7	1	50	9		
Kanamycin	1	0	7	1	50	9		
Penicillins								
Ampicillin	1	1	7	5	50	32		
Trimethoprim + sulfonamides	1	0	7	3	50	6		
Fully sensitive	1	1	7	2	50	3		
Resistant to 1 antimicrobial			7	0	50	17		
Resistant to 2 antimicrobials			7	0	50	5		
Resistant to 3 antimicrobials			7	0	50	6		
Resistant to 4 antimicrobials			7	2	50	11		
Resistant to >4 antimicrobials			7	3	50	8		

Footnote

Isolates from the National Reference Laboratory for Escherichia coli

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	E. coli																					
	Gallus gallus (fowl)																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	50																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	50	19							30	1	0	0	19									
Amphenicols																						
Chloramphenicol	50	1								12	35	2	0	1								
Florfenicol	50	1							1	22	25	1	1									
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	50	9					34	2	0	5	9											
Fluoroquinolones																						
Ciprofloxacin	50	4	28	0	0	7	10	1	0	4												
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	50	22								28	0	0	0	1	21							
Sulfonamides																						
Sulfonamide	50	12											38	0	0	0	12					
Trimethoprim	50	6								44	0	0	6									
Aminoglycosides																						
Streptomycin	50	8								23	19	0	0	8								
Gentamicin	50	2						48	0	0	0	1	1									
Neomycin	50	9							40	1	0	0	9									
Kanamycin	50	9								40	1	0	0	9								
Penicillins																						
Ampicillin	50	32						4	13	1	0	0	32									
Trimethoprim + sulfonamides	50	0						44	0	0	6											

Footnote

Isolates from the National Reference Laboratory for Escherichia coli

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	E. coli																					
	Pigs																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	7																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	7	5							2	0	0	0	5									
Amphenicols																						
Chloramphenicol	7	1									5	1	0	1								
Florfenicol	7	0								3	4											
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	7	0					7															
Fluoroquinolones																						
Ciprofloxacin	7	2	3	0	0	1	1	0	0	2												
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	7	4								3	0	0	0	1	3							
Sulfonamides																						
Sulfonamide	7	3											4	0	0	0	3					
Trimethoprim	7	3								4	0	0	3									
Aminoglycosides																						
Streptomycin	7	2								3	1	1	0	2								
Gentamicin	7	0						5	2													
Neomycin	7	1							5	1	0	0	1									
Kanamycin	7	1								4	2	0	0	1								
Penicillins																						
Ampicillin	7	5							2	0	0	0	5									
Trimethoprim + sulfonamides	7	0						4	0	0	0	3										

Footnote

Isolates from the National Reference Laboratory for Escherichia coli

Table Antimicrobial susceptibility testing of E. coli in food

n = Number of resistant isolates	E. coli									
	Meat from pig		**Meat from bovine animals**		**Meat from broilers (Gallus gallus)**		**Meat from other poultry species**		**Meat, mixed meat - minced meat**	
Isolates out of a monitoring programme	no		no		no				no	
Number of isolates available in the laboratory	9		5		0				53	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines										
Tetracyclin	9	0	5	1					51	7
Amphenicols										
Chloramphenicol	9	0	5	1					51	2
Florfenicol	9	0	5	0					51	0
Cephalosporins										
Ceftiofur	9	0	5	0					51	0
Fluoroquinolones										
Ciprofloxacin	9	0	5	1					51	0
Quinolones										
Nalidixic acid	9	0	5	1					51	4
Sulfonamides										
Sulfonamide	9	0	5	1					51	8
Trimethoprim	9	0	5	1					51	5
Aminoglycosides										
Streptomycin	9	0	5	0					51	11
Gentamicin	9	0	5	0					51	0
Neomycin	9	0	5	0					51	0
Kanamycin	9	0	5	0					51	0
Penicillins										
Ampicillin	9	0	5	1					51	4
Trimethoprim + sulfonamides	9	0	5	1					51	5

Footnote

Isolates from the National Reference Laboratory for Escherichia coli

Table Antimicrobial susceptibility testing of E. coli in Meat, mixed meat - minced meat - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	E. coli																					
	Meat, mixed meat - minced meat																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	53																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	51	7							41	3	0	0	7									
Amphenicols																						
Chloramphenicol	51	2								10	38	1	0	2								
Florfenicol	51	0							1	21	26	3										
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	51	0					51															
Fluoroquinolones																						
Ciprofloxacin	51	0	46	0	1	4																
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	51	5								46	0	0	0	1	4							
Sulfonamides																						
Sulfonamide	51	8											42	1	0	0	8					
Trimethoprim	51	5								46	0	0	5									
Aminoglycosides																						
Streptomycin	51	11								19	20	1	0	11								
Gentamicin	51	0						50	1													
Neomycin	51	0							50	1												
Kanamycin	51	0								49	2											
Penicillins																						
Ampicillin	51	4						3	25	17	2	0	4									
Trimethoprim + sulfonamides	51	5						46	0	0	5											

Footnote

national reference laboratory for Escherichia coli

Table Antimicrobial susceptibility testing of E. coli in meat products - Meat, mixed meat - fermented sausages - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	E. coli																					
	Meat, mixed meat - meat products - fermented sausages																					
Isolates out of a monitoring programme	no																					
Number of isolates available in the laboratory	27																					
Antimicrobials:	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Tetracyclines																						
Tetracyclin	26	7							17	2	0	0	7									
Amphenicols																						
Chloramphenicol	26	3								8	13	2	0	3								
Florfenicol	26	0								11	12	3										
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftiofur	26	0					26															
Fluoroquinolones																						
Ciprofloxacin	26	0	26																			
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	26	0								26												
Sulfonamides																						
Sulfonamide	26	4											22	0	0	0	4					
Trimethoprim	26	1								25	0	0	1									
Aminoglycosides																						
Streptomycin	26	6								14	5	1	1	5								
Gentamicin	26	0						25	1													
Neomycin	26	0							26													
Kanamycin	26	0								24	2											
Penicillins																						
Ampicillin	26	3							12	7	4	0	3									
Trimethoprim + sulfonamides	26	0						25	0	0	1											

Footnote

sausage not only fermented
Isolates from the National Reference Laboratory for Escherichia coli

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used
Disc diffusion
Agar dilution
Broth dilution
E-test

Standards used for testing
NCCLS

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	CLSI	8	16	16	2	64				
Florfenicol	NCCLS	8	16	16	2	64				
Tetracyclines										
Tetracyclin	CLSI	4	8	8	2	32				
Fluoroquinolones										
Ciprofloxacin	NCCLS Bovine	0.25	1	1	0.03	4				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI	16		16	4	128				
Trimethoprim	CLSI	8		8	4	32				
Sulfonamides										
Sulfonamide	CLSI	256		256	32	512				
Aminoglycosides										
Streptomycin		8	16	16	4	64				
Gentamicin	CLSI	4	8	8	1	32				
Neomycin		4	8	8	2	32				
Kanamycin	CLSI	16	32	32	4	64				
Trimethoprim + sulfonamides	CLSI	38		38	19	152				
Cephalosporins										
Ceftiofur	NCCLS Bovine	2	4	4	0.5	8				
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI	8	16	16	1	32				

Footnote

CLSI see M100-S16
NCCLS see M31-A2
Bovine Ciprofloxacin taken from enroflaxacin

Table Breakpoints used for antimicrobial susceptibility testing in Food

Test Method Used

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

Standards used for testing

- NCCLS

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	CLSI	8	16	16	2	64				
Florfenicol	NCCLS	8	16	16	2	64				
Tetracyclines										
Tetracyclin	CLSI	4	8	8	2	32				
Fluoroquinolones										
Ciprofloxacin	NCCLS Bovine	0.25	1	1	0.03	4				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI	16		16	4	128				
Trimethoprim	CLSI	8		8	4	32				
Sulfonamides										
Sulfonamide	CLSI	256		256	32	512				
Aminoglycosides										
Streptomycin		8	16	16	4	64				
Gentamicin	CLSI	4	8	8	1	32				
Neomycin		4	8	8	2	32				
Kanamycin	CLSI	16	32	32	4	64				
Trimethoprim + sulfonamides	CLSI	2		2	19	152				
Cephalosporins										
Ceftiofur	NCCLS Bovine	2	4	4	0.5	8				
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI	8	16	16	1	32				

Footnote

CLSI see M100-S16
NCCLS see M31-A2
Bovine Ciprofloxacin taken from enroflaxacin

Table Breakpoints used for antimicrobial susceptibility testing in Feedingstuff

Test Method Used

Disc diffusion

Agar dilution

Broth dilution

E-test

Standards used for testing

NCCLS

Escherichia coli, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	CLSI	8	16	16	2	64				
Florfenicol	NCCLS	8	16	16	2	64				
Tetracyclines										
Tetracyclin	CLSI	4	8	8	2	32				
Fluoroquinolones										
Ciprofloxacin	NCCLS Bovine	0.25	1	1	0.03	4				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI	16		16	4	128				
Trimethoprim	CLSI	8		8	4	32				
Sulfonamides										
Sulfonamide	CLSI	256		256	32	512				
Aminoglycosides										
Streptomycin		8	16	16	4	64				
Gentamicin	CLSI	4	8	8	1	32				
Neomycin		4	8	8	2	32				
Kanamycin	CLSI	16	32	32	4	64				
Trimethoprim + sulfonamides	CLSI	38		38	19	152				
Cephalosporins										
Ceftiofur	NCCLS Bovine	2	4	4	0.5	8				
3rd generation cephalosporins										
Penicillins										
Ampicillin	CLSI	8	16	16	1	32				

Footnote

CLSI see M100-S16
NCCLS see M31-A2
Bovine Ciprofloxacin taken from enroflaxacin

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1. HISTAMINE

4.1.1. General evaluation of the national situation

4.1.2. Histamine in foodstuffs

4.2. ENTEROBACTER SAKAZAKII

4.2.1. General evaluation of the national situation

4.2.2. Enterobacter sakazakii in foodstuffs

Table Enterobacter sakazakii in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Enterobacter sakazakii
Infant formula					
(intended for infants below 6 months)	official food control with sampling plan	single		403	4
((intended for infants from 6 months))	official food control with sampling plan	single		9	0
Foodstuffs intended for special nutritional uses					
dried dietary foods for special medical purposes intended for infants below 6 months	official food control with sampling plan	single		61	0
Milk, cows'					
(dryed milk)	official food control with sampling plan			7	0

4.3. STAPHYLOCOCCAL ENTEROTOXINS

4.3.1. General evaluation of the national situation

4.3.2. Staphylococcal enterotoxins in foodstuffs

Table Staphylococcal enterotoxins in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Staphylococcal enterotoxins	enterotoxin B
Cheeses made from cows' milk		single				
soft and semi-soft						
made from pasteurised milk	official food control with sampling plan	single		3	0	
made from raw or low heat-treated milk	official food control with sampling plan	single		1	0	
hard						
made from raw or low heat-treated milk	official food control with sampling plan	single		6	0	
made from pasteurised milk	official food control with sampling plan	single		7	0	
Cheeses made from sheep's milk						
soft and semi-soft						
made from raw or low heat-treated milk	official food control with sampling plan	single		1	0	
Milk from other animal species or unspecified						
raw	official food control with sampling plan	single		1	1	1
Other food	official food control with sampling plan	single		31	0	

5. FOODBORNE OUTBREAKS

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

A. Foodborne outbreaks

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

Surveillance of Infectious Diseases in Humans is regulated in Germany by the Act on the Prevention and Control of Infectious Diseases in Man
(Protection against Infection Act), that came into force on 1 January 2001. It assigns the Robert Koch Institute (RKI) the task to compile the notifications of human infections at the national level and to evaluate and analyse the data under epidemiological aspects. Cases are notified by laboratories (diagnosed pathogens) and for some diseases also by physicians to the local public health office. All pathogens included in the EU Zoonoses Directive are notifiable by the laboratories.
Outbreak reporting is integrated into this system by linking individual cases into groups with a common outbreak code.
On the local level, case-based data is entered by the local public health office in a standardised way describing the place and the suspected source or vehicle of the outbreak and the degree of evidence that a specific foodstuff is the vehicle in the outbreak (case-control study, cohort study, detection of pathogen in humans and foodstuff consumed, etc.). The information is then forwarded electronically via the state health authorities ("Bundesländer") to the RKI using a SQL database developed by the RKI. Multiple local outbreaks can be linked to meta-outbreaks on federal or national level, allowing multi-state outbreaks to be analysed. The system generates automated reports, based on case specific data. This system has increased by large the number of outbreaks that have been reported previously.
The investigation of local outbreaks lies in the responsibility of the local health departments. However, they can ask the state health authorities or the RKI for support.
Surveillance results and information on outbreaks are regularly published in the national epidemiological bulletin (see: www.rki.de>Infektionsschutz>Epidemiologisches Bulletin) and the annual report on the epidemiology of notifiable infectious diseases (see: www.rki.de>Infektionsschutz> Jahrbuch>2006).
In addition to the infectious disease reporting system of the Robert Koch-Institut, a voluntary reporting system collecting detailed information on the food implicated in outbreaks was established in 2005 at the Federal Institute for Risk Assessment (BfR). It is based on experiences gained from a former pilot project (ZEVALI). The system applies three reporting forms used by the involved parties. The first form collects the necessary information on the human cases and is submitted by the local health authority. The local food control authorities fill in the second form, which is collecting detailed data regarding the incriminated food vehicle. Data concerning the laboratory investigation of food samples collected during the outbreak investigations are listed in the third form. Following the outbreak investigation, the three surveillance forms are sent to the BfR for data analysis. The BfR provides feed-back on the results to all parties involved.

Description of the types of outbreaks covered by the reporting:

For infectious disease surveillance, outbreaks are defined as two or more epidemiologically linked cases including at least one laboratory confirmed case. There is a distinction between general outbreaks and household outbreaks. A household outbreak involves human cases living in one household. All outbreaks which are not classified as household outbreaks are defined as general outbreaks (e.g. hospital, school, residential institution).
The reporting system is collecting detailed information on the food implicated in outbreaks. As pick-list for foodstuffs Eurocode 2 is used. All causative agents listed in the Zoonosis Directive (Directive 2003/ 99/ EC) are monitored.
Outbreaks are defined as food-borne outbreaks if the local public health office who investigates the outbreak enters a foodstuff in the "foodstuff field" (pick list: Eurocode 2) of the electronic outbreak reporting system or classifies the information of the food stuff field as "meal is suspicious, but food vehicle not determined".
The reporting system collecting detailed information on the food implicated in outbreaks of the BfR covers foodborne outbreaks caused by bacteria, viruses, parasites and toxins. The definition of foodborne outbreaks given in the Zoonoses Directive 2003/ 99/ EC is used by this system.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

In Germany, altogether 1,351 outbreaks were reported to the Robert Koch Institute in 2006, affecting a total of 7,507 human cases. Nine patients died. The number of food-borne outbreaks in 2006 was almost stable in comparison to the year 2005 when also about 1,300 outbreaks were reported.
The reporting system for detailed information on the food implicated in outbreaks of the BfR has only recently been introduced and submission of outbreak reports to the system is voluntary. Therefore, in 2006, a total of 35 foodborne outbreak investigations were reported to BfR by eight of the 16 Länder. The outbreaks affected 929 patients of whom 5 died. In 16 outbreaks investigated and reported to BfR in 2006 it was possible to confirm the implicated food vehicle by isolation of the causative agent in a food sample.

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

Most of the 1,352 food borne outbreaks in Germany that were reported to the Robert Koch Institute were caused by Salmonella (n=905, 67%) and Campylobacter (n=207, 15%).
Number of outbreaks by causative agent, RKI, 2006:
Bacillus cereus 1
Campylobacter 207
Cryptosporidium 5
E. coli (excluding VTEC)7
Giardia 12
Hepatitis A 15
Listeria monocytognes 1
Norovirus 140
Salmonella 905
Shigella 7
Staphylococci, coag. (+) 1
Trichinella spiralis 1

VTEC 6
Yersinia 13
unknown 31
Total 1,352
According to the data submitted from the local health departments to the Robert Koch Institute in 529 (39%) outbreaks, a meal was suspicious but the incriminated food could not be definitely determined as the responsible vehicle. Among the remaining 823 outbreaks with defined foodstuff eggs or egg products were responsible for 387 outbreaks (47%), meat or meat products for 252 outbreaks (31%), milk or dairy products for 70 outbreaks (9%) and fish or seafood was identified as food vehicle in 53 outbreaks (7%). Most of the Salmonella outbreaks were caused by eggs or egg products and (n=382, 42%) and meat or meat products (n=150, 17%) whereas for Campylobacter outbreaks 84 (41%) were caused by meat or meat products and 22 (11%) were caused by milk and other dairy products.
The most frequently reported causative agent in the 35 outbreaks reported by food control authorities to BfR was Salmonella with 16 outbreaks (47%). Of these, 14 were caused by S. Enteritidis (88%). In three outbreaks PT 4 was detected and in two outbreaks PT 21 was the cause. The second most frequently reported agent was Norovirus (10 outbreaks, 29%). Five intoxications were reported to BfR in 2006, involving 86 patients in total.
The food items contaminated with Salmonella were mostly eggs and products containing eggs such as bakery products (50% of the Salmonella outbreaks reported to BfR). Four outbreaks caused by staphylococci or staphylococcal enterotoxin were reported which were isolated from a range of food items such as cold meat cuts, mushroom soup and doner kebab. The outbreak of trichinellosis reported in 2006 was caused by pork meat and meat products, but the origin of the processed meat could not be identified.

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

The place of exposure was available for 1,246 food borne outbreaks (92%) reported to the Robert Koch Institute in 2006. Outbreaks in households were most common (n=794, 64%) followed by outbreaks in restaurant settings (n=169, 14%) and in hotels (n=81, 7%).
Of the 35 foodborne outbreaks reported in 2006 to the reporting system for detailed information on the food implicated in outbreaks of the BfR, 12 (34%) occurred in private homes, while in 15 outbreaks the implicated food was consumed in public places such as restaurants or hotels, institutional catering or canteens. Six outbreaks occurred in military structures involving 183 (20%) of the reported cases.
The single most frequently reported factor contributing to the contamination of food was handling of the implicated food by an infected person (4 outbreaks).

Evaluation of the severity and clinical picture of the human cases

In 2006, nine cases died during food borne outbreaks. Seven deaths were caused by Salmonella, one death was caused by Listeria monocytogenes and one death was caused by Norovirus.

Descriptions of single outbreaks of special interest

In 2006 a nationwide outbreak of gastroenteritis due to Salmonella Hadar (a relatively rare serovar in human infections in Germany) occurred. A large case control-study and laboratory results of isolates obtained from humans, animals and food stuff identified turkey meat as

probable source of the outbreak.
Three local outbreaks due to Salmonella Enteritidis with more than 100 cases each were reported to the Robert Koch Institute and the BfR. One outbreak with 171 cases was caused by ice cream offered in an ice cream parlour in North-Rhine-Westphalia. The second outbreak was caused by a meal for lunch produced in a canteen kitchen and affected 144 children and their nursery teachers in several day care centres in Berlin. The third outbreak was caused by a contaminated cake stored at ambient temperature before being consumed and affected 136 patients in a home for the elderly in Hamburg.
In fall 2006, a nationwide outbreak due to Listeria monocytogenes occurred leading to the death of at least one patient. The outbreak was caused by a contaminated curdled milk cheese product, Harz cheese. Identical Listeria isolates, proved by PFGE-pattern, were detected in human blood samples, in cheese samples collected in refrigerators of patients, and also in retain samples of the cheese product collected in the cheese manufacturing company, where a high level of contamination (52,000 to 120,000 cfu/ g) was shown in food samples.
In January 2006, a local outbreak caused by Trichinella spiralis occurred in Mecklenburg-Western Pomerania and affected 16 human cases. Larvae of Trichinella spiralis were isolated in left over bacon and liver sausage. The origin of the processed meat is unclear.