ZOONOSES MONITORING

SWITZERLAND

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 2007

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Switzerland**
Reporting Year: **2007**
Institutions and laboratories involved in reporting and monitoring:

Laboratory name	Description	Contribution
FVO	Swiss Federal Veterinary Office	Swiss Zoonoses Report
FOPH	Federal Office of public health	Foodborne outbreaks, Swiss Zoonoses Report
ZOBA	Centre for Zoonoses, Bacterial Animal Diseases Antimicrobial Resistance at Institute of Veterinary Bacteriology, Vetsuisse Faculty, University of Bern	National Reference Laboratory for Brucellosis, Salmonellosis, Campylobacteriosis, Listeriosis, Yersiniosis, Antimicrobial Resistance Monitoring
IPB	Institute of Parasitology, Vetsuisse Faculty and Faculty of Medicine University of Bern	National Reference Laboratory for, Trichinellosis, Toxoplasmosis
SRC	Swiss Rabies Center at Institute of Veterinary Virology, Vetsuisse Faculty University of Bern	National Reference Laboratory for Rabies
IPZ	Institute of Parasitology, Vetsuisse Faculty University of Zurich	National Reference Laboratory for Echinococcosis

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 Switzerland during the year 2007. The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given.
The information given covers both zoonoses that are important for the public health in the whole European Community as well as zoonoses, which are relevant on the basis of the national epidemiological situation.
The report describes the monitoring systems in place and the prevention and control strategies applied in the country. For some zoonoses this monitoring is based on legal requirements laid down by the Community Legislation, while for the other zoonoses national approaches are applied.
The report presents the results of the examinations carried out in the reporting year. A national evaluation of the epidemiological situation, with special reference to trends and sources of zoonotic infections, is given. Whenever possible, the relevance of findings in foodstuffs and animals to zoonoses cases in humans is evaluated.
The information covered by this report is used in the annual Community Summary Report on zoonoses that is published each year by EFSA.

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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:

Living animals and herds: Coordinated census of agriculture. Swiss federal office of agriculture and Swiss federal office of statistics.
Slaughtered animals: Official meat inspection statistics (FVO) and monthly agricultural statistics (Swiss Farmer's Federation)

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

Number of animals hold in farms in Switzerland at 10th of May 2007.
Number of animals slaughtered in the year 2007.

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

The indicated number of holdings is identical to the number of farms holding respective species. Agriculture census counts the number of farms. Farms with more than one holding per species are very rare in Switzerland.

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

The number of farms holding large animals is decreasing on a yearly basis between 1% and 3% what corresponds to the yearly decrease of all farms. Holdings of pigs (-7.5%) and horses (-13.5%) decreased since 2006 above average. Broiler production increased since 2006 by 12%, what shows that the market has recovered from the drop in 2006 due to avian influenza. 30% of the turkey holders gave up their business in 2007. This high rate is the consequence of the closure of a large slaughterhouse for turkeys. Numbers of holdings with laying and breeding hens have a large fluctuation due to a large number of very small flocks on farms which are counted in agricultural census. The number of laying hens is stable since years. 50 holdings with more than 100 breeding hens keep 91% of all breeding hens.

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

Average size of the farms in 2007: 30 cattle. 147 pigs, 41 sheep, 12 goats, 184 laying hens, 5138 broilers.

Table Susceptible animal populations

* Only if different than current reporting year

Animal species	Category of animals	Number of herds or flocks	Year*	Number of slaughtered animals	Year*	Livestock numbers (live animals)	Year*	Number of holdings	Year*
Cattle (bovine animals)	in total			612664		1279823		42382	
Gallus gallus (fowl)	breeding flocks, unspecified - in total					164417		41	
	laying hens					2956753		16057	
	broilers			44843651		4994038		972	
Goats	in total			29730		77784		6500	
Pigs	in total			2782708		1564564		10628	
Sheep	in total			249547		435331		10528	
Solipeds, domestic	horses - in total			3221		53293		9564	
Turkeys	meat production flocks					112825		218	

Footnote

The 41 holdings with breeding flocks mentioned in the table are holdings with over 250 animals.
Number of slaughtered turkeys is not available. 1908 tons of turkey meat were produced in 2007.

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

A. General evaluation

History of the disease and/ or infection in the country

Salmonella infection in humans is the second most common food borne infection since 1997. In 2007, 1796 cases (23,9 reports per 100,000 inhabitants) of salmonellosis were reported, whereas the rate for campylobacteriosis was 80.5 reports per 100,000 inhabitants. Of the 1796 reported cases, 52.7% were caused by S. Enteritidis and 16.4% by S. Typhimurium.
Salmonellosis in cows, goats, milk sheep are classified as animal diseases to be controlled and they are notifiable diseases (Swiss ordinance of epizootics (TSV), Article 222-227).
Furthermore, from 1995 until 2006 the infection of chicken with Salmonella Enteritidis was notifiable and a control program was in place. 2007, the control programs concerning Salmonella infections was expanded to other serovars and species (Swiss ordinance of epizootics (TSV), Article 255-261). Several baseline studies have been or are carried out to be able to implement adequate control programs within the next few years.

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

The incidence of Salmonella Enteritidis infection in poultry (breeding flocks and laying hens flocks) has declined steadily in the period 1994 to 2006 (from 38 to under 3 infected flocks per year). 2007 the incidence of Salmonella Enteritidis infection in breeding flocks and laying hens remained on the low level of 2006 (3 infected flocks per year).
The baseline study in broilers according to commission decision 2005/ 636/ EC – which was carried out in Switzerland in 2007 – showed, that also the Salmonella prevalence in broilers is low (0.3%).
Cases of salmonellosis in animals are reported to the FVO by the cantonal veterinarians. In 2007, 74 cases of salmonellosis in animals were reported (27 in cows, 22 in reptiles, 13 in dogs and cats, 3 in birds, 4 in sheep and one case each in pigs, chicken, solipeds, lama and lynx). In total 9880 tests on salmonellosis were carried out in approved Swiss Veterinary Laboratories.
In addition, a national survey in broiler meat at retail in 2007 showed, that Swiss products from poultry have a low Salmonella prevalence.

Recent actions taken to control the zoonoses

Control measures according to the Swiss ordinance of epizootics (TSV) as well as a baseline study in laying hens (2006) and in broilers (2007). Furthermore baseline studies in slaughter and in breeding pigs were initialized, which are carried out in 2007/ 2008 resp. 2008.

Additional information

1. The industry takes responsibility for the monitoring of fattening poultry and poultry meat production in a system of self-auditing. Results of the Salmonella monitoring of the largest poultry producers and abattoirs are available covering more than 90% of the production. Samples are taken several times a year at random. The number of animals tested is substantially higher than the number of samples described in the relevant text blocks and shown in the relevant tables, because collective

samples were often tested (pooling).
2. Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.1.2. Salmonellosis in humans

2.1.3. Salmonella in foodstuffs

A. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At retail

Sampling of broiler meat and meat products at retail during the year 2007. The samples were taken as a part of the national monitoring scheme for antimicrobial resistance in Switzerland. 415 samples of fresh broiler meat were collected by the food safety inspectors of the cantonal laboratories from January to December 2007 in randomly selected retail stores throughout Switzerland. According to the market share 60% of the samples were taken from meat of domestic production (245 samples) and 30% were imported broiler meat (168 samples). The origin of two samples was unknown. 70% of the samples were refrigerated and 30% were frozen.

Frequency of the sampling

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At retail

Fresh meat

Methods of sampling (description of sampling techniques)

At retail

Official sampling of raw broiler meat (whole chickens as well as parts such as cutlet, meat cut into strips, legs, drumsticks, wings and breast / pure or marinated or spiced) not more than one sample of the same product category being taken in each branch.

Definition of positive finding

At retail

Growth in microbiological culture and identification of Salmonella.

Diagnostic/ analytical methods used

At retail

Other: According to the descriptions of the Swiss Food Manual 2005 (Chapter 56) that

corresponds to ISO 6579 (2002) with minor deviation.

Preventive measures in place

Vaccination is prohibited.

Measures in case of the positive findings or single cases

No measures are taken.

Notification system in place

Notifiable disease in animals according to Swiss ordinance of epizootics (TSV, Art. 5).

Results of the investigation

27 from the 415 (6.5%) samples were Salmonella positive. Following serovars were found: 16x S. Infantis, 4x S. Virchow, 3x S. Enteritidis and 2x S. Paratyphi B (two positive Salmonella samples remained unspecified). One of the positive samples (S. Infantis) originated from Switzerland, the other 26 positive samples were imported products (15 from Hungary, 4 from Poland, 3 from Germany, 2 from France, 1 from Brasil and 1 not known). Thus products originating from Switzerland had a significant lower prevalence then imported products (0.4% versus 15.3%).
Furthermore, it could be shown in this study, that products without skin had a significant higher Salmonella prevalence than products with skin (11.5% versus 1.0% prevalence).

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

Equally as in the baseline study in broilers (prevalence in broiler flocks was 0.3%) it could be shown, that the prevalence of Salmonella in poultry meat from Switzerland is low (0.4%). The results from the imported products correlate well with the findings of the EU-wide carried out baseline studies in broilers.

Additional information

1. Imported poultry meat from third countries is controlled by the border veterinarian service and randomly sampled for Campylobacter and Salmonella. To test for Salmonella spp., 79 samples (98% of the imported meat came from Brazil) were taken in 2007. In 5 samples (=6.3%) Salmonella spp. (3x S. Enteritidis, 1x S. Benefica and 1x S. Minnesota) were detected. Different from the previous years, imported meat from the EU was no longer tested at the border, therefore there are no data available.
2. The industry takes responsibility for the monitoring for poultry meat in a system of self-auditing. 2007 the industry tested 1753 (mainly pooled) samples at the slaughterhouses and 1346 (mainly pooled) samples at processing plant. At the slaughterhouses, 11 from the 1753 samples were Salmonella positive (=0.6%). They found 5x S. Agona, 2x S. Newport, 2x S. Typhimurium, 1x S. Infantis and 1x S. Enteritidis. At processing plant, 1 of the 1346 samples was positive (=0.1%). It was S. Agona.
3. Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

B. Salmonella spp. in food - Cheeses made from cows' milk - soft and semi-soft - at processing plant - Monitoring - official sampling - objective sampling

Monitoring system

Sampling strategy

In the national monitoring program of dairy products producers of cheese and other milk products from all over Switzerland are inspected by official food control on a regular basis. On the occasion of the inspection samples of dairy products are taken at the end of the production line. Enterprises to be sampled are selected randomly.

Frequency of the sampling

Selected enterprises are visited once a year.

Type of specimen taken

Other: Specimens are taken from cheeses (25 g) at the end of the production, before it is sold to the trader or to the consumer.

Methods of sampling (description of sampling techniques)

A single sample of one cheese is taken.

Definition of positive finding

Analysis is done in 25 grams of cheese. Growth in microbiological culture and identification of Salmonella.

Diagnostic/ analytical methods used

Detection of Salmonella spp. according to the descriptions of the Swiss Food Manual 2005 (Chapter 56) that corresponds to ISO 6579 (2002) with minor deviation.

Preventive measures in place

The implementation of a hygiene concept in order to control the safety of the products is in the responsibility of the producers. All larger cheese producers run a certified quality management fulfilling ISO 9000.

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

Salmonella is involved in the national monitoring program of dairy products on an irregular basis. As far as results are available (2007 the exact data are not yet available) there have never been results that indicate a contamination of cheeses with Salmonella spp..

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Infantis	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Virchow	S. Paratyphi B	S. Agona	S. Newport
Meat from broilers (Gallus gallus)													
fresh													
- at slaughterhouse	poultry industry (1)	single	25g	1753	11	1	1	2				5	2
- at processing plant	poultry industry (1)	single	25g	1346	1							1	
- at retail	Swiss zoonoses report 2007 (2)	single	25g	415	27	16	3		2	4	2		

Footnote

(1) Poultry industry = surveillance of salmonella in poultry industry in a system of self-auditing; sample units from the poultry industry are neither single nor batch => samples are often pooled.
(2) Data from the official 1 year study of broiler products at retail. In 245 samples originating from Switzerland 1 positive sample (S. Infantis) was found. In 168 samples from imported products 25 samples were positive. In one positive sample the origin was unknown.
Further information see Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

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

Footnote

Unfortunately the data from the national monitoring program of dairy products from 2007 are not yet available (as at June 2nd 2008).

2.1.4. Salmonella in animals

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

Vaccination policy

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

Vaccination is prohibited.

Laying hens flocks

Vaccination is prohibited.

Control program/ mechanisms

The control program/ strategies in place

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

Control measures according to the Swiss ordinance of epizootics (TSV, Article 255-261) and Commission Regulation (EC) No. 1003/ 2005.

Laying hens flocks

Control measures according to the Swiss ordinance of epizootics (TSV, Article 255-261) and Commission Regulation (EC) No. 1168/ 2006.

Measures in case of the positive findings or single cases

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

In the event of a definitive positive finding, a simple first-degree quarantine is imposed on the flock (Article 69 TSV): To prevent the disease from spreading, animal movements are prohibited. All direct contacts between birds that are subject to the quarantine and birds from other flocks is forbidden. The quarantined flocks must not be changed either by moving animals to other flocks or by introducing animals from other flocks. The diseased flocks must be slaughtered or culled.

Laying hens flocks

In the event of a definitive positive finding, a simple first-degree quarantine is imposed on the flock (Article 69 TSV): To prevent the disease from spreading, animal movements are prohibited. All direct contacts between birds that are subject to the quarantine and birds from other flocks is forbidden. The quarantined flocks must not be changed either by moving animals to other flocks or by introducing animals from other flocks. The diseased flocks must be slaughtered or culled.

Notification system in place

The Swiss ordinance of epizootics covers Salmonella infection in poultry (TSV, Article 255-261) as notifiable animal disease.

Results of the investigation

In 2007, in 3 poultry flocks Salmonella Enteritidis infection was detected and the flocks were culled.

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

The incidence of Salmonella Enteritidis infection in poultry (breeding flocks and laying hens flocks) has declined steadily in the period 1994 to 2007 (from 38 to 3 infected flocks per year). The low prevalence of Salmonella spp. in flocks of laying hens in Switzerland (=1,3%) was approved by the baseline study on the prevalence of Salmonella in laying flocks of Gallus gallus in 2006.

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

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

Monitoring system

Sampling strategy

Broiler flocks

Baseline study on the prevalence of Salmonella in broiler flocks of Gallus gallus referring to the Commission Regulation (EC) No. 2160/ 2003, Commission Decision 2005/ 636/ EC and technical specification SANCO/ 1688/ 2005 Rev.1. From the 31.01.2007 until the 04.12.2007 in total 299 broiler flocks were sampled at the end of their production period, within 3 weeks before slaughter. The study was conducted in a randomized sample of 295 holdings drawn out of all holdings with a size of at least 4000 broiler places.

Frequency of the sampling

Broiler flocks: Before slaughter at farm

Sampling distributed evenly throughout the year

Type of specimen taken

Broiler flocks: Before slaughter at farm

Socks/ boot swabs

Methods of sampling (description of sampling techniques)

Broiler flocks: Before slaughter at farm

5 pairs of boot swabs per flock (each pair was taken in minimum 100m in a different

sector of the stable).

Case definition

Broiler flocks: Before slaughter at farm

Growth in microbiological culture and identification of Salmonella.

Diagnostic/ analytical methods used

Broiler flocks: Before slaughter at farm

Other: Due to the fact, that the prevalence was expected to be very low, the 5 pairs of boot swabs from one flock were pooled and then analysed.The detection method is a modification of ISO 6579 (2002), where a semisolid medium (MSRV) is used as the single selective enrichment medium.

Vaccination policy

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

Vaccination is prohibited.

Broiler flocks

Vaccination is prohibited.

Control program/ mechanisms

The control program/ strategies in place

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

Control measures in breeding flocks according to the Swiss ordinance of epizootics (TSV, Article 255-261) and Commission Regulation (EC) No. 1003/ 2005.

Broiler flocks

In 2007 the baseline study in broiler flocks was carried out (see above).
Control measures in broiler flocks according to the Swiss ordinance of epizootics (TSV, Article 255-261) and Commission Regulation (EC) No. 646/ 2007 were implemented and will be in force depart from 01.01.2009.

Notification system in place

Notifiable disease in animals according to Swiss ordinance of epizootics (TSV, Art. 5).

Results of the investigation

1 flock of the 299 was Salmonella positive. Serovar Salmonella Typhimurium was detected. The prevalence of Salmonella spp. in Swiss broiler flocks is thus 0.3%.

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

The basline study in broiler flocks in 2007 showed, that Salmonella prevalence in Switzerland is low (0,3%). With the control measures implemented depart from 01.01.2009, Switzerland wants to maintain the current situation.

Additional information

1. The industry takes responsibility for the monitoring for broiler in a system of self-auditing. 2007 the industry tested 185 (mainly pooled) samples in breeding flocks for meat production and 341 (mainly pooled) samples in broiler flocks. All results were negative.
2. Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

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	S. Hadar	S. Infantis	S. Virchow	Salmonella spp., unspecified
Gallus gallus (fowl)										
parent breeding flocks for meat production line	poultry industry (1)	single	227	0						

Footnote

(1) poultry industry = surveillance of salmonella in poultry industry in a system of self-auditing. Unfortunately the data of the different organisations are not yet delivered in the necessary detail. The mentioned number in "units tested" are the numbers of tests in total (and can therefore be single units up to flocks).

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Gallus gallus (fowl)							
laying hens	Swiss zoonoses report 2007 (2)	holding	521	3	3		
broilers							
sampling in the framework of the broiler baseline study	Swiss zoonoses report 2007 (2)	flock	299	1		1	
unspecified	poultry industry (1)	single	341	0			

Footnote

(1) Poultry industry = surveillance of salmonella in poultry industry in a system of self-auditing; sample units from the poultry industry are neither single nor flock => samples are often pooled.
(2) The 521 holdings are 480 holdings with more then 1000 laying hens and 41 holdings with more then 250 breeding animals. Further information see Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

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

2.1.5. Salmonella in feedingstuffs

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.

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 foodstuff derived from poultry

Sampling strategy used in monitoring

Frequency of the sampling

The samples were taken as a part of the national monitoring scheme for antimicrobial resistance in Switzerland. 415 samples of fresh broiler meat were collected by the food safety inspectors of the cantonal laboratories from January to December 2007 in randomly selected retail stores throughout Switzerland. According to the market share two third of the samples were taken from meat of domestic production and one third from imported broiler meat, two third from refrigerated and one third from frozen meat.
Monitoring for antimicrobial resistance in food from animal origin will focus on a different animal species each year. Therefore meat from poultry, pig and beef will be sampled alternately.

Type of specimen taken

fresh meat

Methods of sampling (description of sampling techniques)

Official sampling of raw broiler meat (whole chickens as well as parts such as cutlet, meat cut into strips, legs, drumsticks, wings and breast / pure or marinated or spiced) not more than one sample of the same product category being taken in each branch.

Procedures for the selection of isolates for antimicrobial testing

All positive Salmonella isolates were submitted to susceptibility testing.

Methods used for collecting data

Salmonella strains were isolated at nine regional laboratories. The isolates were sent to the Centre for Zoonoses, Bacterial Animal Diseases and Antibiotic Resistance, University of Bern, Switzerland for phenotypical verification, serotyping and susceptibility testing.

Laboratory methodology used for identification of the microbial isolates

Bacteriological culture according to the descriptions of the Swiss Food Manual 2007 (ISO 6579:2002).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Apramycin, Amoxicillin/ Clavulanic Acid(2:1), Cephalotin, Chloramphenicol, Ciprofloxacin, Colistin, Florfenicol, Gentamicin, Nalidixic Acid, Neomycin, Sulfamethoxazole, Spectinomycin, Streptomycin, Trimethoprim/ Sulfamethoxazole (1:19), Tetracyclin, Ceftiofur.

Breakpoints used in testing

Ampicillin, ≥ 4 µg/ ml; Apramycin, ≥ 32 µg/ ml; Amoxicillin/ Clavulanic Acid, ≥ 32 µg/ ml; Cephalotin, ≥ 32 µg/ ml; Chloramphenicol, ≥ 32 µg/ ml; Ciprofloxacin, ≥ 0.125 µg/ ml; Colistin, ≥ 16 µg/ ml; Florfenicol, ≥ 32 µg/ ml; Gentamicin, ≥ 16 µg/ ml; Nalidixic Acid ≥ 32 µg/ ml; Neomycin, ≥ 16 µg/ ml; Sulfamethoxazole, ≥ 512 µg/ ml; Spectinomycin, ≥ 128 µg/ ml; Streptomycin, ≥ 32 µg/ ml; Trimethoprim/ Sulfamethoxazole, ≥ 4µg/ ml; Tetracyclin, ≥ 16 µg/ ml; Ceftiofur, ≥ 8 µg/ ml

Preventive measures in place

No specific measures for antimicrobial resistance in Salmonella. General preventive measures include education of veterinarians and farmers, disease eradication programmes, incentives for good farming practice and limitation of use of antimicrobials to veterinary prescription.

Control program/ mechanisms

The control program/ strategies in place

None

Suggestions to the Community for the actions to be taken

Currently no specific action necessary.

Measures in case of the positive findings or single cases

No measures

Results of the investigation

The Salmonella strains showed high levels of resistance for ciprofloxacin (88 %), nalidixic acid (88%), spectinomycin (76%), sulfamehtoxazol (72%), tetracyclin (64%) and streptomycin (60%). 72% of the Isolates were resistant to > 4 antimicrobials, 2 isolates (8%) were fully senitive.

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

24 of the 25 tested Salmonella strains were isolated from imported broiler meat. Thereof 15 came from Hungary, where high levels of antimicrobial resistance to nalidixic acid, streptomycin and tetracyclin occur.
The Salmonella strain from broiler meat produced in Switzerland was an S. Infantis with resistance against ciprofloxacin, nalidixic acid, sulfamethoxacol, spectinomycin, streptomycin and tetracyclin.

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

High prevalence of ciprofloxacin resistance in Salmonella isolates is giving cause for concern because ciprofloxacin is used as first choice drug for antimicrobial therapy of Salmonella infections in patients

at risk.

Additional information

See: Antibiotikaresistenzmonitoring - Jahresbericht 2007
on http:/ / www.bvet.admin.ch/ gesundheit_tiere/ 00293/ 00296/ index.html?lang=de

Table Antimicrobial susceptibility testing of Salmonella spp. in food

n = Number of resistant isolates

Salmonella spp.

	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Meat from other poultry species	
Isolates out of a monitoring programme	yes									
Number of isolates available in the laboratory	25									
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides										
Apramycin	25	0								
Gentamicin	25	1								
Neomycin	25	0								
Spectinomycin	25	19								
Streptomycin	25	15								
Amphenicols										
Chloramphenicol	25	3								
Florfenicol	25	15								
Cephalosporins										
Ceftiofur	25	0								
Cephalothin	25	2								
Fluoroquinolones										
Ciprofloxacin	25	22								
Fully sensitive	25	2								
Penicillins										
Amoxicillin / Clavulanic acid	25	1								
Ampicillin	25	3								
Polymyxins										
Colistin	25	0								
Quinolones										
Nalidixic acid	25	22								
Resistant to 1 antimicrobial	25	0								
Resistant to 2 antimicrobials	25	3								
Resistant to 3 antimicrobials	25	2								
Resistant to 4 antimicrobials	25	0								
Resistant to >4 antimicrobials	25	18								
Sulfonamides										
Sulfamethoxazol	25	18								
Tetracyclines										
Tetracyclin	25	16								
Trimethoprim + sulfonamides										

Table Antimicrobial susceptibility testing of Salmonella spp. in Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	Salmonella spp.
	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	25

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																			
				<=0.03	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Apramycin	16	25	0							25													
Gentamicin	8	25	1					24					1										
Neomycin	8	25	0						25														
Spectinomycin	64	25	19										2	2	2		19						
Streptomycin	16	25	15							4		1	5	12	1	2							
Amphenicols																							
Chloramphenicol	16	25	3								1	16	5	2		1							
Florfenicol	4	25	15								10	9	5	1									
Cephalosporins																							
Ceftiofur	4	25	0				6		14	5													
Cephalothin	16	25	2						3		9	9	2		2								
Fluoroquinolones																							
Ciprofloxacin	0.06	25	22	3			5	11	5	1													
Penicillins																							
Amoxicillin / Clavulanic acid	16	25	1						22			1	1	1									
Ampicillin	16	25	3					6		12	4				3								
Polymyxins																							
Colistin	8	25	0							25													
Quinolones																							
Nalidixic acid	16	25	22								3						22						
Sulfonamides																							
Sulfamethoxazol	256	25	18											7						18			

Tetracyclines																								
Tetracyclin	8		25	16						6		2	1			16								
Trimethoprim + sulfonamides	0																							

Footnote

24 isolates from imported broiler meat
1 isolate from domestic broiler meat production

Table Breakpoints for antibiotic resistance testing in Food

Test Method Used

Broth dilution

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	CLSI M7-A6 (M100-S15)	8	16	16	2	64				
Florfenicol	ARBAO-II 2005	2	4	4	2	64				
Tetracyclines										
Tetracyclin	CLSI M7-A6 (M100-S15)	4	8	8	2	32				
Cephalosporins										
Cephalothin	CLSI M7-A6 (M100-S15)	8	16	16	2	64				
Ceftiofur	ARBAO-II 2005	2	4	4	0.5	8				
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin (1)		0.03	0.06	0.06	0.03	4				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI M7-A6 (M100-S15)	16		16	8	128				
Trimethoprim										
Sulfonamides										
Sulfonamide										
Sulfamethoxazol	CLSI M7-A6 (M100-S15)	256		256	64	1024				
Aminoglycosides										
Streptomycin	Sensititre	8	16	16	4	64				
Gentamicin	CLSI M7-A6 (M100-S15)	4	8	8	1	32				
Neomycin	CLSI M7-A6 (M100-S15)	8		8	2	32				
Kanamycin										
Apramycin	DANMAP 2004	16		16	4	64				
Spectinomycin	DANMAP 2004	64		64	4	128				
Trimethoprim + sulfonamides										
Trimethoprim + Sulfamethoxazol	CLSI M7-A6 (M100-S15)	2		2	1	8				
Penicillins										
Amoxicillin / Clavulanic acid	CLSI M7-A6 (M100-S15)	8	16	16	2	32				
Ampicillin	CLSI M7-A6 (M100-S15)	8	16	16	1	32				
Polymyxins										
Colistin	DANMAP 2004	8		8	4	64				

(1) : Breakpoint resistent >=0.125 microg/ ml; Aarestrup et al. 2003, Antimicrob. Agents Chemother. 47:827-829

2.2. CAMPYLOBACTERIOSIS

2.2.1. General evaluation of the national situation

A. Thermophilic Campylobacter general evaluation

History of the disease and/ or infection in the country

Since 1997 Campylobacter infection in humans is the main food-associated infection in Switzerland and Campylobacteriosis cases are still increasing. In 2007, 6113 cases of campylobacteriosis were reported in humans. With a rate of 80.5 reports per 100,000 inhabitants, campylobacteriosis was reported more than two-and-a-half times more often than salmonellosis (23.9 reports per 100,000 inhabitants). This is in the range of previous years.
Campylobacter spp. are predominantly transmitted to humans via the alimentary tract, water and poultry being the primary sources. An important approach to controlling the rate of infection in humans is therefore to prevent the colonisation of broilers by Campylobacter, so that the pathogen does not even enter the abattoir and thus the food chain.

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

Human as well as animal cases are notifiable.
The prevalence of Campylobacter in broilers is monitored since 2002 as part of a monitoring program on antimicrobial resistance. For this purpose cloacal swabs are taken at slaughter. 139 of the 320 samples tested in 2007 were Campylobacter positive (43%). The prevalence of Campylobacter spp. in broiler production increased significant in 2007 compared with previous years (2006: 26%; 2005: 23%; 2004: 26%; 2003: 25%) and reached again the level of the significant higher prevalence in the year 2002 (42%). A national survey in broiler meat at retail showed a similar prevalence (44%).
Cases of Campylobacter in animals are reported to the FVO by the cantonal veterinarians. In 2007, 6 cases of campylobacteriosis were reported by cantonal veterinarians (5 in dogs and 1 in cats).
In the diagnostic laboratories, a total of 3538 samples were tested for campylobacteriosis.

Recent actions taken to control the zoonoses

Notifiable disease in animals according to Swiss ordinance of epizootics (TSV, Art. 5).

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.2.2. Campylobacteriosis in humans

2.2.3. Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Monitoring system

Sampling strategy

At retail

Sampling of broiler meat and meat products at retail during the year 2007. The samples were taken as a part of the national monitoring scheme for antimicrobial resistance in Switzerland. 414 samples of fresh broiler meat were collected by the food safety inspectors of the cantonal laboratories from January to December 2007 in randomly selected retail stores throughout Switzerland. According to the market share 60% of the samples were taken from meat of domestic production (245 samples) and 30% were imported broiler meat (167 samples). The origin of two samples was unknown. 70% of the samples were refrigerated and 30% were frozen.

Frequency of the sampling

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At retail

Fresh meat

Methods of sampling (description of sampling techniques)

At retail

Official sampling of raw broiler meat (whole chickens as well as parts such as cutlet, meat cut into strips, legs, drumsticks, wings and breast / pure or marinated or spiced) not more than one sample of the same product category being taken in each branch.

Definition of positive finding

At retail

Bacterial growth and identification by interpretation of gram staining, oxidase-katalyse-tests and hippurat- and indoxylacetate-hydrolysis.

Diagnostic/ analytical methods used

At retail

Bacteriological method: Enrichment of bacteria during 24h at 43°C with Campylobacter Enrichment Broth (Biolife) and cultivation on Campylosel agar plates (bioMérieux, France).

Preventive measures in place

The poultry industry incentivises farmers to lower the Campylobacter burden by incentives for negative herds at slaughter. No immunoprophylactic methods allowed.

Measures in case of the positive findings or single cases

Notification mandatory; no measures are taken.

Notification system in place

Campylobacteriosis is a notifiable disease in animals according to Swiss ordinance of epizootics (TSV, Art. 5).

Results of the investigation

181 from the 414 (43,7%) samples were Campylobacter positive. Products originating from Switzerland had a slightly higher prevalence then the imported products (45.7 versus 41.1%). 150 of the 181 positive samples were further characterised: 109 samples were C. jejuni, 37 samples were C. coli and 4 samples could not be further specified.

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

Since the last study comparable to this one in 2002, the prevalence of Campylobacter in poultry meat has increased significantly.

Additional information

1. Imported poultry meat from third countries is controlled by the border veterinarian service and randomly sampled for Campylobacter and Salmonella. To test for Campylobacter spp., 79 samples (98% of the imported meat came from Brazil) were taken in 2007. In 1 sample (=1,3%) Campylobacter jejuni was detected. Different from the previous years, imported meat from the EU was no longer tested at the border, therefore there are no data available.
2. Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. coli	C. lari	C. upsaliensis	C. jejuni	Thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus)	Swiss zoonoses report 2007 (1)	single	25g	414	181	37			109	35

Footnote

(1) Data from the official 1 year study of broiler products at retail, see also Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.2.4. Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

The analysis of Campylobacter prevalence in broilers is part of a national monitoring program for antimicrobial resistance in Swiss food-producing animals. The program follows the EU Directive on the monitoring of zoonoses and zoonotic agents (2003/ 99/ EC).

Frequency of the sampling

At slaughter

Other: From March to May 2007, 320 broilers were sampled at 5 abattoirs representing more than 95% of the Swiss broiler production. One-hundred and sixty slaughter groups were randomly selected, two animals per group were included in the monitoring.

Type of specimen taken

At slaughter

Other: Cloacal swabs of single birds.

Methods of sampling (description of sampling techniques)

At slaughter

In 2007 160 herds of broilers were randomly selected. From each herd 2 specimens were sampled by collecting cloacal swabs (Transport Swabs, Oxoid TS0001A, AMIES W/ O CH). The swabs were analysed at one single Lab for the presence of Campylobacter spp..

Case definition

At slaughter

Bacterial growth and identification by interpretation of gram staining, oxidase-katalyse-tests and hippurat- and Indoxylacetate-hydrolysis.

Diagnostic/ analytical methods used

At slaughter

Bacteriological method: Enrichment of bacteria during 24h at 43°C with Campylobacter Enrichment Broth (Biolife) and cultivation on Campylosel agar plates (bioMérieux, France).

Vaccination policy

No vaccination available.

Other preventive measures than vaccination in place

The poultry industry incentivises farmers to lower the Campylobacter burden by incentives for negative herds at slaughter. No immunoprophylactic methods allowed.

Measures in case of the positive findings or single cases

Mandatory notification; no measures are taken.

Notification system in place

Notifiable disease in animals according to Swiss Regulation of epizootics (TSV, Art. 5).

Results of the investigation

139 of the 320 samples tested in 2007 were Campylobacter positive (43%).

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

The prevalence of Campylobacter spp. in broiler production remained stable at approximately 25% over the last years (2006: 26%; 2005: 23%; 2004: 26%; 2003: 25%). Now in 2007, the prevalence increased significantly to 43% and reached again the level of the significant higher prevalence in the year 2002 (42%).

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

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
Gallus gallus (fowl)									
broilers									
- at slaughterhouse	Monotoring programme for antimicrobial resistance in broilers (1)	single	320	139	121	17			1

Footnote

(1) Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.2.5. Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in cattle

Sampling strategy used in monitoring

Methods used for collecting data

B. Antimicrobial resistance in Campylobacter jejuni and coli in pigs

Sampling strategy used in monitoring

Frequency of the sampling

As a part of the permanent national monitoring scheme for antimicrobial resistance in Swiss food-producing animals 100 pigs were sampled from February to April 2007 at two major abattoirs. Slaughter groups were randomly selected, one animal per group was included in the monitoring.

Type of specimen taken

Fecal samples

Methods of sampling (description of sampling techniques)

Fecal samples were taken from the colon along the slaughter line after the evisceration of the carcasses using a swab in standard transportation medium (Transport Swabs, Oxoid TS0001A, AMIES W/ O CH). Immediately after collection, the samples were cooled and brought to the laboratory for analysis.

Procedures for the selection of isolates for antimicrobial testing

From each sample and campylobacter subtype, one isolate was submitted to susceptibility testing.

Methods used for collecting data

All samples were analysed in the same laboratory (Centre for Zoonoses, Bacterial Animal Diseases and Antibiotic Resistance, University of Bern, Switzerland).

Laboratory methodology used for identification of the microbial isolates

Samples were cultured for Campylobacter spp. within 72 h after sampling using standard microbiological procedures. Enrichment of bacteria during 24h at 43°C with Campylobacter Enrichment Broth (Biolife) and cultivation on Campylosel agar plates (bioMérieux, France).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Amoxicillin/ Clavulanic acid, Chloramphenicol, Ciprofloxacin, Erythromycin, Florfenicol, Gentamicin, Meropenem, Nalidixic acid, Neomycin, Streptomycin, Tetracyclin

Breakpoints used in testing

Resistance was defined following the breakpoints published in approved literature (ARBAO-II 2005, CLSI M7-A6 and M100-S15, DANMAP 2004 and FDA 2002): Ampicillin, ≥ 32 µg/ ml; Amoxicillin/ Clavulanic acid, ≥ 32/ 16 µg/ ml; Chloramphenicol, ≥ 32 µg/ ml; Ciprofloxacin, ≥ 4 µg/ ml; Erythromycin, ≥ 32 µg/ ml; Florfenicol, ≥ 32 µg/ ml; Gentamicin, ≥ 16 µg/ ml; Meropenem, ≥ 16 µg/ ml; Nalidixic acid, ≥ 64 µg/ ml; Neomycin, ≥ 16 µg/ ml; Streptomycin, ≥ 16 µg/ ml; Tetracyclin, ≥ 16 µg/ ml

Preventive measures in place

No specific preventive measures for antimicrobial resistance in campylobacter. General preventive measures include education of veterinarians and farmers, disease eradication programmes, incentives for good farming practice and limitation of use of antimicrobials to veterinary prescription.

Control program/ mechanisms

Suggestions to the Community for the actions to be taken

Currently no specific action necessary

Measures in case of the positive findings or single cases

No measures

Notification system in place

No notification system

Results of the investigation

46 Campylobacter coli isolates from pigs were subjected to susceptibility testing.
A high prevalence of resistance was observed in Campylobacter coli from pigs. 6.5% of the isolates were fully sensitive for all tested antimicrobials. Resistance to streptomycin was common (84.4% of isolates resistant). In addition, a substantial percentage of isolates was resistant to fluoroquinolones (30.4%), macrolides (10.9%) and tetracyclin (37%).

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

The high prevalence of resistance can partially be explained by the fact that C. coli is the predominant campylobacter species in pigs. C. coli are known to be more frequently resistant and to exhibit multidrug resistance more often than C. jejuni.
The results were similar to those of 2006.

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

Consumption of pork amounted to 25.4kg per person in the year 2007. This corresponds to 42% of the total meat consumption. Even though the prevalence of campylobacter is substantially reduced during

the meat processing, pork can not be neglected as a source of resistant campylobacter for humans. Approximately 5% of human campylobacter infections in Switzerland are caused by C. coli. For these infections, pigs are a possible source. The large percentage of isolates resistant to fluoroquinolones, macrolides and tetracyclin is of concern, because these antimicrobials are used to treat human campylobacter infections.

Additional information

See: Antibiotikaresistenzmonitoring 2007 - Jahresbericht on
http:/ / www.bvet.admin.ch/ gesundheit_tiere/ 00293/ 00296/ index.html?lang=de

C. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Sampling strategy used in monitoring

Frequency of the sampling

As a part of the permanent national monitoring scheme for antimicrobial resistance in Swiss food-producing animals, 320 broilers were sampled from March to Mai 2007 at 5 abattoirs representing more than 95% of the Swiss broiler production. One-hundred and sixty slaughter groups were randomly selected, two animals per group were included in the monitoring.

Type of specimen taken

Cloacal swabs of single birds

Methods of sampling (description of sampling techniques)

Cloacal swabs were collected after stunning, using a swab in standard transportation medium (Transport Swabs, Oxoid TS0001A, AMIES W/ O CH). Immediately after collection, the samples were cooled and sent to the laboratory for analysis.

Procedures for the selection of isolates for antimicrobial testing

From each sample and campylobacter subtype, one isolate was submitted to susceptibility testing.

Methods used for collecting data

All samples were analysed in the same laboratory (Centre for Zoonoses, Bacterial Animal Diseases and Antibiotic Resistance, University of Bern, Switzerland).

Laboratory methodology used for identification of the microbial isolates

Samples were cultured for Campylobacter spp. within 72 h after sampling using standard microbiological procedures. Enrichment of bacteria during 24h at 43°C with Campylobacter Enrichment Broth (Biolife) and cultivation on Campylosel agar plates (bioMérieux, France).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Amoxicillin/ Clavulanic acid, Chloramphenicol, Ciprofloxacin, Erythromycin, Florfenicol, Gentamicin, Meropenem, Nalidixic acid, Neomycin, Streptomycin, Tetracyclin

Breakpoints used in testing

Resistance was defined following the breakpoints published in approved literature (ARBAO-II 2005, CLSI M7-A6 and M100-S15, DANMAP 2004 and FDA 2002): Ampicillin, ≥ 32 µg/ ml; Amoxicillin/ Clavulanic acid, ≥ 32/ 16 µg/ ml; Chloramphenicol, ≥ 32 µg/ ml; Ciprofloxacin, ≥ 4 µg/ ml; Erythromycin, ≥ 32 µg/ ml; Florfenicol, ≥ 32 µg/ ml; Gentamicin, ≥ 16 µg/ ml; Meropenem, ≥ 16 µg/ ml; Nalidixin acid, ≥ 64 µg/ ml; Neomycin, ≥ 16 µg/ ml; Streptomycin, ≥ 16 µg/ ml; Tetracyclin, ≥ 16 µg/ ml

Preventive measures in place

No specific preventive measures for antimicrobial resistance in campylobacter. General preventive measures include education of veterinarians and farmers, disease eradication programmes, incentives for good farming practice and limitation of use of antimicrobials to veterinary prescription

Control program/ mechanisms

Suggestions to the Community for the actions to be taken

Currently no specific action necessary

Measures in case of the positive findings or single cases

No measures

Notification system in place

No notification system

Results of the investigation

122 C. jejuni and 17 C. coli isolates from broilers were subjected to susceptibility testing.
The highest proportions of resistant isolates were found for ciprofloxacin, nalidixic acid and tetracyclin with prevalences between 14.8 – 23.5%. For C. coli additionally relatively high levels of resistance for streptomycin (23.5%) could be detected.
70.2% of the C. jejuni isolates and 58.9% of the C. coli isolates were fully sensitive for all tested antimicrobials.

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

Resistance in campylobacter from poultry has been monitored in Switzerland since 2002. Since then different trends can be observed for different antimicrobials. Prevalence of resistance is constantly low for erythromycin, amoxicillin and gentamicin. After an increase of the prevalence of resistance for ampicillin and streptomycin in 2006 a decrease could be observed in 2007 again. The prevalence of resistance for tetracyclin and ciprofloxacin has increased in former years and seems to be stable now. However these findings must be interpreted with caution because with the introduction of the national monitoring scheme the laboratory was changed and some breakpoints were adapted.

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

source of infection)

Consumption of poultry meat was 9.6 kg per person in 2007, which corresponds to 16% of total meat consumption. About 40% of the poultry meat consumed in Switzerland is imported (34.4 % from Brazil, 21.1% from Germany, 12.7% from France, 9.7% from Hungary and 6.3% from Poland). Campylobacter survives well in poultry meat, therefore broilers are an important source of human infection with Campylobacter jejuni. It is thus important for public health to maintain the favorable resistance situation in campylobacter in broilers. In addition to Swiss broiler meat production, imported poultry meat should be monitored for antimicrobial resistance. A survey performed in 2002 and in 2007 showed a higher prevalence of resistance in imported poultry meat compared to Swiss production.

Additional information

See: Antibiotikaresistenzmonitoring 2007 - Jahresbericht on
http:/ / www.bvet.admin.ch/ gesundheit_tiere/ 00293/ 00296/ index.html?lang=de

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

Sampling strategy used in monitoring

Frequency of the sampling

The samples were taken as a part of the national monitoring scheme for antimicrobial resistance in Switzerland. See: Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Type of specimen taken

fresh meat. See: Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Methods of sampling (description of sampling techniques)

See: Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Procedures for the selection of isolates for antimicrobial testing

From each sample and campylobacter subtype, one isolate was submitted to susceptibility testing.

Methods used for collecting data

Campylobacter strains were isolated at nine regional laboratories. The isolates were sent to the Centre for Zoonoses, Bacterial Animal Diseases and Antibiotic Resistance, University of Bern, Switzerland for phenotypical verification, differentiation and susceptibility testing.

Laboratory methodology used for identification of the microbial isolates

Bacteriological culture according to the descriptions of the Swiss Food Manual 2007 (ISO 10272-1:2006).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Amoxicillin/ Clavulanic acid, Chloramphenicol, Ciprofloxacin, Erythromycin, Florfenicol, Gentamicin, Meropenem, Nalidixic acid, Neomycin, Streptomycin, Tetracyclin

Breakpoints used in testing

Resistance was defined following the breakpoints published in approved literature (ARBAO-II 2005, CLSI M7-A6 and M100-S15, DANMAP 2004 and FDA 2002): Ampicillin, ≥ 32 µg/ ml; Amoxicillin/ Clavoulanic acid, ≥ 32 µg/ ml; Chloramphenicol, ≥ 32 µg/ ml; Ciprofloxacin, ≥ 4 µg/ ml; Erythromycin, ≥ 32 µg/ ml; Florfenicol, ≥ 32 µg/ ml; Gentamicin, ≥ 16 µg/ ml; Meropenem, ≥ 16 µg/ ml; Nalidixic acid, ≥ 64 µg/ ml; Neomycin, ≥ 16 µg/ ml; Streptomycin, ≥ 16 µg/ ml; Tetracyclin, ≥ 16 µg/ ml

Preventive measures in place

No specific measures for antimicrobial resistance in Campylobacter. General preventive measures include education of veterinarians and farmers, disease eradication programmes, incentives for good farming practice and limitation of use of antimicrobials to veterinary prescription.

Control program/ mechanisms

Suggestions to the Community for the actions to be taken

Currently no specific action necessary

Measures in case of the positive findings or single cases

No measures

Notification system in place

No notification system

Results of the investigation

Susceptibility testing was performed on 109 C. jejuni and 37 C. coli isolates. The highest proportions of resistant isolates were found for ciprofloxacin, nadixic acid and tetracyclin with prevalences between 27.5 – 51.5%. For C. coli additionally relatively high levels of resistance for streptomycin (27%) could be detected.
54.1% of the C. jejuni isolates and 24.3% of the C. coli isolates were fully sensitive for all tested antimicrobials.

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

The proportion of resistant isolates from imported broiler meat was significantly higher for ampicillin, ciprofloxacin, nalidixic acid and tetracyclin than from broiler meat of Swiss origin. The proportion of fully sensitive Campylobacter isolates was higher for isolates from broiler meat of domestic production (54.4%) than from imported meat (35.1 %).
In comparison with the results of a similar survey in 2002 the proportion of resistant C. jejuni isolates

for tetracyclin seems to have increased. The level of resistance for the other tested antimicrobials is similar. However these findings must be interpreted with caution because with the introduction of the national monitoring scheme the laboratory was changed and some breakpoints were adapted

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

Consumption of poultry meat was 9.6 kg per person in 2007, which corresponds to 16% of total meat consumption. About 40% of the poultry meat consumed in Switzerland is imported (34.4 % from Brazil, 21.1% from Germany, 12.7% from France, 9.7% from Hungary and 6.3% from Poland). Campylobacter survives well in poultry meat, therefore broilers are an important source of human infection with C. jejuni. It is thus important for public health to maintain the favorable resistance situation in campylobacter in broilers.

Additional information

See: Antibiotikaresistenzmonitoring 2007 - Jahresbericht on
http:/ / www.bvet.admin.ch/ gesundheit_tiere/ 00293/ 00296/ index.html?lang=de

Table Antimicrobial susceptibility testing in C. coli

n = Number of resistant isolates				
	C. coli			
	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling		**Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling**	
Isolates out of a monitoring programme	yes		yes	
Number of isolates available in the laboratory	46		17	
Antimicrobials:	**N**	**n**	**N**	**n**
Aminoglycosides				
Gentamicin	46	0	17	0
Neomycin	46	0	17	0
Streptomycin	46	39	17	4
Amphenicols				
Chloramphenicol	46	0	17	0
Florfenicol	46	0	17	0
Carbapenems				
Meropenem	46	0	17	0
Fluoroquinolones				
Ciprofloxacin	46	14	17	4
Fully sensitive	46	3	17	10
Macrolides				
Erythromycin	46	5	17	0
Penicillins				
Amoxicillin / Clavulanic acid	46	0	17	0
Ampicillin	46	1	17	1
Quinolones				
Nalidixic acid	46	14	17	4
Resistant to 1 antimicrobial	46	14	17	3
Resistant to 2 antimicrobials	46	18	17	0
Resistant to 3 antimicrobials	46	5	17	3
Resistant to 4 antimicrobials	46	5	17	1
Resistant to >4 antimicrobials	46	1	17	0
Tetracyclines				
Tetracyclin	46	17	17	3

Table Antimicrobial susceptibility testing of C. coli in Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	C. coli
	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	46

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	8	46	0			36	10																
Neomycin	8	46	0					46															
Streptomycin	8	46	39					5		1		1	10	15	7	7							
Amphenicols																							
Chloramphenicol	16	46	0							10	26	10											
Florfenicol	16	46	0				1		30	14	1												
Carbapenems																							
Meropenem	8	46	0			46																	
Fluoroquinolones																							
Ciprofloxacin	2	46	14	1	14	11	6				3	7	4										
Macrolides																							
Erythromycin	16	46	5					5	13	15	7	1			5								
Penicillins																							
Amoxicillin / Clavulanic acid	16	46	0				3	17		18	7	1											
Ampicillin	16	46	1						5	10	22	4	4		1								
Quinolones																							
Nalidixic acid	32	46	14							2	22	8			1	10	3						
Tetracyclines																							
Tetracyclin	8	46	17			8		14	4	2	1		8	4	5								

Table Antimicrobial susceptibility testing of C. coli in Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	C. coli Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	17

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																			
				<=0.03	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	8	17	0			14		3															
Neomycin	8	17	0					17															
Streptomycin	8	17	4					13					1	1	2								
Amphenicols																							
Chloramphenicol	16	17	0							1	15	1											
Florfenicol	16	17	0						6	10	1												
Carbapenems																							
Meropenem	8	17	0			17																	
Fluoroquinolones																							
Ciprofloxacin	2	17	4		3	10						2	2										
Macrolides																							
Erythromycin	16	17	0			2		5	5	5													
Penicillins																							
Amoxicillin / Clavulanic acid	16	17	0					6		7	4												
Ampicillin	16	17	1							5	7	2	2		1								
Quinolones																							
Nalidixic acid	32	17	4								10	3			2	2							
Tetracyclines																							
Tetracyclin	8	17	3			3		6	1	3	1				3								

Table Antimicrobial susceptibility testing of C. coli in Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	C. coli
	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	37

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	8	37	0			33		4															
Neomycin	8	37	0					36				1											
Streptomycin	8	37	10					27					3	3		4							
Amphenicols																							
Chloramphenicol	16	37	0							8	16	13											
Florfenicol	16	37	0						11	16	10												
Carbapenems																							
Meropenem	8	37	0			37																	
Fluoroquinolones																							
Ciprofloxacin	2	37	17		4	11	5				4	6	7										
Macrolides																							
Erythromycin	16	37	2			6		8	9	7	5				2								
Penicillins																							
Amoxicillin / Clavulanic acid	16	37	0					1	7	10	17	2											
Ampicillin	16	37	1						2	5	9	13	7		1								
Quinolones																							
Nalidixic acid	32	37	17								7	13			2	10	5						
Tetracyclines																							
Tetracyclin	8	37	19			6		6	4	1		1			19								

Footnote

18 isolates from imported broiler meat

19 isolates from domestic broiler meat production

Table Antimicrobial susceptibility testing in C. coli

n = Number of resistant isolates	C. coli	
	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling	
Isolates out of a monitoring programme	yes	
Number of isolates available in the laboratory	37	
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	37	0
Neomycin	37	0
Streptomycin	37	10
Amphenicols		
Chloramphenicol	37	0
Florfenicol	37	0
Carbapenems		
Meropenem	37	0
Fluoroquinolones		
Ciprofloxacin	37	17
Fully sensitive	37	9
Macrolides		
Erythromycin	37	2
Penicillins		
Amoxicillin / Clavulanic acid	37	0
Ampicillin	37	1
Quinolones		
Nalidixic acid	37	17
Resistant to 1 antimicrobial	37	10
Resistant to 2 antimicrobials	37	4
Resistant to 3 antimicrobials	37	9
Resistant to 4 antimicrobials	37	4
Resistant to >4 antimicrobials	37	1
Tetracyclines		
Tetracyclin	37	19

Table Antimicrobial susceptibility testing of C. jejuni in Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	C. jejuni Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	122

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																			
				<=0.03	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	8	122	1			116		2		1		2	1										
Neomycin	8	122	3					118			1				1	2							
Streptomycin	8	122	5					110		6	1		4	1									
Amphenicols																							
Chloramphenicol	16	122	0					1		68	49	4											
Florfenicol	16	122	0				1			65	51	5											
Carbapenems																							
Meropenem	8	122	0			121					1												
Fluoroquinolones																							
Ciprofloxacin	2	122	18	1	36	56	6	2	3			6	9	3									
Macrolides																							
Erythromycin	16	122	4			21		57	27	11	2			1	3								
Penicillins																							
Amoxicillin / Clavulanic acid	16	122	0		1		14	48		55	4												
Ampicillin	16	122	5				7		10	19	59	17	5	2	3								
Quinolones																							
Nalidixic acid	32	122	21							43	52	5		1		7	14						
Tetracyclines																							
Tetracyclin	8	122	22			84		12	2			2	3	6	13								

Table Antimicrobial susceptibility testing in C. jejuni

n = Number of resistant isolates		
	C. jejuni	
	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling	
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		122
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	122	1
Neomycin	122	3
Streptomycin	122	5
Amphenicols		
Chloramphenicol	122	0
Florfenicol	122	0
Carbapenems		
Meropenem	122	0
Fluoroquinolones		
Ciprofloxacin	122	18
Fully sensitive	122	86
Macrolides		
Erythromycin	122	4
Penicillins		
Amoxicillin / Clavulanic acid	122	0
Ampicillin	122	5
Quinolones		
Nalidixic acid	122	21
Resistant to 1 antimicrobial	122	15
Resistant to 2 antimicrobials	122	5
Resistant to 3 antimicrobials	122	12
Resistant to 4 antimicrobials	122	2
Resistant to >4 antimicrobials	122	2
Tetracyclines		
Tetracyclin	122	22

Table Antimicrobial susceptibility testing in C. jejuni

n = Number of resistant isolates	C. jejuni	
	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling	
Isolates out of a monitoring programme	yes	
Number of isolates available in the laboratory	109	
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	109	0
Neomycin	109	0
Streptomycin	109	2
Amphenicols		
Chloramphenicol	109	0
Florfenicol	109	0
Carbapenems		
Meropenem	109	0
Fluoroquinolones		
Ciprofloxacin	109	32
Fully sensitive	109	59
Macrolides		
Erythromycin	109	0
Penicillins		
Amoxicillin / Clavulanic acid	109	0
Ampicillin	109	19
Quinolones		
Nalidixic acid	109	33
Resistant to 1 antimicrobial	109	14
Resistant to 2 antimicrobials	109	15
Resistant to 3 antimicrobials	109	12
Resistant to 4 antimicrobials	109	9
Resistant to >4 antimicrobials	109	0
Tetracyclines		
Tetracyclin	109	30

Table Antimicrobial susceptibility testing of C. jejuni in Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	C. jejuni
	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	109

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	8	109	0			108		1															
Neomycin	8	109	0					109															
Streptomycin	8	109	2					106		1				1		1							
Amphenicols																							
Chloramphenicol	16	109	0					5		69	30	5											
Florfenicol	16	109	0				1		65	36	7												
Carbapenems																							
Meropenem	8	109	0			107		2															
Fluoroquinolones																							
Ciprofloxacin	2	109	32	1	34	35	6			1	2	13	13	4									
Macrolides																							
Erythromycin	16	109	0			27		60	17	4	1												
Penicillins																							
Amoxicillin / Clavulanic acid	16	109	0					6	31	60	11	1											
Ampicillin	16	109	19				3		5	9	56	14	3	9	10								
Quinolones																							
Nalidixic acid	32	109	33							25	45	6			2	7	24						
Tetracyclines																							
Tetracyclin	8	109	30			51		22	1		1	4	1	2	27								

Footnote

39 isolates from imported broiler meat

70 isolates from domestic broiler meat production

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

Broth dilution

Standards used for testing

NCCLS

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	ARBAO-II 2005	16		16	1	64				
Florfenicol	ARBAO-II 2005	16		16	0.5	64				
Tetracyclines										
Tetracyclin	ARBAO-II 2005	8		8	0.25	32				
Fluoroquinolones										
Ciprofloxacin	ARBAO-II 2005	2		2	0.03	16				
Quinolones										
Nalidixic acid	ARBAO-II 2005	32		32	1	128				
Aminoglycosides										
Streptomycin	ARBAO-II 2005	8		8	1	64				
Gentamicin	ARBAO-II 2005	8		8	0.25	32				
Neomycin	ARBAO-II 2005	8		8	1	64				
Macrolides										
Erythromycin	ARBAO-II 2005	16		16	0.25	32				
Carbapenems										
Meropenem	FDA 2002	4	8	8	0.25	32				
Penicillins										
Amoxicillin / Clavulanic acid	ARBAO-II 2005	16		16	0.25	32				
Ampicillin	ARBAO-II 2005	16		16	0.5	32				

Table Breakpoints used for antimicrobial susceptibility testing in Food

Test Method Used

Broth dilution

Standards used for testing

NCCLS

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	ARBAO-II 2005	16		16	1	64				
Florfenicol	ARBAO-II 2005	16		16	0.5	64				
Tetracyclines										
Tetracyclin	ARBAO-II 2005	8		8	0.25	32				
Fluoroquinolones										
Ciprofloxacin	ARBAO-II 2005	2		2	0.03	16				
Quinolones										
Nalidixic acid	ARBAO-II 2005	32		32	1	128				
Aminoglycosides										
Streptomycin	ARBAO-II 2005	8		8	1	64				
Gentamicin	ARBAO-II 2005	8		8	0.25	32				
Neomycin	ARBAO-II 2005	8		8	1	64				
Macrolides										
Erythromycin	ARBAO-II 2005	16		16	0.25	32				
Carbapenems										
Meropenem	FDA 2002	4	8	8	0.25	32				
Penicillins										
Amoxicillin / Clavulanic acid	ARBAO-II 2005	16		16	0.25	32				
Ampicillin	ARBAO-II 2005	16		16	0.25	32				

2.3. LISTERIOSIS

2.3.1. General evaluation of the national situation

A. Listeriosis general evaluation

History of the disease and/ or infection in the country

In comparison with Salmonella and Campylobacter, Listeria represent the highest risk for a hospitalization and the second highest risk for death due to a intoxication by food. A major source of infection are milk products and cheese. Approximately 30% of the diseased people die, whereof aborted foetus have a major part.
The biggest epidemic outbreak in Switzerland was in the 80ies due to contaminated cheese of a particular variety. The first cases of this outbreak were diagnosed in 1983. However, the epidemic pattern and the cause of the infection was a long time not identified because the disease was not notifiable to that time. No more than in 1986 the contaminated cheese was identified as a source of infection. To that time 122 people diseased and 33 died.

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

Human as well as animal cases are notifiable.
A total of 57 cases (mainly babies and seniors diseased) of Listeria monocytogenes were registered 2007 with the Federal Office of Public Health and the Centre National de Référence des Listerias (CNRL). After more then 70 cases in the years 2005 and 2006, the number of cases decreased 2007 to the level of 2004. Whereas in 2005, the elevated number of cases was due in part to an outbreak in Canton Neuchatel, where cheese contaminated with Listeria monocytogenes (serotyp 1/ 2a) was sold, the increased number of cases in 2006 could not be linked to a particular outbreak.
In the year 2007, cantonal veterinarians reported 6 cases of listeriosis in animals (4 in cattle, 1 in sheep and 1 in goat). The reported cases have decreased significantly compared with the recent years. The reason for the decrease remains unclear.
The approved Swiss Veterinary Laboratories reported 54 diagnostic testings in several different animals, mainly cattle, sheep and goat.

Recent actions taken to control the zoonoses

Notifiable disease in animals according to Swiss ordinance of epizootics (TSV, Art. 5).

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.3.2. Listeriosis in humans

2.3.3. Listeria in foodstuffs

A. L. monocytogenes in food - Cheeses made from cows' milk - at processing plant - Monitoring (The same monitoring was done in processing plants producing goats semi-soft cheese.)

Monitoring system

Sampling strategy

In the national monitoring program of dairy products producers of cheese and other milk products from all over Switzerland are inspected by official food control on a regular basis. On the occasion of the inspection samples of all dairy products are taken at the end of the production line. Enterprises to be sampled are selected randomly.

Frequency of the sampling

At the production plant

Once a year

Type of specimen taken

At the production plant

Specimens are taken from cheeses (25 g) at the end of the production, before it is sold to the trader or to the consumer.

Methods of sampling (description of sampling techniques)

At the production plant

A single sample of one cheese is taken.

Definition of positive finding

At the production plant

Analysis is done in 25 grams of cheese. Growth in microbiological culture and identification of Listeria monocytogenes.

Diagnostic/ analytical methods used

At the production plant

Bacteriological method: Detection of Listeria monocytogenes according to the descriptions of the Swiss Food Manual 2005 (Chapter 56) that corresponds to ISO 11290-1 (2002) with minor deviation.

Preventive measures in place

The implementation of a hygiene concept in order to control the safety of the products is in the responsibility of the producers. All larger cheese producers run a certified quality management fulfilling ISO 9000. The federal research station Agroscope Liebefeld Posieux (ALP) is running a Listeria monitoring program for early detection of Listeria in production facilities.
In the Listeria monitoring program in 2007, 76 of 4373 (=1.6%) samples were tested Listeria monocytogenes positive. The positive results were obtained in samples from cheeses (44), milk (3), butter (2) and from the environment (27). With only two exceptions, the Listeria monocytogenes in cheese samples were found on the surface of the cheeses. In addition, in 168 samples other Listeria than Listeria monocytogenes were found.

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/ g	L. monocytogenes > 100 cfu/ g

Footnote

Unfortunately the data from the national monitoring program of dairy products from 2007 are not yet available (as at June 2nd 2008).

2.3.4. Listeria in animals

Table Listeria in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria spp.	L. monocytogenes	Listeria spp., unspecified

Footnote

2.4. E. COLI INFECTIONS

2.4.1. General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

History of the disease and/ or infection in the country

In Switzerland, surveys at slaughter showed that 14% of faecal samples from slaughter cattle and 30% of samples from slaughter sheep were STEC-positive (Stephan et al., Schweiz. Arch. Tierheilkd. 142, 110-114 (2000), Zweifel et al., Int. J. Food Microbiol. 92, 45-53 (2004)). In bovine species, it was also found that younger animals excrete more STEC than older animals. Caution is therefore needed when interpreting average figures on the occurrence of STEC for the whole cattle population.
Since 1999 the detection of enterohaemorrhagic Escherichia coli (EHEC) in human samples is notifiable. In 2005 and 2006 62 and 64 detections of EHEC were notified respectively.

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

The situation in humans (EHEC) is stable in the last years. Figures from food producing animals, show, that ruminants, especially small ruminants, are an important reservoir for STEC infections in Switzerland. In food only few data is available.

Recent actions taken to control the zoonoses

Since 1999 the detection of enterohaemorrhagic Escherichia coli (EHEC) in human samples is notifiable. Various surveys in the last years contributed to the hazard description in food producing animals.

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications). Stephan et al. (2008). Prevalence and characteristics of Shiga toxin-producing Escherichia coli in Swiss Raw Milk Cheeses Collected at Producer Level. Journal of Dairy Science (in press).

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

In the national monitoring program of dairy products producers of cheese and other milk products from all over Switzerland are inspected by official food control on a regular basis. On the occasion of the inspection samples of dairy products are taken at the end of the production lane. Enterprises to be sampled are selected randomly.

Frequency of the sampling

Selected enterprises are visited once a year.

Type of specimen taken

Other: Specimens are taken from cheeses (25 g) at the end of the production, before it is sold to the trader or to the consumer.

Methods of sampling (description of sampling techniques)

A single sample of cheese is taken.

Definition of positive finding

Detection of shiga toxin gen by PCR and in the 25 g cheese. From PCR postitive samples, STEC strains were isolated by colony hybridization.

Diagnostic/ analytical methods used

For the detection of shigatoxine producing E. coli (STEC assay), cultivated strains of E. coli were evaluated by polymerase chain reaction (PCR) with primers based on sequences targeting a region conserved between stx1 and stx2 genes.For the cultivation of E. coli 25 g cheese were enriched in 225 ml brilliant green bile broth (BBL, Cockeysville, Md.) at 37 °C for 24 h. The enrichment samples were streaked onto sheep blood agar (Difco Laboratories, Detroit, Mich.; 5% sheep blood Oxoid Ltd., Hampshire, UK), and after incubation at 37 °C for another 24 h, the colonies were washed off with 2 ml of 0.85% saline solution.
From PCR positive samples, STEC strains were isolated by colony hybridization. Strains were confirmed as E. coli by biochemical properties. By PCR, all strains were examined for the presence of stx1, stx2, rfbE, eae and ehxA genes.

Preventive measures in place

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Table VT E. coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified	Verotoxigenic E. coli (VTEC) - VTEC O22:H8
Cheeses made from cows' milk									
soft and semi-soft									
made from raw or low heat-treated milk									
- at processing plant - Monitoring	National monitoring program of dairy products (1)	single	25g	315	7	0	6		1
Cheeses made from goats' milk									
soft and semi-soft									
made from raw or low heat-treated milk									
- at processing plant - Monitoring	National monitoring program of dairy products (2)	single	25g	37	2	0	2		

Footnote

(1) the six VTEC non O157 in cheeses from cows were:
O2:H27 (2x)
O22:HNM
O109:H16
Or:HNT
ONT:HNM
(2) the two VTEC non O157 in cheeses from goats were:
ONT:H9 (2x).

2.4.4. Escherichia coli, pathogenic in animals

2.5. TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1. General evaluation of the national situation

A. Tuberculosis general evaluation

History of the disease and/ or infection in the country

Switzerland is officially acknowledged as free from bovine tuberculosis since 1959.
Freedom from disease has been proven in 1997 conducting a survey in a randomized sample of 4874 farms. 111‘394 cattle (whole holdings older than 6 months) were tuberculin tested. In 72 farms tests had to be repeated. All farms were negative.
Vaccination is prohibited. Requirements of section 3.2.3.10 of the OIE International Animal Health Code are fulfilled since 1959. Free status is recognised by EU (Bilateral Agreement on Agriculture, Veterinary Annex).

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

There are no observations that would challenge the freedom of Swiss cattle from tuberculosis.

2.5.2. Tuberculosis, Mycobacterial Diseases in humans

2.5.3. Mycobacterium in animals

A. Mycobacterium bovis in bovine animals

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

Switzerland is officially acknowledged as free from bovine tuberculosis since 1959.
Freedom from disease has been proven in 1997 conducting a survey in a randomized sample of 4874 farms. 111‘394 cattle (whole holdings older than 6 months) were tuberculin tested. In 72 farms tests had to be repeated. All farms were negative.

Control program/ mechanisms

The control program/ strategies in place

Bovine tuberculosis is regulated as a zoonoses to be eradicated (Swiss ordinance of epizootics, TSV Art. 158 - Art. 165). Notification of suspicious cases is mandatory. Actions to be taken in suspicious farms are ban of all animal traffic and investigation of the whole herd.
Official meat inspection is investigating each carcass, its organs and lymphatic tissue on the prevalence of abnormal alterations. Carcasses showing clinical signs of tuberculosis have to be destroyed.

Measures in case of the positive findings or single cases

In confirmed cases (herds) all diseased or suspicious cattle has to be slaughtered and the milk of them is disposed. The barn has to be disinfected.

Notification system in place

Bovine tuberculosis is notifiable since 1950.

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

There are no observations that would challenge the freedom of Swiss cattle population from tuberculosis.

2.6. BRUCELLOSIS

2.6.1. General evaluation of the national situation

A. Brucellosis general evaluation

History of the disease and/ or infection in the country

Switzerland is officially acknowledged as free from bovine brucellosis since 1959. Bovine brucellosis is notifiable since 1956. Vaccination is prohibited since 1961. Requirements of section 3.2.1.5 of the OIE International Animal Health Code are fulfilled since 1963. Free status is recognised by EU (Bilateral Agreement on Agriculture, Veterinary Annex). National Survey in 1997.
Switzerland's sheep and goat population is officially acknowledged as brucellosis free. Free status is recognized by EU (Bilateral Agreement on Agriculture, Veterinary Annex). National Surveys are carried out since 1998.

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

There are no observations that would challenge the freedom of Swiss cattle population from brucellosis. There are no observations that would challenge the freedom of Swiss sheep and goat population from brucellosis.

Recent actions taken to control the zoonoses

National surveys on a yearly basis are carried out to document freedom from brucellosis in sheep and goat since 1998.

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.6.2. Brucellosis in humans

2.6.3. Brucella in foodstuffs

2.6.4. Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Switzerland is officially acknowledged as free from bovine brucellosis since 1959. Bovine brucellosis is notifiable since 1956. Vaccination is prohibited since 1961. Requirements of section 3.2.1.5 of the OIE International Animal Health Code are fulfilled since 1963. Free status is recognised by EU (Bilateral Agreement on Agriculture, Veterinary Annex).
Freedom from disease has been proven in 1997 conducting a survey in a randomized sample of 4874 farms. 139‘655 cows (in general older than 24 months) were tested using serological test. There were no positive findings in these samples.

Control program/ mechanisms

The control program/ strategies in place

Brucellosis in bovine animals is regulated as zoonoses to be eradicated (Swiss ordinance of epizootics, TSV Art. 150 - Art. 157). Notification of suspicious cases is mandatory. Actions to be taken in suspicious farms are ban of all animal traffic and investigation of the whole herd as well as the placenta of calving cows.
Official meat inspection is investigating each carcass, its organs and lymphatic tissue on the prevalence of abnormal alterations. Carcasses showing clinical signs of brucellosis have to be destroyed.

Measures in case of the positive findings or single cases

In confirmed cases (herds) all diseased cattle has to be killed. All placentas, abortion material and the milk of diseased and suspicious cows has to be disposed. The barn has to be disinfected.

Notification system in place

Notification of suspicious cases and outbreaks is mandatory since 1956.

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

There are no observations that would challenge the freedom of Swiss cattle population from brucellosis.

B. Brucella melitensis in sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Freedom from disease has been proved every year since 1998 conducting a survey in a randomized sample of farms. Free status is recognized by EU (Bilateral Agreement on Agriculture, Veterinary Annex).

Control program/ mechanisms

The control program/ strategies in place

Brucellosis in sheep and goats is regulated as zoonoses to be eradicated (Swiss ordinance of epizootics, TSV Art. 190 - Art. 195). Notification of suspicious cases is mandatory. Actions to be taken in suspicious farms are ban of all animal traffic and the investigation of the whole herd.
Official meat inspection is investigating each carcass, its organs and lymphatic tissue on the prevalence of abnormal alterations. Carcasses showing clinical signs of brucellosis have to be destroyed and farms of origin are investigated.
Freedom from disease has been documented every year since 1998 conducting a survey in a randomized sample of farms. In 2007 a randomized sample of 758 farms with sheep and 387 farms with goats were included in the survey. 11'460 samples from sheep and 2'506 samples from goats were tested using serological test. There were no positive findings in these samples. EU regulation 91/ 68/ EEC that defines populations of sheep and goat as one epidemiological unit is the basis of the survey. Scientific basis is published by Hadorn et al. 2002: Risk-based design of repeated surveys for the documentation of freedom from non-highly contagious diseases. Preventive Veterinary Medicine (2002) 56: 179.192.

Measures in case of the positive findings or single cases

In confirmed cases (herds) the whole herd has to be killed immediately. All placentas, abortion material and the milk of diseased and suspicious animals have to be disposed. The barn has to be disinfected.

Notification system in place

Notification of suspicious cases and outbreaks is mandatory since 1966.

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

There are no observations that would challenge the freedom of Swiss sheep population from brucellosis.

C. Brucella melitensis in goats

Status as officially free of caprine brucellosis during the reporting year

The entire country free

Freedom from disease has been proved every year since 1998 conducting a survey in a randomized sample of farms. Free status is recognized by EU (Bilateral Agreement on Agriculture, Veterinary Annex).

Control program/ mechanisms

The control program/ strategies in place

Brucellosis in sheep and goats is regulated as zoonoses to be eradicated (Swiss ordinance of epizootics, TSV Art. 190 - Art. 195). Notification of suspicious cases is mandatory. Actions to be taken in suspicious farms are ban of all animal traffic and the investigation of the whole herd.
Official meat inspection is investigating each carcass, its organs and lymphatic tissue on the prevalence of abnormal alterations. Carcasses showing clinical signs of brucellosis have to be destroyed and farms of origin are investigated.
Freedom from disease has been documented every year since 1998 conducting a survey in a randomized sample of farms. In 2007 a randomized sample of 758 farms with sheep and 387 farms with goats were included in the survey. 11'460 samples from sheep and 2'506 samples from goats were tested using serological test. There were no positive findings in these samples. EU regulation 91/ 68/ EEC that defines populations of sheep and goat as one epidemiological unit is the basis of the survey. Scientific basis is published by Hadorn et al. 2002: Risk-based design of repeated surveys for the documentation of freedom from non-highly contagious diseases. Preventive Veterinary Medicine (2002) 56: 179.192.

Measures in case of the positive findings or single cases

In confirmed cases (herds) the whole herd has to be killed immediately. All placentas, abortion material and the milk of diseased and suspicious animals have to be disposed. The barn has to be disinfected.

Notification system in place

Notification of suspicious cases and outbreaks is mandatory since 1966.

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

There are no observations that would challenge the freedom of Swiss goat population from brucellosis.

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk samples			Information about abortions			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds tested	Number of bovine herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals		Number of animals examined microbio logically	Number of animals positive microbio logically
																		Serologically	BST		
Schweiz/ Suisse/ Svizzera	42382	1279823	42382	100	0	0	4874	31042	0	4874	18952	0									
Total	42382	1279823	42382	100	0	0	4874	31042	0	4874	18952	0	0	0	0	0	0	0	0	0	0

Footnote

Last surveillance 1997.

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 microbio logically	Number of animals positive microbio logically	Number of suspended herds
Schweiz/ Suisse/ Svizzera	17028	513115	17028	100	0	0	1145	13966	0			0		
Total	17028	513115	17028	100	0	0	1145	13966	0	0	0	0	0	0

Footnote

Details of the surveillance are described in a report and can be downloaded: http:/ / www.bvet.admin.ch/ gesundheit_tiere/ 00314/ index.html?lang=de.

2.7. YERSINIOSIS

2.7.1. General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

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

Yersiniosis (Y. enterocolitica, Y. pseudotuberculosis) in animal is notifiable, but not in humans.
Cases of Yersinia in animals are reported to the FVO by the cantonal veterinarians. In 2007, one case of yersiniosis in a hare was reported by cantonal veterinarians.
In the diagnostic laboratories, a total of 2512 samples were tested for yersiniosis.

Recent actions taken to control the zoonoses

Notifiable disease in animals according to Swiss ordinance of epizootics (TSV, Art. 5).

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.7.2. Yersiniosis in humans

2.7.3. Yersinia in foodstuffs

2.7.4. Yersinia in animals

Table Yersinia in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. enterocolitica - O:9	Y. enterocolitica - O:3	Y. enterocolitica - unspecified

2.8. TRICHINELLOSIS

2.8.1. General evaluation of the national situation

A. Trichinellosis general evaluation

History of the disease and/ or infection in the country

Trichinella infections acquired in Switzerland have probably not occurred in humans for years in this country. But since human trichinellosis is not a notifiable disease, this cannot be stated with certainty.
Trichinellosis and suspicion of trichinellosis in animals are notifiable since 1966. Trichinella infections have not been detected in pigs in Switzerland for many decades. From 2001 to 2004, between 400,000 and 490,000 pigs (15 to 19% of all slaughtered pigs) were tested every year without any positive findings being obtained. In recent years the number of pigs tested in abattoirs increased steadily: 916,791 pigs in 2005 (34% of the pigs slaughtered), 1.25 Mio pigs in 2006 (44% of the pigs slaughtered) and 2,42 Mio pigs in 2007 (87% of the pigs slaughtered). All results were negative.
However, the fox and lynx are known to harbour Trichinella britovi in Switzerland. Seven infected foxes were identified in a study in 1992/ 1993 (Jakob et al., Schweiz. Arch. Tierheilk. 136: 298-308,1994) and a recent study carried out in 2006/ 2007 showed that 21 from 1298 foxes (=1.6%) were infected with Trichinella britovi. In a further study carried out from 1999 until 2007 55 lynx were tested and 15 (=27.3%) were Trichinella britovi positive.
Cases of trichinellosis in animals are reported to the FVO by the cantonal veterinarians. In 2007, two cases of trichinellosis (1 lynx and 1 fox) were reported by cantonal veterinarians.
Next to the tests carried out at the abattoirs (see above) a total of 3872 samples were tested for trichinellosis in the diagnostic laboratories.

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

Testing on trichinellosis of all slaughter pigs is mandatory in all slaughterhouses which are approved to export meat to the EU. Exceptions from the obligation to test all slaughtered pigs are only made for slaughterhouses with a small capacity who do not export to the EU. Meat of pigs which have not been tested for trichinellosis is labeled with a special stamp, so that it can be guaranteed that such meat is not exported to the EU.
As the results over the last decades show, Trichinella infections have not been detected in pigs and wild boars. Because fox and lynx in Switzerland harbour Trichinella britovi, Switzerland is working on a risk based surveillance program, in which mainly wild animals will be tested.

2.8.2. Trichinellosis in humans

2.8.3. Trichinella in animals

A. Trichinella in pigs

Monitoring system

Sampling strategy

General

The investigation of slaughtered pigs and wild boars is mandatory (Swiss ordinance of slaughter and meat control, VSFK, Art. 31). All pigs slaughtered in slaughterhouses that are approved to export in the EU are sampled for trichinella examination. Exceptions of this test obligation are made for small slaughterhouses of the national market which do not export to the EU.

Frequency of the sampling

General

In 2007, a total of 2.42 Mio pigs in 13 abattoirs were tested according to Commission Regulation (EC) No. 2075/ 2005 which corresponded to 87 % of the pigs slaughtered in Switzerland. All results were negative.
In 2007 in addition, 737 wild boars were tested with negative results in slaughterhouses and 1738 wild animals (including mainly wild boars, but also fox, lynx, wolf, etc.) were tested with negative results in diagnostic laboratories.

Type of specimen taken

General

Piece of pillar of the diaphragm.

Methods of sampling (description of sampling techniques)

General

Piece of pillar of the diaphragm taken at slaughter.

Case definition

General

Detection of Trichinella spp. larvae.

Diagnostic/ analytical methods used

General

Artificial digestion method according to Commission Regulation (EC) No. 2075/ 2005.

Notification system in place

Trichinellosis is a notifiable disease in animals. In humans trichinellosis is not notifiable right now, but the obligation to report trichinellosis cases in humans will be implemented in 2009.

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

There are no observations that would challenge the freedom of Swiss pigs from trichinellosis.

B. Trichinella in horses

Monitoring system

Sampling strategy

The investigation of horses is mandatory (Swiss ordinance of slaughter and meat control, VSFK, Art. 31).

Frequency of the sampling

1730 horses were reported to be tested on trichinella in 2007.

Type of specimen taken

Piece of pillar of the diaphragm.

Case definition

Detection of Trichinella spp. larvae.

Diagnostic/ analytical methods used

Artificial digestion method according to Commission Regulation (EC) No. 2075/ 2005.

Results of the investigation including the origin of the positive animals

Negative results in all samples.

Notification system in place

Trichinellosis is a notifiable disease in animals. In humans trichinellosis is not notifiable right now, but the obligation to report trichinellosis cases in humans will be implemented in 2009.

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. spiralis	Trichinella spp., unspecified
Pigs	Swiss zoonoses report 2007	animal	2418732	0		
Solipeds, domestic						
horses	Swiss zoonoses report 2007	animal	1730	0		
Wild boars						
wild	Swiss zoonoses report 2007	animal	2475	0		

Footnote

Not all of the 2475 tests, but most of them were from wild boars. 1738 tests were reported to be done in "wild animals": next to the wild boars (which are the main group) also foxes, lynx and badgers are included in these data.
Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.9. ECHINOCOCCOSIS

2.9.1. General evaluation of the national situation

A. Echinococcus spp. general evaluation

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

Echinococcosis in animals is notifiable, but not in humans.
In the year 2007 6 cases were reported to the FVO by the cantonal veterinarians (2 dogs, 2 foxes, 1 monkey and 1 mammal) which is in the range of the last 10 years.
The approved Swiss Veterinary Laboratories reported 168 diagnostic testings in mainly dogs, cats and wild animals.
The burden of infection from E. multilocularis has increased in the recent years because 1) of the increasing of the fox population has increased after having eradicated fox rabies, and 2) foxes have extended their habitat to urban areas. This may mean that the human population is exposed to a higher risk.
Indeed, data from a request in hospitals specialized in liver diseases show, that in the years 2001-2005 the number of new cases of alveolar hydatid disease has increased 2,5 fold compared to years before 2001 (instead of 7 to 10 new cases per year in years before 2001 11-28 new cases per year were reported in the years 2001-2005).

Recent actions taken to control the zoonoses

Notifiable disease in animals according to Swiss ordinance of epizootics (TSV, Art. 5).

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

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

2.10. TOXOPLASMOSIS

2.10.1. General evaluation of the national situation

A. Toxoplasmosis general evaluation

History of the disease and/ or infection in the country

There are some sporadic cases of toxoplasmosis in humans and animals. However, due to a lack of surveillance data, the knowledge about the prevalence of the infection in humans and animals is scarce.

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

Toxoplasma in animals is notifiable, but not in humans.
Cantonal veterinarians reported 2 cases of toxoplasmosis in animals (1 in cats and 1 in goats). Twenty cases in animals were reported since 1997: sheep (6); goat (6); cat (2); cattle (2); monkey (3); other mammalia (1).
The approved Swiss Veterinary Laboratories reported 249 serological and 392 agent testings in cats, dogs, sheep and goats.

Recent actions taken to control the zoonoses

Notifiable disease in animals according to Swiss ordinance of epizootics (TSV, Art. 5).

Additional information

Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.10.2. Toxoplasmosis in humans

2.10.3. Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii

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

The European fox rabies epizootic starting in 1939 at the eastern border of Poland reached Switzerland on March 3, 1967. Rabies spread over large parts of the country until 1977, the year it caused three human deaths. In 1978 the first field trial world-wide for the oral immunization of foxes against rabies was conducted in Switzerland. Initially, the expansion of the vaccination area led to a rapid reduction in rabies cases. However, the 1990s were characterized by a recrudescence of rabies in spite of regular oral immunization of foxes. The last endemic case of rabies was diagnosed in 1996 after an adaptation of the vaccination strategy.
In the period from 1967 until 1999 a total of 17'109 rabies cases, of which 73% in foxes and 14% in domestic animals were diagnosed, leading to an estimated number of some 25 000 postexposure treatments in humans. To eliminate rabies, a total of 2.8 million baits containing a modified live virus were distributed - mostly by hand - in the field.
According to the definitions of the OIE and WHO (no cases for at least two years) Switzerland has been officially recognized as free of rabies since 1998. A suspected case of rabies in a dog (urban rabies) was confirmed in 2003, but since the dog was a foundling picked up close to the French border, it is highly unlikely that this indicates a focus of rabies infection in Switzerland.
Bat rabies has been diagnosed in three cases in the past fifteen years (1992, 1993, 2002).

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

Switzerland and all neighboring countries are free from European fox rabies. Therefore there is no risk at the moment for the Swiss fox population to be re-infected by immigrating infected foxes.
Human as well as animal cases are notifiable.
In 2007, two human samples were tested for rabies as a differential diagnosis with negative results. 473 human sera (142 of them were a control of postexposure treatments) were tested, if the level of protecting antibodies is sufficient.
81 animals (50% fox, 26% dogs and cats, 20% bats, 4% others) were tested if they were infected with rabies virus. All results were negative. In addition, 2123 sera from traveling dogs and cats were tested, if the level of protecting antibodies is sufficient.

Recent actions taken to control the zoonoses

Rabies testing on animals with suspect symptoms. Vaccination of the Swiss dog population is recommended (and common), but not mandatory. (Re-)Import conditions for cats, dogs and ferrets according to the EU regulation 998/ 2003/ EC.

Additional information

All test concerning rabies are carried out in the reference laboratory, the Swiss Rabies Center =>http:/ / www.ivv.unibe.ch/ Swiss_Rabies_Center/ swiss_rabies_center.html. It is authorized by the EU for rabies testing, see http:/ / ec.europa.eu/ food/ animal/ liveanimals/ pets/ approval_en.htm. For rabies

virus detection immunfluorescence (FAT) and virus isolation using murine neuroblastoma cell culture (RTCIT) is used and the rabies antibody detection is carried out using the rapid fluorescent focus inhibition test (RFFIT) as described in the OIE manual, see http:/ / www.oie.int/ eng/ normes/ mmanual/ a_00044.htm.
Swiss zoonoses report 2007 (www.bvet.admin.ch > Documentation > Publications).

2.11.2. Lyssavirus (rabies) in animals

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	Unspecified Lyssavirus	European Bat Lyssavirus - unspecified	Classical rabies virus (genotype 1)
Solipeds, domestic	Swiss Rabies Center (1)	animal	1	0			
Dogs	Swiss Rabies Center (1)	animal	12	0			
Cats	Swiss Rabies Center (1)	animal	9	0			
Bats							
wild	Swiss Rabies Center (1)	animal	16	0			
Foxes							
wild	Swiss Rabies Center (1)	animal	41	0			
Wild boars							
wild	Swiss Rabies Center (1)	animal	1	0			
Rabbits	Swiss Rabies Center (1)	animal	1	0			

Footnote

(1) Swiss Rabies Center =>http:/
/ www.ivv.unibe.ch/ Swiss_Rabies_Center/ swiss_rabies_center.html.

2.12. Q-FEVER

2.12.1. General evaluation of the national situation

2.12.2. Coxiella (Q-fever) in animals

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ENTEROCOCCUS, NON-PATHOGENIC

3.1.1. General evaluation of the national situation

3.1.2. Antimicrobial resistance in Enterococcus, non-pathogenic isolates

A. Antimicrobial resistance of Enterococcus spp., unspecified in animal

Sampling strategy used in monitoring

Frequency of the sampling

Indicator bacteria were analysed for antimicrobial resistance in 100 samples from pigs and 320 samples from broilers. All faecal samples and cloacal swaps were collected in the context of a monitoring programme from animals randomly selected at slaughter. Details are described in the section on Campylobacter spp.

Type of specimen taken

Fecal samples from pigs, cloacal swabs from broilers

Methods of sampling (description of sampling techniques)

Fecal samples were taken at the slaughter line using a swab in standard transportation medium (Transport Swabs, Oxoid TS0001A, AMIES W/ O CH). Immediately after collection, the samples were cooled and brought to the laboratory for analysis.

Procedures for the selection of isolates for antimicrobial testing

From each sample and Enterococcus subtype, one isolate was submitted to susceptibility testing.

Methods used for collecting data

All samples were analysed in the same laboratory (Centre for Zoonoses, Bacterial Animal Diseases and Antibiotic Resistance, University of Bern, Switzerland).

Laboratory methodology used for identification of the microbial isolates

Samples were cultured for Enterococcus spp. within 72 h after sampling using standard microbiological procedures.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Amoxicillin/ Clavulanic acid (2:1), Bacitracin, Chloramphenicol, Ciprofloxacin, Erythromycin, Florfenicol, Flavofosfolipol, Gentamicin, Neomycin, Nitrofurantoin, Salinomycin, Streptomycin, Quinupristin/ Dalfopristin, Tetracyclin, Vancomycin

Breakpoints used in testing

Ampicillin, ≥ 16 µg/ ml; Amoxicillin/ Clavulanic acid, ≥ 16 µg/ ml; Bacitracin, ≥ 128 µg/ ml; Chloramphenicol, ≥ 32 µg/ ml; Ciprofloxacin, ≥ 4 µg/ ml; Erythromycin, ≥ 8 µg/ ml; Florfenicol, ≥ 32 µg/ ml; Flavofosfolipol, ≥ 16 µg/ ml; Gentamicin, ≥ 1024 µg/ ml; Neomycin, ≥ 32 µg/ ml; Nitrofurantoin, ≥ 128 µg/ ml; Salinomycin, ≥ 16 µg/ ml; Streptomycin, ≥ 2048 µg/

ml; Quinupristin/ Dalfopristin, ≥ 4 µg/ ml; Tetracyclin, ≥ 16 µg/ ml; Vancomycin, ≥ 32 µg/ ml

Preventive measures in place

No specific measures for antimicrobial resistance in Enterococcus spp. General preventive measures include education of veterinarians and farmers, disease eradication programmes, incentives for good farming practice and limitation of use of antimicrobials to veterinary prescription.

Control program/ mechanisms

Suggestions to the Community for the actions to be taken

Currently no specific action necessary

Measures in case of the positive findings or single cases

No measures

Notification system in place

No notification system

Results of the investigation

216 Enterococcus faecalis and 30 Enterococcus faecium isolates from broilers as well as 26 Enterococccus faecalis and 29 Enterococcus faecium isolates from pigs were subjected to susceptibility testing.
High levels of resistance for flavofosfolipol, quinupristin/ dalfopristin, tetracyclin, neomycin, bacitracin and streptomycin were observed.
Resistance against vancomycin was rare, only one strain isolated from poultry showed resistance.

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

In general, the resistance situation of indicator bacteria in Switzerland is favorable. The high prevalence of resistance against flavofosfolipol and quinupristin/ dalfopristin may partially be explained by intrinsic resistance of E. faecium against flavofosfolipol and E. faecalis against quinupristin/ dalfopristin. Nevertheless, E. faecium also was frequently resistant against quinupristin/ dalfopristin. This might be due to the former use of another streptogramin (virginiamycin) as a growth promoter. Since 1999, the use of antimicrobial growth promoters is illegal in Switzerland. Quinupristin/ dalfopristin resistance is of potential importance for public health, because it is used for the treatment of vancomycin resistant E. faecium in humans.
The results are similar to those in 2006.

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

Non-pathogenic Enterococci from food animals may serve as a reservoir for resistance genes which could potentially be transmitted to human pathogens.

Additional information

See: Antibiotikaresistenzmonitoring 2007 - Jahresbericht on

http:/ / www.bvet.admin.ch/ gesundheit_tiere/ 00293/ 00296/ index.html?

B. Antimicrobial resistance of Enterococcus spp., unspecified in food

Sampling strategy used in monitoring

Frequency of the sampling

The samples were taken as a part of the national monitoring scheme for antimicrobial resistance in Switzerland. See: Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Type of specimen taken

fresh meat. See: Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Methods of sampling (description of sampling techniques)

See: Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Procedures for the selection of isolates for antimicrobial testing

From each sample and Enterococcus subtype, one isolate was submitted to susceptibility testing.

Methods used for collecting data

Enterococcus strains were isolated at nine regional laboratories. One isolate per sample and per subtype was sent to the Center for Zoonoses, Bacterial Animal Diseases and Antibiotic Resistance, University of Bern, Switzerland for phenotypical verification, differentiation and susceptibility testing.

Laboratory methodology used for identification of the microbial isolates

Samples were cultured for Enterococcus spp. within 72h after sampling according to the descriptions of the Swiss Food Manual 2007 (method 1406).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Amoxicillin/ Clavulanic acid (2:1), Bacitracin, Chloramphenicol, Ciprofloxacin, Erythromycin, Florfenicol, Flavofosfolipol, Gentamicin, Neomycin, Nitrofurantoin, Salinomycin, Streptomycin, Quinupristin/ Dalfopristin, Tetracycline, Vancomycin

Breakpoints used in testing

Ampicillin, ≥ 16 µg/ ml; Amoxicillin/ Clavulanic acid, ≥ 16 µg/ ml; Bacitracin, ≥ 128 µg/ ml; Chloramphenicol, ≥ 32 µg/ ml; Ciprofloxacin, ≥ 4 µg/ ml; Erythromycin, ≥ 8 µg/ ml; Florfenicol, ≥ 32 µg/ ml; Flavofosfolipol, ≥ 16 µg/ ml; Gentamicin, ≥ 1024 µg/ ml; Neomycin, ≥ 32 µg/ ml; Nitrofurantoin, ≥ 128 µg/ ml; Salinomycin, ≥ 16 µg/ ml; Streptomycin, ≥ 2048 µg/ ml; Quinupristin/ Dalfopristin, ≥ 4 µg/ ml; Tetracycline, ≥ 16 µg/ ml; Vancomycin, ≥ 32 µg/ ml

Preventive measures in place

No specific measures for antimicrobial resistance in Enterococcus spp. General preventive measures include education of veterinarians and farmers, disease eradication programmes, incentives for good farming practice, and limitation of use of antimicrobials to veterinary prescription-

Control program/ mechanisms

Suggestions to the Community for the actions to be taken

Currently no specific action necessary.

Measures in case of the positive findings or single cases

None

Notification system in place

No notification system

Results of the investigation

72 Enterococcus faecalis and 35 Enterococcus faecium isolates from broiler meat were subjected to susceptibility testing.
High levels of resistance for erythromycin, flavofosfolipol, quinupristin/ dalfopristin, tetracycline, neomycin, bacitracin and streptomycin were observed.
No resistance against vancomycin was found.

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

Enterococci from broiler meat showed a similar resistance pattern to the isolates from animals.

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

Non-pathogenic Enterococci from food may serve as a reservoir for resistance genes which could potentially be transmitted to human pathogens.

Additional information

See: Antibiotikaresistenzmonitoring 2007 - Jahresbericht on
http:/ / www.bvet.admin.ch/ gesundheit_tiere/ 00293/ 00296/ index.html?

Table Antimicrobial susceptibility testing of E. faecium in Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	E. faecium Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	30

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																		
				<=0.03	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	512	30	0												30								
Neomycin	16	30	6								10		14	5			1						
Streptomycin	1024	30	0												29				1				
Amphenicols																							
Chloramphenicol	16	30	1						6		7	16		1									
Florfenicol	16	30	0						9		21												
Fluoroquinolones																							
Ciprofloxacin	2	30	10				2		8	10	9	1											
Glycolipids																							
Flavofosfolipol	8	30	27				2				1			4	23								
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	64	30	22								3		1	2	2	7	4	11					
Vancomycin	16	30	1					29							1								
Ionophores																							
Salinomycin	8	30	0					7			4	19											
Macrolides																							
Erythromycin	4	30	12				9		8	1		2		10									
Nitroimidazoles and Nitrofurans																							
Nitrofurantoin	64	30	8										18		4	7	1						
Penicillins																							
Amoxicillin / Clavulanic acid	8	30	0						22		5	3											

Ampicillin	8	30	0						15		8	7												
Streptogramins																								
Quinupristin/ Dalfopristin	2	30	16				3		2	9	12	3	1											
Tetracyclines	8	30	11					17				2	1	1	9									

Table Antimicrobial susceptibility testing in E. faecium

n = Number of resistant isolates				
	E. faecium			
	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling		**Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling**	
Isolates out of a monitoring programme	yes		yes	
Number of isolates available in the laboratory	30		29	
Antimicrobials:	**N**	**n**	**N**	**n**
Aminoglycosides				
Gentamicin	30	0	29	0
Neomycin	30	6	29	2
Streptomycin	30	0	29	0
Amphenicols				
Chloramphenicol	30	1	29	0
Florfenicol	30	0	29	0
Fluoroquinolones				
Ciprofloxacin	30	10	29	7
Fully sensitive	30	0	29	0
Glycolipids				
Flavofosfolipol	30	27	29	29
Glycopeptides (Cyclic peptides, Polypeptides)				
Bacitracin	30	22	29	22
Vancomycin	30	1	29	0
Ionophores				
Salinomycin	30	0	29	0
Macrolides				
Erythromycin	30	12	29	1
Nitroimidazoles and Nitrofurans				
Nitrofurantoin	30	8	29	7
Penicillins				
Amoxicillin / Clavulanic acid	30	0	29	0
Ampicillin	30	0	29	0
Resistant to 1 antimicrobial	30	0	29	1
Resistant to 2 antimicrobials	30	4	29	5
Resistant to 3 antimicrobials	30	10	29	16
Resistant to 4 antimicrobials	30	7	29	5
Resistant to >4 antimicrobials	30	9	29	2
Streptogramins				
Quinupristin/ Dalfopristin	30	16	29	17
Tetracyclines				
Tetracyclin	30	11	29	4

Table Antimicrobial susceptibility testing of E. faecium in Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	E. faecium
	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	29

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																		
				<=0.03	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	512	29	0												29								
Neomycin	16	29	2								18		9	2									
Streptomycin	1024	29	0												29								
Amphenicols																							
Chloramphenicol	16	29	0						2		9	17	1										
Florfenicol	16	29	0						6		23												
Fluoroquinolones																							
Ciprofloxacin	2	29	7				5		14	3	7												
Glycolipids																							
Flavofosfolipol	8	29	29												29								
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	64	29	22											3	4	14	6	2					
Vancomycin	16	29	0					28		1													
Ionophores																							
Salinomycin	8	29	0					26		3													
Macrolides																							
Erythromycin	4	29	1				3		4	12	9			1									
Nitroimidazoles and Nitrofurans																							
Nitrofurantoin	64	29	7										7		15	6	1						
Penicillins																							
Amoxicillin / Clavulanic acid	8	29	0						28		1												
Ampicillin	8	29	0						25		3	1											

Streptogramins																							
Quinupristin/ Dalfopristin	2	29	17				5		4	3	16	1											
Tetracyclines	8	29	4					25							4								

Table Antimicrobial susceptibility testing of E. faecium in Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	E. faecium
	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	35

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	512	35	0												35								
Neomycin	16	35	4								11		20	2			2						
Streptomycin	1024	35	4												31					4			
Amphenicols																							
Chloramphenicol	16	35	0						1		6	24	4										
Florfenicol	16	35	0						4		30	1											
Fluoroquinolones																							
Ciprofloxacin	2	35	6				1		18	10	5	1											
Glycolipids																							
Flavofosfolipol	8	35	32								1	2	3	2	27								
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	64	35	23								10			1	1	9	3	11					
Vancomycin	16	35	0					34			1												
Ionophores																							
Salinomycin	8	35	1					5		5	3	21	1										
Macrolides																							
Erythromycin	4	35	13				10		6	3	3	3		10									
Nitroimidazoles and Nitrofurans																							
Nitrofurantoin	64	35	6										15		14	5		1					
Penicillins																							
Amoxicillin / Clavulanic acid	8	35	0						31		4												
Ampicillin	8	35	0						23		7	5											
Streptogramins																							
Quinupristin/ Dalfopristin	2	35	15				6		7	7	14	1											


Tetracyclines
8
35
9
26
1
8

Table Antimicrobial susceptibility testing in E. faecium

n = Number of resistant isolates	E. faecium	
	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling	
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		35
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	35	0
Neomycin	35	4
Streptomycin	35	4
Amphenicols		
Chloramphenicol	35	0
Florfenicol	35	0
Fluoroquinolones		
Fully sensitive	35	0
Glycolipids		
Flavofosfolipol	35	32
Glycopeptides (Cyclic peptides, Polypeptides)		
Bacitracin	35	23
Vancomycin	35	0
Ionophores		
Salinomycin	35	1
Macrolides		
Erythromycin	35	13
Nitroimidazoles and Nitrofurans		
Nitrofurantoin	35	6
Penicillins		
Amoxicillin / Clavulanic acid	35	0
Ampicillin	35	0
Resistant to 1 antimicrobial	35	2
Resistant to 2 antimicrobials	35	8
Resistant to 3 antimicrobials	35	12
Resistant to 4 antimicrobials	35	8
Resistant to >4 antimicrobials	35	4
Streptogramins		
Quinupristin/ Dalfopristin	35	15
Tetracyclines		
Tetracyclin	35	9

Table Antimicrobial susceptibility testing of E. faecalis in Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

E. faecalis

Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling

Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	216

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	512	216	0												216								
Neomycin	16	216	167								2		47	106	41	1	19						
Streptomycin	1024	216	47												168				1	47			
Amphenicols																							
Chloramphenicol	16	216	2						3		78	133			2								
Florfenicol	16	216	0						72		144												
Fluoroquinolones																							
Ciprofloxacin	2	216	0				85		130	1													
Glycolipids																							
Flavofosfolipol	8	216	3				14		81	98	19	1	1		2								
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	64	216	112										1	35	68	63	3	46					
Vancomycin	16	216	0					110		100	5	1											
Ionophores																							
Salinomycin	8	216	0					212			2	2											
Macrolides																							
Erythromycin	4	216	32				64		46	60	14		3	29									
Nitroimidazoles and Nitrofurans																							
Nitrofurantoin	64	216	0										215		1								
Penicillins																							
Amoxicillin / Clavulanic acid	8	216	0						216														

Ampicillin	8	216	0						215		1													
Streptogramins																								
Quinupristin/ Dalfopristin	2	216	208				6		1	1	3	110	90	5										
Tetracyclines	8	216	191					23		1		1	2	15	174									

Table Antimicrobial susceptibility testing in E. faecalis

n = Number of resistant isolates	E. faecalis			
	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling		**Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling**	
Isolates out of a monitoring programme	yes		yes	
Number of isolates available in the laboratory	216		26	
Antimicrobials:	**N**	**n**	**N**	**n**
Aminoglycosides				
Gentamicin	216	0	26	1
Neomycin	216	167	26	23
Streptomycin	216	47	26	6
Amphenicols				
Chloramphenicol	216	2	26	6
Florfenicol	216	0	26	0
Fluoroquinolones				
Ciprofloxacin	216	0	26	0
Fully sensitive	216	0	26	0
Glycolipids				
Flavofosfolipol	216	3	26	0
Glycopeptides (Cyclic peptides, Polypeptides)				
Bacitracin	216	112	26	2
Vancomycin	216	0	26	0
Ionophores				
Salinomycin	216	0	26	0
Macrolides				
Erythromycin	216	32	26	7
Nitroimidazoles and Nitrofurans				
Nitrofurantoin	216	0	26	0
Penicillins				
Amoxicillin / Clavulanic acid	216	0	26	0
Ampicillin	216	0	26	0
Resistant to 1 antimicrobial	216	5	26	0
Resistant to 2 antimicrobials	216	36	26	8
Resistant to 3 antimicrobials	216	72	26	9
Resistant to 4 antimicrobials	216	59	26	4
Resistant to >4 antimicrobials	216	44	26	5
Streptogramins				
Quinupristin/ Dalfopristin	216	208	26	25
Tetracyclines				
Tetracyclin	216	191	26	19

Table Antimicrobial susceptibility testing of E. faecalis in Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	E. faecalis
	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	26

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	512	26	1												25					1			
Neomycin	16	26	23										3	10	10	1	2						
Streptomycin	1024	26	6												18		2			6			
Amphenicols																							
Chloramphenicol	16	26	6								5	15			5	1							
Florfenicol	16	26	0						6		20												
Fluoroquinolones																							
Ciprofloxacin	2	26	0				4		21	1													
Glycolipids																							
Flavofosfolipol	8	26	0						10	12	4												
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	64	26	2											12	12	1		1					
Vancomycin	16	26	0					14		11	1												
Ionophores																							
Salinomycin	8	26	0					26															
Macrolides																							
Erythromycin	4	26	7				9		4	5	1			7									
Nitroimidazoles and Nitrofurans																							
Nitrofurantoin	64	26	0										25		1								
Penicillins																							
Amoxicillin / Clavulanic acid	8	26	0						26														
Ampicillin	8	26	0						26														

Streptogramins																								
Quinupristin/ Dalfopristin	2	26	25				1				3	6	13		3									
Tetracyclines	8	26	19					7					2			17								

Table Antimicrobial susceptibility testing in E. faecalis

n = Number of resistant isolates	E. faecalis	
	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling	
Isolates out of a monitoring programme		yes
Number of isolates available in the laboratory		72
Antimicrobials:	**N**	**n**
Aminoglycosides		
Gentamicin	72	2
Neomycin	72	58
Streptomycin	72	6
Amphenicols		
Chloramphenicol	72	1
Florfenicol	72	0
Fluoroquinolones		
Ciprofloxacin	72	1
Fully sensitive	72	0
Glycolipids		
Flavofosfolipol	72	1
Glycopeptides (Cyclic peptides, Polypeptides)		
Bacitracin	72	30
Vancomycin	72	0
Ionophores		
Salinomycin	72	0
Macrolides		
Erythromycin	72	28
Nitroimidazoles and Nitrofurans		
Nitrofurantoin	72	0
Penicillins		
Amoxicillin / Clavulanic acid	72	0
Ampicillin	72	0
Resistant to 1 antimicrobial	72	2
Resistant to 2 antimicrobials	72	15
Resistant to 3 antimicrobials	72	20
Resistant to 4 antimicrobials	72	20
Resistant to >4 antimicrobials	72	15
Streptogramins		
Quinupristin/ Dalfopristin	72	70
Tetracyclines		
Tetracyclin	72	51

Table Antimicrobial susceptibility testing of E. faecalis in Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	E. faecalis
	Meat from broilers (Gallus gallus) - fresh - at retail - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	72

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Gentamicin	512	72	2												70					2			
Neomycin	16	72	58								3		11	45	10		3						
Streptomycin	1024	72	6												65				1	6			
Amphenicols																							
Chloramphenicol	16	72	1						1		5	62	3		1								
Florfenicol	16	72	0						3		69												
Fluoroquinolones																							
Ciprofloxacin	2	72	1				26		42	3				1									
Glycolipids																							
Flavofosfolipol	8	72	1				1		31	30	9				1								
Glycopeptides (Cyclic peptides, Polypeptides)																							
Bacitracin	64	72	30								1			4	37	19	2	9					
Vancomycin	16	72	0					14		49	9												
Ionophores																							
Salinomycin	8	72	0					54		5	9	4											
Macrolides																							
Erythromycin	4	72	28				20		14	9	1		4	24									
Nitroimidazoles and Nitrofurans																							
Nitrofurantoin	64	72	0										70		2								
Penicillins																							
Amoxicillin / Clavulanic acid	8	72	0						72														
Ampicillin	8	72	0						72														
Streptogramins																							
Quinupristin/ Dalfopristin	2	72	70						1	1	2	22	43	3									


Tetracyclines
8
72
51
19
2
6
45

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

Test Method Used

Broth dilution

Standards used for testing

NCCLS

Enterococcus, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines	CLSI M7-A6 (M100-S15)	4	8	8	1	32				
Amphenicols										
Chloramphenicol	CLSI M7-A6 (M100-S15)	8	16	16	2	64				
Florfenicol	CLSI M7-A6 (M100-S15)	8	16	16	2	32				
Fluoroquinolones										
Ciprofloxacin	CLSI M7-A6 (M100-S15)	1	2	2	0.5	32				
Aminoglycosides										
Streptomycin	DANMAP 2004	1024		1024	128	2048				
Gentamicin	DANMAP 2004	512		512	128	2048				
Neomycin	ARBA0-II 2005	16		16	8	128				
Macrolides										
Erythromycin	CLSI M7-A6 (M100-S15)	0.5	4	4	0.5	16				
Glycolipids										
Flavofosfolipol	DANMAP 2004	8		8	0.5	32				
Glycopeptides (Cyclic peptides, Polypeptides)										
Bacitracin	ARBAO-II 2005	64		64	8	256				
Vancomycin	CLSI M7-A6 (M100-S15)	4	16	16	1	32				
Ionophores										
Salinomycin	DANMAP 2004	8		8	1	32				
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	CLSI M7-A6 (M100-S15)	32	64	64	32	256				
Penicillins										
Amoxicillin / Clavulanic acid	CLSI M7-A6 (M100-S15)	8		8	2	64				
Ampicillin	CLSI M7-A6 (M100-S15)	8		8	2	128				
Streptogramins										
Quinupristin/ Dalfopristin	CLSI M7-A6 (M100-S15)	1	2	2	0.5	32				

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

Test Method Used

Broth dilution

Standards used for testing

NCCLS

Enterococcus, non-pathogenic	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines	CLSI M7-A6 (M100-S15)	4	8	8	1	32				
Amphenicols										
Chloramphenicol	CLSI M7-A6 (M100-S15)	8	16	16	2	64				
Florfenicol	CLSI M7-A6 (M100-S15)	8	16	16	2	32				
Fluoroquinolones										
Ciprofloxacin	CLSI M7-A6 (M100-S15)	1	2	2	0.5	32				
Aminoglycosides										
Streptomycin	DANMAP 2004	1024		1024	128	2048				
Gentamicin	DANMAP 2004	512		512	128	2048				
Neomycin	ARBA0-II 2005	16		16	8	128				
Macrolides										
Erythromycin	CLSI M7-A6 (M100-S15)	0.5	4	4	0.5	16				
Glycolipids										
Flavofosfolipol	DANMAP 2004	8		8	0.5	32				
Glycopeptides (Cyclic peptides, Polypeptides)										
Bacitracin	ARBAO-II 2005	64		64	8	256				
Vancomycin	CLSI M7-A6 (M100-S15)	4	16	16	1	32				
Ionophores										
Salinomycin	DANMAP 2004	8		8	1	32				
Nitroimidazoles and Nitrofurans										
Nitrofurantoin	CLSI M7-A6 (M100-S15)	32	64	64	32	256				
Penicillins										
Amoxicillin / Clavulanic acid	CLSI M7-A6 (M100-S15)	8		8	2	64				
Ampicillin	CLSI M7-A6 (M100-S15)	8		8	2	128				
Streptogramins										
Quinupristin/ Dalfopristin	CLSI M7-A6 (M100-S15)	1	2	2	0.5	32				

3.2. ESCHERICHIA COLI, NON-PATHOGENIC

3.2.1. General evaluation of the national situation

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

A. Antimicrobial resistance of E.coli in animal

Sampling strategy used in monitoring

Frequency of the sampling

Indicator bacteria were analysed for antimicrobial resistance in 100 samples from pigs and 320 samples from broilers. All faecal samples and cloacal swabs were collected in the context of the permanent national monitoring scheme for antimicrobial resistance in Swiss food-producing animals. Details are described in the section on Campylobacter spp.

Type of specimen taken

Fecal samples from pigs, cloacal swabs from broilers

Methods of sampling (description of sampling techniques)

Fecal samples were taken at the slaughter line using a swab in standard transportation medium (Transport Swabs, Oxoid TS0001A, AMIES W/ O CH). Immediately after collection, the samples were cooled and brought to the laboratory for analysis.

Procedures for the selection of isolates for antimicrobial testing

From each sample positive for E. coli, one isolate was submitted to susceptibility testing.

Methods used for collecting data

All samples were analysed in the same laboratory (Centre for Zoonoses, Bacterial Animal Diseases and Antibiotic Resistance, University of Bern, Switzerland).

Laboratory methodology used for identification of the microbial isolates

Samples were cultured for E. coli within 72 h after sampling using standard microbiological procedures.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Apramycin, Amoxicillin/ Clavulanic Acid(2:1), Cephalotin, Chloramphenicol, Ciprofloxacin, Colistin, Florfenicol, Gentamicin, Nalidixic Acid, Neomycin, Sulfamethoxazole, Spectinomycin, Streptomycin, Trimethoprim/ Sulfamethoxazole (1:19), Tetracyclin, Ceftiofur.

Breakpoints used in testing

Ampicillin, ≥ 4 µg/ ml; Apramycin, ≥ 32 µg/ ml; Amoxicillin/ Clavulanic Acid, ≥ 32 µg/ ml; Cephalotin, ≥ 32 µg/ ml; Chloramphenicol, ≥ 32 µg/ ml; Ciprofloxacin, ≥ 4 µg/ ml; Colistin, ≥ 16 µg/ ml; Florfenicol, ≥ 32 µg/ ml; Gentamicin, ≥ 16 µg/ ml; Nalidixic Acid ≥ 32 µg/ ml; Neomycin, ≥ 16 µg/ ml; Sulfamethoxazole, ≥ 512 µg/ ml; Spectinomycin, ≥ 128 µg/ ml; Streptomycin, ≥ 32 µg/ ml; Trimethoprim/ Sulfamethoxazole, ≥ 4 µg/ ml; Tetracyclin, ≥ 16 µg/

ml; Ceftiofur, ≥ 8 µg/ ml

Preventive measures in place

No specific measures for antimicrobial resistance in E. coli. General preventive measures include education of veterinarians and farmers, disease eradication programmes, incentives for good farming practice and limitation of use of antimicrobials to veterinary prescription.

Control program/ mechanisms

Suggestions to the Community for the actions to be taken

Currently no specific action necessary

Measures in case of the positive findings or single cases

No measures

Notification system in place

No notification system

Results of the investigation

284 isolates from broilers and 98 isolates from pigs were subjected to susceptibility testing.
Prevalence of resistance in pigs and poultry is similar. The highest levels of resistance were found for sulfomethoxacol, ampicillin, streptomycin, trimethoprim/ sulfomethoxacol, nalidixic acid, spectinomycin and tetracyclin.

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

In general, the resistance situation of indicator bacteria in Switzerland is favorable. Resistance was most frequently observed against antimicrobials that have been used in food animals for many years, such as trimethoprim/ sulfonamide, tetracyclin and streptomycin. Resistance against newer antimicrobials more critical for public health (fluoroquinolones, cephalosporins) was rare.
The results were similar to those of 2006.

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

The relatively high prevalence of ampicillin resistance in E. coli from pigs and broilers and resistance against nalidixic acid in broilers is a potential public health concern and should be monitored in future years.
Non-pathogenic E.coli from food animals may serve as a reservoir for resistance genes which could potentially be transmitted to human pathogens.

Additional information

See: Antibiotikaresistenzmonitoring 2007 - Jahresbericht on
http:/ / www.bvet.admin.ch/ gesundheit_tiere/ 00293/ 00296/ index.html?

Table Antimicrobial susceptibility testing of E. coli in animals

n = Number of resistant isolates

E. coli

	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys		Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling		Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling	
Isolates out of a monitoring programme									yes		yes	
Number of isolates available in the laboratory									284		98	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides												
Apramycin									284	0	98	1
Gentamicin									284	5	98	5
Neomycin									284	10	98	5
Spectinomycin									284	16	98	35
Streptomycin									284	45	98	57
Amphenicols												
Chloramphenicol									284	10	98	8
Florfenicol									284	137	98	40
Cephalosporins												
Ceftiofur									284	1	98	0
Cephalothin									284	24	98	1
Fluoroquinolones												
Ciprofloxacin									284	5	98	1
Fully sensitive									284	46	98	16
Penicillins												
Amoxicillin / Clavulanic acid									284	4	98	1
Ampicillin									284	40	98	24
Polymyxins												
Colistin									284	0	98	0
Quinolones												
Nalidixic acid									284	67	98	5
Resistant to 1 antimicrobial									284	86	98	18
Resistant to 2 antimicrobials									284	58	98	2
Resistant to 3 antimicrobials									284	38	98	18
Resistant to 4 antimicrobials									284	24	98	10
Resistant to >4 antimicrobials									284	32	98	25
Sulfonamides												
Sulfamethoxazol									284	114	98	46
Tetracyclines												
Tetracyclin									284	97	98	35

Trimethoprim + sulfonamides												

Table Antimicrobial susceptibility testing of E. coli in Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	E. coli
	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	98

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**N**	**n**	**<=0.03**	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Apramycin	16	98	1							92		4	1			1							
Gentamicin	8	98	5					92		1				3	2								
Neomycin	8	98	5						91		2		1	3	1								
Spectinomycin	64	98	35										51	7	5	9	26						
Streptomycin	16	98	57							29		3	9	12	13	32							
Amphenicols																							
Chloramphenicol	16	98	8						5		32	50	3	4	1		3						
Florfenicol	4	98	40						8		50	38	2										
Cephalosporins																							
Ceftiofur	4	98	0				94		4														
Cephalothin	16	98	1						8		22	55	12			1							
Fluoroquinolones																							
Ciprofloxacin	2	98	1	92	1	1	2	1				1											
Penicillins																							
Amoxicillin / Clavulanic acid	16	98	1						39		36	22		1									
Ampicillin	16	98	24					14		39	20	1			24								
Polymyxins																							
Colistin	8	98	0							94		4											
Quinolones																							
Nalidixic acid	16	98	5								93				1	1	3						
Sulfonamides																							
Sulfamethoxazol	256	98	46											52						46			

Tetracyclines																								
Tetracyclin	8		98	35						61		2		2	3	30								
Trimethoprim + sulfonamides	0																							

Table Antimicrobial susceptibility testing of E. coli in Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

	E. coli Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	284

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																		
				<=0.03	**0.06**	**0.12**	**0.25**	**0.5**	**1**	**2**	**4**	**8**	**16**	**32**	**64**	**128**	**256**	**512**	**1024**	**2048**	**>2048**	**lowest**	**highest**
Aminoglycosides																							
Apramycin	16	284	0							244		37	3										
Gentamicin	8	284	5					267		10	2		4	1									
Neomycin	8	284	10						265		9		3	3	4								
Spectinomycin	64	284	16										195	62	11	4	12						
Streptomycin	16	284	45							197		33	9	12	16	17							
Amphenicols																							
Chloramphenicol	16	284	10						5		93	166	10			10							
Florfenicol	4	284	137						13		134	129	6	2									
Cephalosporins																							
Ceftiofur	4	284	1				274		7	1	1		1										
Cephalothin	16	284	24						15		56	132	57	17	2	5							
Fluoroquinolones																							
Ciprofloxacin	2	284	5	214	5	20	32	7	1		1	4											
Penicillins																							
Amoxicillin / Clavulanic acid	16	281	4						92		134	47	4	1	3								
Ampicillin	16	284	40					21		118	99	6			40								
Polymyxins																							
Colistin	8	284	0							283		1											
Quinolones																							
Nalidixic acid	16	284	67								215		2	11	12	25	19						
Sulfonamides																							

Sulfamethoxazol	256	284	114										169		1		1	4	109				
Tetracyclines																								
Tetracyclin	8	284	97						163		19	5		10	87									
Trimethoprim + sulfonamides	0																							

Table Breakpoints used for antimicrobial susceptibility testing in Animals

Test Method Used

Broth dilution

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 M7-A6 (M100-S15)	8	16	16	2	64				
Florfenicol	ARBAO-II 2005	2	4	4	2	64				
Tetracyclines										
Tetracyclin	CLSI M7-A6 (M100-S15)	4	8	8	2	32				
Cephalosporins										
Cephalothin	CLSI M7-A6 (M100-S15)	8	16	16	2	64				
Ceftiofur	ARBAO-II 2005	2	4	4	0.5	8				
3rd generation cephalosporins										
Fluoroquinolones										
Ciprofloxacin	CLSI M7-A6 (M100-S15)	1	2	2	0.03	4				
Enrofloxacin										
Quinolones										
Nalidixic acid	CLSI M7-A6 (M100-S15)	16		16	8	128				
Trimethoprim										
Sulfonamides										
Sulfonamide										
Sulfamethoxazol	CLSI M7-A6 (M100-S15)	256		256	64	1024				
Aminoglycosides										
Streptomycin	Sensititre	8	16	16	4	64				
Gentamicin	CLSI M7-A6 (M100-S15)	4	8	8	1	32				
Neomycin	DANMAP 2004	8		8	2	32				
Kanamycin										
Apramycin	DANMAP 2004	16		16	4	64				
Spectinomycin	DANMAP 2004	64		64	4	128				
Trimethoprim + sulfonamides										
Trimethoprim + Sulfamethoxazol	CLSI M7-A6 (M100-S15)	2		2	1	8				
Penicillins										
Amoxicillin / Clavulanic acid	CLSI M7-A6 (M100-S15)	8	16	16	2	32				
Ampicillin	CLSI M7-A6 (M100-S15)	8	16	16	1	32				
Polymyxins										

Colistin	DANMAP 2004	8		8	4	64				

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

4.3. STAPHYLOCOCCAL ENTEROTOXINS

4.3.1. General evaluation of the national situation

4.3.2. Staphylococcal enterotoxins in foodstuffs

5. FOODBORNE OUTBREAKS

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

A. Foodborne outbreaks

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

The Swiss Federal Office of Public Health (FOPH) coordinates the national surveillance of communicable diseases. Notifications of physicians and laboratories are made to cantonal (regional) health authorities and to the FOPH under the provisions of the public health legislation, namely the Ordinance on Disease Notification of 13th January 1999.
Under this scheme, data provided for each notification depend on its supplier: (i) laboratories report diagnostic confirmations (subtype, method, material) while for selected diseases (ii) physicians additionally cover the subsidiaries of clinical diagnosis, exposition, development and measures. Besides the case-oriented reporting, physicians also have to report observations of unexpected clusters of any communicable disease. At the FOPH, the combined notifications of laboratories and physicians are analyzed and published in the weekly Bulletin.
The surveillance of food-borne infectious agents follows the mandatory system. The laboratories are required to report identifications of Salmonella causing gastroenteritis, Salmonella Typhi, Salmonella Paratyphi, Campylobacter spp., Shigella spp., verotoxin-positive Escherichia coli, Listeria monocytogenes, Clostridium botulinum, and hepatitis A virus. A complementary notification by physicians is required for typhoid/ paratyphoid fever, diseases associated with verotoxin-positive Escherichia coli, botulism, and hepatitis A. It is planned that, following a modification of the Ordinance on Disease Notification, laboratories will additionally be required to report identifications of Trichinella spp. from 1st January 2009 on.
Basically, the responsibility for outbreak investigations lies with the cantonal authorities. On request, the FOPH offers the cantons its expertise in epidemiology, infectious diseases, food microbiology, risk assessment and risk management. However, under the federal law on the Control of Transmissible Diseases of Man and the federal law on Food-Stuffs and Utility Articles, the central government, and in particular the FOPH, have the duty to supervise the enforcement of the concerned legislation. In cases of outbreaks which are not limited to the territory of one canton, the federal authorities have the competence to coordinate, and if necessary, to direct control actions and information activities of the cantons. In such a situation, the FOPH can conduct its own epidemiological investigations in cooperation with its national reference laboratories. In the field of food-borne diseases two laboratories designated by the FOPH are currently operating, the National Centre for Enteropathogenic Bacteria and the National Centre for Listeria. These reference laboratories dispose of the facilities, techniques and agents required not only to confirm results from other laboratories but also for epidemiological typing (serotyping and molecular typing) of various bacterial pathogens.
According to a revision of the food legislation in the year 2007, cantonal authorities of food control must report relevant data of outbreaks in a standardized format to the FOPH as soon as the investigations are finished. This improvement allows the FOPH to obtain more complete information

on food- and waterborne outbreaks in Switzerland.

Description of the types of outbreaks covered by the reporting:

In the data possible and verified outbreaks are included.

National evaluation of the reported outbreaks in the country:

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

Salmonella (3), Campylobacter, Staphylococcus aureus (2) and histamine are causative agents.

Foodborne Outbreaks: summarized data

	Total number of outbreaks	Number of possible outbreaks	Number of verified outbreaks
Bacillus	0	0	0
Campylobacter	1	0	1
Clostridium	0	0	0
Escherichia coli, pathogenic	0	0	0
Foodborne viruses	0	0	0
Listeria	0	0	0
Other agents	1	0	1
Parasites	0	0	0
Salmonella	3	0	3
Staphylococcus	2	0	2
Unknown	4	4	0
Yersinia	0	0	0

Verified Foodborne Outbreaks: detailed data

C. jejuni

	Value
Code	7
Subagent Choice	Campylobacter; C. jejuni
Outbreak type	General
Human cases	13
Hospitalized	2
Deaths	0
Foodstuff implicated	Broiler meat (Gallus gallus) and products thereof
More Foodstuff	
Type of evidence	Analytical epidemiological evidence, Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Cross-contamination
Outbreaks	1
Comment	

Histamine

	Value
Code	4
Subagent Choice	
Outbreak type	General
Human cases	17
Hospitalized	0
Deaths	0
Foodstuff implicated	Fish and fish products
More Foodstuff	tuna fish
Type of evidence	Laboratory characterization of isolates
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Storage time/temperature abuse, Inadequate chilling
Outbreaks	1
Comment	

S. Enteritidis

	Value
Code	6
Subagent Choice	Salmonella; S. Enteritidis; 1
Outbreak type	General
Human cases	14
Hospitalized	0
Deaths	0
Foodstuff implicated	Eggs and egg products
More Foodstuff	
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Domestic
Contributory factors	Storage time/temperature abuse, Inadequate chilling
Outbreaks	1
Comment	

S. Enteritidis

	Value
Code	3
Subagent Choice	
Outbreak type	General
Human cases	3
Hospitalized	1
Deaths	0
Foodstuff implicated	Broiler meat (Gallus gallus) and products thereof
More Foodstuff	
Type of evidence	Laboratory detection in human cases, Analytical epidemiological evidence
Setting	School, kindergarten
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Cross-contamination
Outbreaks	1
Comment	

S. Enteritidis

	Value
Code	5
Subagent Choice	
Outbreak type	General
Human cases	28
Hospitalized	5
Deaths	0
Foodstuff implicated	Eggs and egg products
More Foodstuff	
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Domestic
Contributory factors	Storage time/temperature abuse, Inadequate chilling
Outbreaks	1
Comment	

S. aureus

	Value
Code	1
Subagent Choice	
Outbreak type	General
Human cases	12
Hospitalized	10
Deaths	0
Foodstuff implicated	Other foods
More Foodstuff	potato salad
Type of evidence	Laboratory detection in human cases, Laboratory detection in implicated food
Setting	Household
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Unknown
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	

S. aureus

	Value
Code	2
Subagent Choice	
Outbreak type	General
Human cases	6
Hospitalized	0
Deaths	0
Foodstuff implicated	Broiler meat (Gallus gallus) and products thereof
More Foodstuff	Kebab, chicken
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Processing plant
Origin of foodstuff	Unknown
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	