European Food Safety Authority

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 2009

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: Switzerland

Reporting Year:

Laboratory name	Description	Contribution
FVO	Swiss Federal Veterinary Office	Swiss Zoonoses Report
FOPH	Swiss 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 the 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
Agroscope Liebefeld-Posieux ALP	Research Station	Official feed inspection service

PREFACE

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/ EC*. 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 2009 .

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.

---

* 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

List of Contents

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 3th of May 2009. Number of animals slaughtered in the year 2009.

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 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. Numbers of holdings with breeding hens have a large fluctuation due to a large number of very small flocks on farms which are counted in agricultural census. 40 holdings with more than 100 breeding hens keep 91% of all breeding hens. The number of laying hens is slightly increasing. Broiler production increased since 2008 by 3.2%.

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

Average size of the farms in 2009: 38 cattle. 165 pigs, 43 sheep, 13 goats, 199 laying hens, 5426 broilers.

Table Susceptible animal populations

* Only if different than current reporting year

		Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
Animal species	Category of animals	Data	Year*	Data	Year*	Data	Year*	Data	Year*
Cattle (bovine animals)	- in total			649006		1602513		42584	
Gallus gallus (fowl)	breeding flocks, unspecified - in total					143282		1284	
	broilers			50077778		5469043		1008	
	laying hens					3136986		15744	
	- in total					8749311			
Goats	- in total			27883		79793		6280	
Pigs	- in total			2711101		1545361		9365	
Sheep	- in total			238683		424885		9803	
Turkeys	- in total					52887		256	

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

Salmonellosis in humans is a notifiable disease. The detection of Salmonella spp. must be reported by the laboratory within one week (ordinance of the FDHA on doctor and laboratory reports). In the 80s Salmonellosis was the most reported food borne disease in humans. After reaching a peak in 1992 with 113,6 reports per 100,000 inhabitants the incidence declined steadily resulting in a takeover of Campylobacteriosis as the most reported food borne disease in humans in 1997. Depart from 2004 the incidence was never over 30,0 reports per 100,000 inhabitants. S. Enteritidis has always been the most frequently isolated serovar followed by S. Typhimurium.

Salmonellosis in animals is a notifiable diseases and classified as animal diseases to be controlled (Swiss ordinance of epizootics (TSV), Article 222-227). Animal keepers, livestock inspectors, AI technicians, animal health advisory services, meat inspectors, abattoir personnel, police and customs officers are under an obligation to report any suspected case of salmonellosis in animals to a veterinarian. If Salmonella are confirmed in a suspected case by a diagnostic laboratory, this must be reported to the cantonal veterinarian who is responsible for the livestock. If biungulates are affected, the sick animals must be isolated and the whole herd and the environment must be tested. Only healthy animals from this herd (even if they might be excreting Salmonellae) may be slaughtered, but then only with a special official permit and subject to appropriate precautions at the abattoir. If salmonellosis is detected in cows, goats or dairy sheep, the cantonal veterinarian must inform the cantonal health and food safety authorities. Milk from animals that are excreting Salmonella must not be used for human consumption and may only be used as animal feed after pasteurisation or boiling. If the disease occurs in animals other than biungulates, appropriate action must likewise be taken to prevent any risk to humans.
In general, salmonellosis cases in animals are frequently reported (between 43 and 126 cases per year). From 2000 until 2009 753 salmonellosis cases were recorded to the FVO by cantonal veterinarians which occurred mainly in cattle (324), snakes (88), dogs (70) and saurians (63).

In addition to the disease also the infection with Salmonella in certain species is notifiable. From 1995 until 2006 the infection of chicken with S. Enteritidis was notifiable and a control program was in place for breeding flocks and laying hen flocks (TSV, Article 255-261). During this period the incidence of S. Enteritidis infection in breeding flocks and laying hen flocks has steadily declined from 38 to 3 infected flocks per year. This control program was expanded 2007 to other serovars and species (TSV, Article 255-261) according to the regulation 2160/2003 of the European community.

The baseline study in laying hens resp. in broilers – which were carried out in Switzerland in 2006 resp. 2007 – showed, that the Salmonella prevalence in laying hens and broilers is low (1.3 % resp. 0.3%). The baseline study on the prevalence and antimicrobial resistance of Campylobacter spp. in broiler flocks and on the prevalence of Campylobacter spp. and Salmonella spp. in broiler carcasses carried out in 2008 resulted in a prevalence of Salmonella in broiler carcasses of 2.6%.
A study in broiler meat at retail in 2007 showed, that Swiss products from poultry had a low Salmonella prevalence (products originating from Switzerland had a prevalence of 0.4% compared to 15.3% within imported products).

In 2007 and 2008 two baseline studies were conducted, one in slaughter pigs and one in breeding pigs. The prevalence in slaughter pigs was with 2.3% on an equal level as in previous research studies. The prevalence in herds of breeding pigs was 12.9%. As breeding pigs have not been addressed in recent research this prevalence cannot be compared with previous data. Studies to be conducted in the future will deliver data for trend analysis

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

In 2009, the incidence for salmonellosis in humans counted 17.2 reports per 100,000 inhabitants. The year before, an incidence of 26.6 per 100,000 inhabitants was reported. 437 (33%) of the 1325 reported cases were caused by S. Enteritidis and 240 (18%) by S. Typhimurium. Salmonellosis is the second most frequent zoonosis in Switzerland.

Regarding salmonellosis in animals 83 cases were reported to the FVO by cantonal veterinarians in 2009 (22 in cattle, 29 in reptiles, 17 in dogs and cats, 9 in sheeps, 2 in wild birds, 2 in horses and one case each in a pig and a parrot. Furthermore, in veterinary diagnostic laboratories 6317 tests for salmonellosis were carried out in the context of clinical investigations, mainly in cattle (2321), dogs (1373) and cats (966) (see table). 393 animals were tested positive for Salmonella.

No cases of Salmonella infections in breeding flocks, laying hens or broiler flocks under the control program were reported in 2009. Two cases of infection with Salmonella Typhimurium in small scale flocks of laying hens were notified.

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

Since many years most cases in humans are caused by S. Enteritidis and S. Typhimurium.

In the slaughter pigs survey from 2008, 60% of the detected serovars (9 of 15 serovars) were either S. Enteritidis or S. Typhimurium proving once again the clear presence of these two serovars in the pig population. In the breeding pig population the presence of these two serovars was with 27% (8 of 30 serovars) significantly less dominant.

Recent actions taken to control the zoonoses

Baseline studies in laying hens (2006), broilers (2007), slaughter pigs (2007/2008) and breeding pigs (2008) were carried out to be able to realise adequate control programs. National control programs have been set up for breeding poultry flocks according to Commission Regulation (EC) No. 1003/2005 and for flocks of laying hens according to Commission Regulation (EC) No. 1168/2006.

Additional information

1. The poultry industry takes responsibility for the monitoring of broilers and poultry meat production in a system of self-auditing. More information can be found in the relevant chapters.
2. Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2.1.2 Salmonellosis in humans

Table Salmonella in humans - Species/serotype distribution

Distribution Zoonotic Agent	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.	Unknown status
Salmonella	1325	0	0	0	0	0	0
S. Enteritidis	437						
S. Typhimurium	240						
Salmonella spp.	648						

Table Salmonella in humans - Age distribution

Age distribution	S. Enteritidis			S. Typhimurium			Salmonella spp.		
	All	M	F	All	M	F	All	M	F
<1 year							50	25	24
1 to 4 years	2	1	1	16	10	5	156	87	66
5 to 14 years	11	7	4	49	21	28	135	73	59
15 to 24 years	39	20	19	60	28	32	95	48	46
25 to 44 years	98	52	44	69	32	37	97	44	52
45 to 64 years	157	94	58	34	18	15	62	31	31
65 years and older	120	58	61	12	5	7	51	29	22
Age unknown	10	2	7				2	2	0
Total :	437	234	194	240	114	124	648	339	300

Table Salmonella in humans - Seasonal distribution

Distribution Seasonal	S. Enteritidis	S. Typhimurium	Salmonella spp.
	Cases	Cases	Cases
January	27	24	61
February	21	13	32
March	20	15	36
April	23	24	53
May	35	21	61
June	36	9	46
July	64	28	57
August	81	28	88
September	38	32	47
October	63	22	72
November	24	12	65
December	5	12	30
Total :	437	240	648

2.1.3 Salmonella in foodstuffs

A. Salmonella spp. in broiler meat and products thereof

Results of the investigation

The industry takes responsibility for the monitoring of poultry meat 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. Fresh poultry meat, poultry meat preparations and poultry meat products were tested at different stages such as slaughterhouse, cutting plant and processing plant (see poultry meat table). In total 2677 tests were done (including single as well as pooled samples) of which 25 proved positive for Salmonella spp. (8 x S. Enteritidis, 6 x S. Typhimurium, 2 x S. Mbandaka, 1 x S. Senftenberg, 1 x S. 4,12:i- monophasic and 7 x Salmonella spp. not identified.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

B. Salmonella spp. in turkey meat and products thereof

Results of the investigation

The industry takes responsibility for the monitoring of turkey meat 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. 195 fresh turkey meat, turkey meat preparations and turkey meat products were tested at different stages such as slaughterhouse, cutting plant and processing plant (see poultry meat table). No positive samples could be found.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

C. 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 lane. Enterprises to be sampled are selected randomly.

Frequency of the sampling

Selected enterprises are visited once a year.

Type of specimen taken

At manufacter:
Specimens are taken from semi-hard, soft and fresh cheeses made from cow and goat milk (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.

Results of the investigation

541 cheeses were tested, all with a negative result.

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.

Additional information

1. Swiss report 2009 of the National Milk Product surveillance program
2. Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. 4,12:i:-	S. Mbandaka	S. Senftenberg
Meat from broilers (Gallus gallus) - fresh - at slaughterhouse	poultry industry	Batch	25g	140	2	2					
Meat from broilers (Gallus gallus) - fresh - at processing plant	poultry industry	Batch	10g/25g	697	8	4		4			
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at processing plant	poultry industry	Batch	10g - 200g	1085	5	1	1	3			
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant	poultry industry	Batch	25g	341	0						
Meat from broilers (Gallus gallus) - mechanically separated meat (MSM)	poultry industry	Batch	10g/100g	261	7	1	3			2	1
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at processing plant	poultry industry	Single	10g/25g	5	0						
Meat from turkey - fresh - at slaughterhouse	poultry industry	Batch	10g/25g	33	0						
Meat from turkey - fresh - at processing plant	poultry industry	Batch	10g	49	0						
Meat from turkey - meat products - raw but intended to be eaten cooked - at processing plant	poultry industry	Batch	10g	34	0						
Meat from turkey - mechanically separated meat (MSM)	poultry industry	Batch	10g	3	0						
Meat from turkey - minced meat - intended to be eaten cooked - at processing plant	poultry industry	Batch	10g	76	0						
Meat from broilers (Gallus gallus) - carcass - at slaughterhouse	poultry industry	Batch	10g/25g	148	3		2		1		

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at retail	National monitoring program	Single	25g	91	0			
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at processing plant	National monitoring program	Single	25g	371	0			
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - at processing plant	National monitoring program	Single	25g	23	0			
Cheeses made from goats' milk - soft and semi-soft - made from raw or low heat-treated milk - at processing plant	National monitoring program	Single	25g	56	0			

2.1.4 Salmonella in animals

A. Salmonella spp. in Gallus Gallus - breeding flocks

Vaccination policy

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

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. The control program covers holdings with more than 250 birds.

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 contact between birds that issubject 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. The empty premises are cleaned and disinfected. The freedom from Salmonella of the premises has to be proven by official sampling after disinfection.

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 the control program none of the tested breeding flocks were positive for salmonella.
Furthermore the industry takes responsibility for the monitoring for broiler in a system of self-auditing.
2009 several breeding flocks for meat production and broiler flocks were tested at different production stages using different materials (see tables). All results were negative.

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

Since many years tested breeding flocks were always negative for Salmonella.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

B. Salmonella spp. in Gallus Gallus - broiler flocks

Monitoring system

Sampling strategy

Broiler flocks

Flocks with at least 5’000 broiler places are being monitored since January 1st 2009.

Vaccination policy

Broiler flocks

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

Broiler flocks

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 are in force since 01.01.2009. The control program covers holdings with more than 5’000 broilers.

Notification system in place

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

Results of the investigation

In the control program, 12 flocks were tested initially positive for Salmonella. Since the determined serovars were not covered by the target or the initial sampling was done in the environment, e.g. boot swaps, and the result couldn’t be confirmed in the muscle/organ or meat of the birds, there was no case of Salmonella infection in broiler flocks.

Furthermore, the industry takes responsibility for the monitoring for broiler in a system of self-auditing. 2009 several breeding flocks for meat production were tested at different production stages using different materials (see tables). All results were negative.

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

The baseline study conducted in broiler flocks in 2007 showed that Salmonella prevalence in broilers in Switzerland is low (0.3%). Switzerland wants to maintain the current situation by implementing the afore-mentioned control measures.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

C. Salmonella spp. in Gallus Gallus - flocks of laying hens

Vaccination policy

Laying hens flocks

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

Laying hens flocks

Control measures according to the Swiss ordinance of epizootics (TSV, Article 255-261) and Commission Regulation (EC) No. 1168/2006. The control program covers holdings with more than 1’000 laying hens.

Measures in case of the positive findings or single cases

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 the control program none of the tested flocks of laying hens were positive for Salmonella.

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

The prevalence of Salmonella spp. in flocks of laying hens in Switzerland in the recent years is low. This was approved by the baseline study on the prevalence of Salmonella in laying flocks of Gallus Gallus in 2006 where Salmonella prevalence was 1.3%. In 2009 two cases of infection with Salmonella Typhimurium in small scale flocks of laying hens were notified.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

Table Salmonella in breeding flocks of Gallus gallus

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Hadar	S. Infantis	S. Typhimurium	S. Virchow	Salmonella spp., unspecified
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - Control and eradication programmes - official and industry sampling		cantons	Flock	54	0						
Gallus gallus (fowl) - breeding flocks for broiler production line - day-old chicks - Control and eradication programmes - official and industry sampling		cantons	Flock	218	0						
Gallus gallus (fowl) - breeding flocks for broiler production line - during rearing period - Control and eradication programmes - official and industry sampling		cantons	Flock	160	0						
Gallus gallus (fowl) - breeding flocks for broiler production line - hatching eggs - Control and eradication programmes - industry sampling		industry	Batch	1153	0						
Gallus gallus (fowl) - breeding flocks for egg production line - adult - Control and eradication programmes - official sampling		cantons	Flock	39	0						
Gallus gallus (fowl) - breeding flocks for egg production line - day-old chicks - Control and eradication programmes - official sampling		cantons	Flock	25	0						
Gallus gallus (fowl) - breeding flocks for egg production line - during rearing period - Control and eradication programmes - official sampling		cantons	Flock	57	0						

Footnote:

The number of breeding flocks for broiler production line and the number of breeding flocks for egg production line are not known. In total there are 34 farms holding breeding flocks with more than 250 birds per farm.

Table Salmonella in other poultry

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. 4,12:i:-	S. Indiana	S. Infantis
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling	433	cantons	Flock	380	0						
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry	433	cantons	Flock	325	0						
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling	433	cantons	Flock	299	0						
Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - industry sampling	3500	cantons	Flock	692	12	2	2		1	1	2
Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - official and industry sampling - objective sampling	3500	cantons	Flock	740	12	2	2		1	1	2
Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - official sampling - objective sampling	3500	cantons	Flock	48	0						
Gallus gallus (fowl) - laying hens - during rearing period - flocks under control programme - Control and eradication programmes - official sampling - objective sampling	433	cantons	Flock	155	0						

Table Salmonella in other poultry

	S. Kentucky	S. Mbandaka	S. Montevideo	S. Rissen
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling				
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry				
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling				
Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - industry sampling	1	1	1	1
Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - official and industry sampling - objective sampling	1	1	1	1
Gallus gallus (fowl) - broilers - before slaughter - Control and eradication programmes - official sampling - objective sampling				
Gallus gallus (fowl) - laying hens - during rearing period - flocks under control programme - Control and eradication programmes - official sampling - objective sampling				

Footnote:

Since there were no positive results in laying hens in industry sampling, there was no flock sampling carried out by the competent authority in case of positivity suspicion.

The information for laying hens (for the rearing period) and the information for the broiler flocks has to be considered as incomplete.

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Alpacas - Clinical investigations	ILD	Animal	15	0			
Birds - Clinical investigations	ILD	Animal	317	39			39
Buffalos - Clinical investigations	ILD	Animal	1	0			
Camels - Clinical investigations	ILD	Animal	3	0			
Cats - Clinical investigations	ILD	Animal	966	8			8
Cattle (bovine animals) - Clinical investigations	ILD	Animal	2321	198			198
Dogs - Clinical investigations	ILD	Animal	1373	25			25
Fur animals - Clinical investigations	ILD	Animal	11	0			
Goats - Clinical investigations	ILD	Animal	61	0			
Other animals - unspecified - Clinical investigations	ILD	Animal	388	90			90
Pigs - Clinical investigations	ILD	Animal	521	3			3
Rabbits - Clinical investigations	ILD	Animal	35	0			
Sheep - Clinical investigations	ILD	Animal	108	22			22
Solipeds, domestic - Clinical investigations	ILD	Animal	197	8			8

Footnote:

ILD = Informationssystem Labordiagnostik in der Schweiz - information system of laboratory information in Switzerland

2.1.5 Salmonella in feedingstuffs

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Compound feedingstuffs for cattle - final product	ALP	Single	800g	165	0			
Compound feedingstuffs for pigs - final product	ALP	Single	800g	31	0			
Compound feedingstuffs for poultry (non specified) - final product	ALP	Single	800g	5	0			
Compound feedingstuffs for poultry - laying hens - final product	ALP	Single	800g	42	0			
Compound feedingstuffs for poultry -breeders - final product	ALP	Single	800g	10	0			
Compound feedingstuffs for horses - final product	ALP	Single	800g	1	0			
Compound feedingstuffs for sheep - final product	ALP	Single	800g	1	0			

Footnote:

ALP = Agroscope Liebefeld-Posieux, official feed inspection service

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of cereal grain origin - maize	ALP	Single	800g	1	0			
Feed material of cereal grain origin - maize - derived	ALP	Single	800g	12	0			
Feed material of oil seed or fruit origin - linseed derived	ALP	Single	800g	1	0			
Feed material of oil seed or fruit origin - rape seed derived	ALP	Single	800g	2	0			
Feed material of oil seed or fruit origin - soya (bean) derived	ALP	Single	800g	16	0			
Feed material of oil seed or fruit origin - sunflower seed derived	ALP	Single	800g	1	0			
Other feed material - forages and roughages	ALP	Single	800g	4	0			
Other feed material - other plants	ALP	Single	800g	2	0			

Footnote:

ALP = Agroscope Liebefeld-Posieux, official feed inspection service

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of marine animal origin - fish meal	ALP	Single	800g	3	0			

Footnote:

ALP = Agroscope Liebefeld-Posieux, official feed inspection service

2.1.6 Antimicrobial resistance in Salmonella isolates

A. Antimicrobial resistance of S. Typhimurium in Animals All animals - unspecified - Clinical investigations

Sampling strategy used in monitoring

Frequency of the sampling

Samples were collected from clinical or subclinical material from different animal species.

Type of specimen taken

Clinical samples of different types and animals

Methods of sampling (description of sampling techniques)

Standard methods were used for isolation and identification.

Procedures for the selection of isolates for antimicrobial testing

All Salmonella isolates were 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 and identified using standard microbiological procedures.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Cefotaxime, Ceftazidime, Chloramphenicol, Ciprofloxacin, Colistin, Florfenicol, Gentamicin, Kanamycin, Nalidixic Acid, Sulfamethoxazole, Streptomycin, Trimethoprim, Tetracyclin

Cut-off values used in testing

Wherever possible the epidemiological cut-off values according to EUCAST were used:
Ampicillin, > 4 µg/ml; Cefotaxime, > 0.25 µg/ml; Ceftazidime, > 0.5 µg/ml; Chloramphenicol, > 16 µg/ml; Ciprofloxacin, > 0.06 µg/ml; Colistin, > 8 µg/ml; Florfenicol, > 16 µg/ml; Gentamicin, > 2 µg/ml; Kanamycin, > 8 µg/ml; Nalidixic Acid > 16 µg/ml; Sulfamethoxazole, > 256 µg/ml; Spectinomycin, > 128 µg/ml; Streptomycin, > 32 µg/ml; Trimethoprim, > 2 µg/ml; Tetrazyklin,> 8 µg/ml

Preventive measures in place

No specific preventive 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.

Results of the investigation

46 S. Typhimurium were isolated from different clinical material. 17 Isolates came from birds (mainly Gallus gallus), 12 from cattle, one from a pig, one from a dog and 14 from different not otherwise specified animal spezies.
The highest levels of resistance were found for tetracycline (17%), sulfomethoxacol (20%), streptomycin (20%), ampicillin (22%) and chloramphenicol (15%).
10% of the isolates were resistant to more than 4 antimicrobials.

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

The results were similar to those of 2008.
Resistance was most frequently observed against antimicrobials that have been used in food animals for many years. Resistance against newer antimicrobials more critical for human health (fluoroquinolones, cephalosporines) was rare.

Additional information

See: Antibiotikaresistenzmonitoring 2009 - Jahresbericht on www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009

B. Antimicrobial resistance of S. Enteritidis in Animals All animals - unspecified - Clinical investigations

Sampling strategy used in monitoring

Frequency of the sampling

Samples were collected from clinical or subclinical material from different animal species.

Type of specimen taken

Clinical samples of different types and animals

Procedures for the selection of isolates for antimicrobial testing

All Salmonella isolates were 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

Standard methods were used for isolation and identification.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Cefotaxime, Ceftazidime, Chloramphenicol, Ciprofloxacin, Colistin, Florfenicol, Gentamicin, Kanamycin, Nalidixic Acid, Sulfamethoxazole, Streptomycin, Trimethoprim, Tetracyclin

Cut-off values used in testing

Wherever possible the epidemiological cut-off values according to EUCAST were used:
Ampicillin, > 4 µg/ml; Cefotaxime, > 0.25 µg/ml; Ceftazidime, > 0.5 µg/ml; Chloramphenicol, > 16 µg/ml; Ciprofloxacin, > 0.06 µg/ml; Colistin, > 8 µg/ml; Florfenicol, > 16 µg/ml; Gentamicin, > 2 µg/ml; Kanamycin, > 8 µg/ml; Nalidixic Acid > 16 µg/ml; Sulfamethoxazole, > 256 µg/ml; Spectinomycin, > 128 µg/ml; Streptomycin, > 32 µg/ml; Trimethoprim, > 2 µg/ml; Tetrazyklin,> 8 µg/ml

Preventive measures in place

No specific preventive 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.

Measures in case of the positive findings or single cases

No measures.

Notification system in place

No notification system.

Results of the investigation

22 S. Enteritidis were isolated from different clinical material. 4 isolates came from birds (mainly Gallus gallus), 5 from cattle, 4 from horses and 9 from different not otherwise specified animal species.
Resistance was rare in S. Enteritidis. Only 2 isolates from horses showed resistance against Gentamicin, Streptomycin, Sulfamethoxazol and Trimethoprim, all other isolates were fully sensible against all tested antimicrobials.

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

The results were similar to those of 2008.

Additional information

See: Antibiotikaresistenzmonitoring 2009 - Jahresbericht on www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009

Table Antimicrobial susceptibility testing of Salmonella in All animals - unspecified - Clinical investigations

Salmonella	S. Enteritidis		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	no		no	
Number of isolates available in the laboratory	22		46	
Antimicrobials:	N	n	N	n
Amphenicols - Chloramphenicol	22	0	46	7
Amphenicols - Florfenicol	22	0	46	6
Tetracyclines - Tetracycline	22	0	46	8
Fluoroquinolones - Ciprofloxacin	22	0	46	3
Quinolones - Nalidixic acid	22	0	46	2
Trimethoprim	22	2	46	4
Aminoglycosides - Streptomycin	22	2	46	9
Aminoglycosides - Gentamicin	22	2	46	0
Aminoglycosides - Kanamycin	22	0	46	0
Penicillins - Ampicillin	22	0	46	9
Cephalosporins - Cefotaxim	22	0	46	0
Cephalosporins - Ceftazidim	22	0	46	0
Fully sensitive	22	20	46	36
Polymyxins - Colistin	22	0	46	0
Resistant to 1 antimicrobial	22	0	46	0
Resistant to 2 antimicrobials	22	0	46	1
Resistant to 3 antimicrobials	22	0	46	1
Resistant to 4 antimicrobials	22	2	46	0
Resistant to >4 antimicrobials	22	0	46	8
Sulfonamides - Sulfamethoxazol	22	2	46	9

Table Antimicrobial susceptibility testing of S. Typhimurium in All animals - unspecified - Clinical investigations - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	All animals - unspecified - Clinical investigations																								
Isolates out of a monitoring program (yes/no)	no																								
Number of isolates available in the laboratory	46																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	16	46	7										4	34	1		1	6							
Amphenicols - Florfenicol	16	46	6										31	8	1	5		1							
Tetracyclines - Tetracycline	8	46	8									22	16			5	2	1							
Fluoroquinolones - Ciprofloxacin	0.06	46	3		2	37	4	1	2																
Quinolones - Nalidixic acid	16	46	2										36	8				2							
Trimethoprim	2	46	4							41	1						4								
Aminoglycosides - Streptomycin	32	46	9											10	24	3	2	4	3						
Aminoglycosides - Gentamicin	2	46	0						22	24															
Aminoglycosides - Kanamycin	16	46	0										46												
Penicillins - Ampicillin	4	46	9								22	14	1				9								
Cephalosporins - Cefotaxim	0.5	46	0				22	21	3																
Cephalosporins - Ceftazidim	2	46	0						45	1															
Polymyxins - Colistin	2	46	0											46											
Sulfonamides - Sulfamethoxazol	256	46	9												3	15	16	3				9			

Table Antimicrobial susceptibility testing of S. Enteritidis in All animals - unspecified - Clinical investigations - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	All animals - unspecified - Clinical investigations																							
Isolates out of a monitoring program (yes/no)	no																							
Number of isolates available in the laboratory	22																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	16	22	0										10	12										
Amphenicols - Florfenicol	2	22	0									2	18	2										
Tetracyclines - Tetracycline	8	22	0								1	19	2											
Fluoroquinolones - Ciprofloxacin	0.06	22	0		1	20	1																	
Quinolones - Nalidixic acid	16	22	0										21	1										
Trimethoprim		22	2							20							2							
Aminoglycosides - Streptomycin	32	22	2									9	8	2	1		2							
Aminoglycosides - Gentamicin	2	22	2						20							2								
Aminoglycosides - Kanamycin	4	22	0										19	3										
Penicillins - Ampicillin	4	22	0							1	7	13	1											
Cephalosporins - Cefotaxim		22	0				12	9	1															
Cephalosporins - Ceftazidim	2	22	0						22															
Polymyxins - Colistin	2	22	0											22										
Sulfonamides - Sulfamethoxazol	256	22	2											1	4	7	8					2		

Table Cut-off values for antibiotic resistance testing of Salmonella in Animals

Test Method Used
Broth dilution

Standard methods used for testing
NCCLS/CLSI

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol	EUCAST	16	
	Florfenicol	EUCAST	16	
Tetracyclines	Tetracycline	EUCAST	8	
Fluoroquinolones	Ciprofloxacin	EUCAST	0.06	
Quinolones	Nalidixic acid	EUCAST	16	
Trimethoprim	Trimethoprim	EUCAST	2	
Sulfonamides	Sulfamethoxazol	CLSI	256	
Aminoglycosides	Streptomycin	EUCAST	32	
	Gentamicin	EUCAST	2	
	Kanamycin	CLSI	8	
Cephalosporins	Cefotaxim	EUCAST	0.5	
	Ceftazidim	EUCAST	2	
Penicillins	Ampicillin	EUCAST	4	
Polymyxins	Colistin	DANMAP	8	

Table Cut-off values for antibiotic resistance testing of Salmonella in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.06	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulfonamides	Sulfonamides		256	
Aminoglycosides	Streptomycin		32	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.5	
Penicillins	Ampicillin		4	

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

Campylobacteriosis in humans is a notifiable disease. Laboratories have to report cases within one week of Campylobacter spp. being detected (ordinance of the FDHA on medical doctor and laboratory reporting). In the 80s campylobacteriosis was after salmonellosis the second most reported food borne disease in humans. However, campylobacteriosis cases increased every year and in 1997 campylobacteriosis overtook salmonellosis. Since then campylobacteriosis is the main food-associated infection in Switzerland. After reaching a peak in 2000 with 105.1 reports per 100'000 inhabitants the incidence declined steadily until 2005, but always remained over 70 reports per 100'000 inhabitants. Since 2005 campylobacteriosis cases are rising again. C. jejuni has always been the most isolated serovar in humans.

Campylobacteriosis is an animal disease to be monitored (TSV, Article 5), i.e. the suspicion of occurrence of such a disease must be reported to the cantonal veterinarian. In general, campylobacteriosis cases reported to the FVO by cantonal veterinarians in animals are low because infected animals usually don't get ill. From 2000 until 2009 78 campylobacteriosis cases were reported which occurred in dogs (56), cats (11), cattle (7), sheep (3) and monkey (1). 72% of the cases concerned dogs.

As poultry represents an important reservoir of Campylobacter, the occurrence of Campylobacter spp. in broiler chicken farms has been studied since 2002 as part of the surveillance program for antibiotic resistance. In 2008 the baseline study on the prevalence and antimicrobial resistance of Campylobacter spp. in broiler flocks and on the prevalence of Campylobacter spp. and Salmonella spp. in broiler carcasses was carried out. This baseline study resulted in a proportion of 46.8% positive broiler flocks in the period May 2008 until April 2009 (60% from May 2008 until December 2008) and a prevalence of Campylobacter in broiler carcasses of 70.6% (cumulated qualitative and quantitative approach).

Furthermore, in 2008 campylobacter in cattle was analysed in the antibiotic resistance monitoring program. Between February and April 2008 faecal samples were collected from 100 cattle just before slaughter at the biggest cattle slaughter house in Switzerland. The share of positive samples was 10%. Compared with the figures from similar survey in 2006, a slight decrease could be shown: from 14% in 2006 to 10% in 2008. In both years only C. jejuni was detected.

A study in broiler meat at retail in 2007 showed, that campylobacter is found in 43.7% of the available poultry products. Products originating from Switzerland had a slightly higher prevalence then the imported products (45.7 versus 41.1%). In ¾ of the cases C. jejuni and in ¼ C. coli was found. Since the last comparable study conducted in 2002, the prevalence of Campylobacter in poultry meat has increased significantly.

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

In 2009 campylobacteriosis cases in humans increased compared with previous years to 105.9 reports per 100'000 inhabitants. The incidence was even higher than the last peak in 2000 with 105.1 reports per 100'000 inhabitants. 52% of the cases were caused by C. jejuni, 3% by C. coli and in 36% either by C.

jejuni or C. coli (no further differentiation was done). Other species such as C. fetus (16 cases) or C. lari (4 cases) were detected very rarely and in 11% the causing species remained unknown.

In animals, 26 (19 dogs, 4 cats, 2 sheep and 1 cattle) cases of campylobacteriosis were reported to the FVO by cantonal veterinarians in 2009. The reporting rate was higher than in the years before. Furthermore, in veterinary diagnostic laboratories 2864 tests for campylobacteriosis were carried out in the context of clinical investigations in 2009, mainly in dogs (1350), cats (952) and cattle (247).

Campylobacter is one of the main bacteria in the antimicrobial resistance monitoring program. A random sample of broilers and pigs was investigated at slaughter using caecal samples and fecal swabs. The samples are taken distributed over the year, so seasonal effects may be excluded. In 2009 44% of the 442 sampled broiler flocks were positive for Campylobacter, 141 isolates of C. jejuni und 55 C. coli were identified. In 350 sampled pigs the prevalence was 67%, 235 C. coli und one C. jejuni strains were isolated.

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

Campylobacteriosis occurs most commonly in young adults (20-29 years). In the year 2009, infants, especially those aged 0-4 years, were most commonly affected. Like adults aged 20-29 years, they are at above-average risk of contracting campylobacteriosis. It is suspected that the high rate of disease in young adults is attributable to increased travel and less regard for kitchen hygiene at this age. Therefore, travelling abroad as well as consumption of poultry meat and poultry liver are expected to be the most likely risk factors in humans for campylobacteriosis in Switzerland.

Recent actions taken to control the zoonoses

Switzerland formed 2009 a so called campylobacter-platform with stakeholders of the poultry industry, researchers and national and cantonal authorities, all of them concerned by increasingly high incidence of human campylobacteriosis, high prevalence in broiler flocks and absence of efficient control measures. The aim of the campylobacter-platform is to contribute to a substantial decrease of campylobacteriosis in humans. Information exchange, coordination and evaluation of control measures, identification of gaps of knowledge and initialization of applied research projects are the main tasks of the campylobacter-platform. The focus is on the three topics: risk factors for human infection, Campylobacter safe broiler production and disease awareness along the food chain.

Additional information

1. The industry takes responsibility for the monitoring of broilers and poultry meat production in a system of self-auditing. More information can be found in the relevant chapters.

2. Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2.2.2 Campylobacteriosis in humans

Table Campylobacter in humans - Species/serotype distribution

Distribution Zoonotic Agent	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.	Unknown status
Campylobacter	8154	0	0	0	0	0	0
C. coli	222						
C. jejuni	4197						
C. upsaliensis	0						
Campylobacter spp., unspecified	3735						

Table Campylobacter in humans - Age distribution

Age distribution	C. coli			C. jejuni			Campylobacter spp., unspecified		
	All	M	F	All	M	F	All	M	F
<1 year	3	1	2	69	37	32	67	37	29
1 to 4 years	9	8	1	200	115	78	195	105	86
5 to 14 years	11	7	4	289	155	124	290	167	122
15 to 24 years	29	9	20	783	397	375	618	303	312
25 to 44 years	73	40	33	1349	693	642	1159	590	561
45 to 64 years	52	29	23	905	529	368	844	473	366
65 years and older	43	15	26	576	297	271	544	270	268
Age unknown	2	1	1	26	10	12	18	13	3
Total :	222	110	110	4197	2233	1902	3735	1958	1747

Table Campylobacter in humans - Seasonal distribution

Distribution Seasonal	C. coli	C. jejuni	C. upsaliensis	Campylobacter spp., unspecified
	Cases	Cases	Cases	Cases
January	28	370	0	718
February	9	162	0	321
March	9	228	0	436
April	12	255	0	482
May	17	277	0	546
June	21	506	0	897
July	34	610	0	1059
August	32	462	0	980
September	12	361	0	721
October	18	333	0	695
November	11	266	0	596
December	19	367	0	701
Total :	222	4197	0	8152

2.2.3 Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Results of the investigation

The industry takes responsibility for the monitoring of poultry meat production in a system of self-auditing following the HACCP principles. Results of the Campylobacter 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. Fresh poultry meat, poultry meat preparations and poultry meat products were tested at different stages such as slaughterhouse, cutting plant and processing plant (see Campylobacter poultry meat table). In total 1536 tests were done (including single as well as pooled samples) of which 527 proved positive for Salmonella spp. (unspecified (399), C. jejuni (123) and C. coli (5)). No imported meat samples were included.

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

The last study in 2008 comparable to the one in 2002, showed that the prevalence of Campylobacter in poultry meat has increased significantly.

Additional information

Swiss zoonoses report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus) - fresh - at slaughterhouse	poultry industry	Batch	10g/25g	40	13		6			7
Meat from broilers (Gallus gallus) - fresh - at processing plant	poultry industry	Batch	10g - 200g	677	341	5	104			232
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at processing plant	poultry industry	Batch	10g - 200g	185	61		13			48
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant	poultry industry	Batch	25g	341	0					
Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - at processing plant	poultry industry	Single	25g	1	0					
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at processing plant	poultry industry	Single	25g	8	4					4
Meat from turkey - fresh - at slaughterhouse	poultry industry	Single	10g	22	0					
Meat from turkey - fresh - at processing plant	poultry industry	Single	10 - 200g	76	12					12
Meat from turkey - meat preparation - intended to be eaten cooked - at retail	poultry industry	Single	10g	18	2		2			
Meat from turkey - minced meat - intended to be eaten cooked - at processing plant	poultry industry	Single	10g	4	0					
Meat from broilers (Gallus gallus) - carcass - at slaughterhouse	poultry industry	Batch	50g	135	85					85
Meat from turkey - fresh - at cutting plant	poultry industry	Single	200g	51	11					11

2.2.4 Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

A random sample of 442 broiler herds was investigated at slaughter using ceacal samples. The samples were taken distributed over the year in order to exclude seasonal effects.
The broiler slaughter plants included in the surveillance program account for 95% of the total production of broilers in Switzerland. The number of samples for each plant has been determined in proportion to the number of animals slaughtered per year. Each sample represents one herd. The samples were taken in the framework of the antimicrobial resistance monitoring and the number of samples taken should provide at least 170 isolates for the susceptibility testing. The broiler batch size of 442 leads to an accuracy of 4.6% and a confidence of 95% with an estimated prevalence of 45%.

Frequency of the sampling

At slaughter

Approx. 38 samples per week

Type of specimen taken

At slaughter

caecal samples

Methods of sampling (description of sampling techniques)

At slaughter

In total 5 intact and full caeca (one each from 5 different broilers) per slaughter batch were collected at the time of evisceration.

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: At the laboratory, caecal contents were aseptically removed and pooled to one composite sample. Direct culture was carried out on a selective medium suitable for Campylobacter (m CCDA as well as Campylosel). Identification of Campylobacter was carried out according to ISO 10272 -1: 2006.

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.

Results of the investigation

In 2009 44% of the 442 sampled broiler flocks were positive for Campylobacter, 141 isolates of C. jejuni und 55 C. coli were identified.

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

The prevalence of Campylobacter in broiler flocks decreased slightly from 47% in 2008 (baseline study) to 44% in 2009.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

B. Campylobacter spp., unspecified in Animals Pigs - fattening pigs - unspecified - at slaughterhouse - Surveillance - official controls - objective sampling

Monitoring system

Sampling strategy

A random sample of 350 pigs is investigated at slaughter using rectal swabs. The samples are taken distributed over the year, in order to exclude seasonal effects.
The pig slaughter plants included in the surveillance program account for over 85% of the total production of pigs in Switzerland. The number of samples for each plant has been determined in proportion to the number of animals slaughtered per year. The samples were taken in the framework of the antimicrobial resistance monitoring and the number of samples taken should provide at least 170 isolates for the susceptibility testing. The sample size of 350 leads to an accuracy of 5% and a confidence of 95% with an estimated prevalence of 65%.

Frequency of the sampling

Approx. 30 samples per month

Type of specimen taken

rectal swabs

Case definition

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

Diagnostic/analytical methods used

At the laboratory, samples were cultured within 72h after sampling with direct cultivation on selective culture media (m CCDA as well as Campylosel). Identification of Campylobacter was carried out according to ISO 10272-1: 2006.

Vaccination policy

No vaccination available.

Measures in case of the positive findings or single cases

Mandatory notification; no measures are taken.

Results of the investigation

In 350 sampled pigs the prevalence of Campylobacter was 67%, 235 C. coli and one C. jejuni strains were isolated.

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

C. coli is prevalent in most swine holdings. As Campylobacter doesn’t survive on the suface of swine carcass due to drying process, this finding is not very meaningful for public health.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009

Table Campylobacter in animals

	Source of information	Sampling unit	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Alpacas - Clinical investigations	ILD	Animal	1	0					
Birds - Clinical investigations	ILD	Animal	70	0					
Camels - Clinical investigations	ILD	Animal	1	0					
Cats - Clinical investigations	ILD	Animal	952	3					3
Cattle (bovine animals) - Clinical investigations	ILD	Animal	247	8					8
Dogs - Clinical investigations	ILD	Animal	1350	12					12
Fur animals - Clinical investigations	ILD	Animal	11	0					
Gallus gallus (fowl) - broilers - at slaughterhouse - Monitoring	antimicrobial resistance monitoring	Flock	442	196	55	141			
Goats - Clinical investigations	ILD	Animal	10	0					
Other animals - unspecified - Clinical investigations	ILD	Animal	94	0					
Pigs - Clinical investigations	ILD	Animal	13	0					
Pigs - fattening pigs - at slaughterhouse - Monitoring	antimicrobial resistance monitoring	Animal	350	236	235	1			
Rabbits - Clinical investigations	ILD	Animal	27	0					
Sheep - Clinical investigations	ILD	Animal	13	0					
Solipeds, domestic - Clinical investigations	ILD	Animal	73	0					
Wild animals - Clinical investigations	ILD	Animal	2	0					

Table Campylobacter in animals

Footnote:

ILD = Informationssystem Labordiagnostik in der Schweiz - information system of laboratory information in Switzerland

2.2.5 Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in pigs

Sampling strategy used in monitoring

Frequency of the sampling

Sampling in the framework of a monitoring programme on antimicrobial resistance in food-producing animals. In total 350 fecal samples were evenly collected throughout the year.The pig slaughter plants included in the surveillance programme account for > 85% of the total production of pigs in Switzerland. The number of samples for each plant has been determined in proportion to the number of animals slaughtered per year.

Type of specimen taken

Fecal samples.

Methods of sampling (description of sampling techniques)

The samples were taken rectally using a swab in standard transportation medium (Transport Swabs, Oxoid TS0001A, AMIES W/O CH). Immediately after collection, the samples were 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 analyzed 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 with direct cultivation on selective culture media. Identification of Campylobacter was carried out according to ISO 10272-1: 2006.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Chloramphenicol, Ciprofloxacin, Erythromycin, Gentamicin, Nalidixic acid, Streptomycin, Tetracyclin

Cut-off values used in testing

Resistance was defined following the epidemiological cut-off values published by the Europaean Committee on Antimicrobial Susceptiblitiy Testing (EUCAST). Chloramphenicol, ≤ 16 µg/ml; Ciprofloxacin, ≤ 1 µg/ml; Erythromycin, ≤ 4 µg/ml for C. jejuni, ≤ 6 µg/ml for C. coli; Gentamicin, ≤ 1 µg/ml for C. jejuni, ≤ 2 µg/ml for C. coli; Nalidixic acid, ≤ 16 µg/ml for C. jejuni, 32µg/ml for C. coli ; Streptomycin, ≤ 2 µg/ml for C. jejuni, 4 µg/ml for C. coli; Tetracycline, ≤ 2 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

Recent actions taken to control the zoonoses

See 2.2.1 A Thermophilic Capylobacter general evaluation

Results of the investigation

191 C. coli isolates from fattening pigs were subjected to susceptibility testing.
The highest proportions of resistant isolates were found against streptomycin (73%). High levels of resistance were also found against ciprofloxacin (35%), nalidixic acid (35%) and tetracycline (23%).
16 % the C. coli isolates were fully sensitive to all tested antimicrobials, 3% showed resistance against more than four antimicrobials.

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

Prevalence of resistance is high to very high for streptomycin and tetracycline but shows decreasing tendencies over the last years. The occurrence of resistances to ciprofloxacin, erythromycin and gentamicin stayed stable for C. coli in pigs.

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

Consumption of pork amounted to 24.6kg per person in the year 2009. This corresponds to 47% of the total meat consumption. Even though the relevance 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 tetracycline is of concern, because these antimicrobials are used to treat human campylobacter infections.

Additional information

See: Antibiotikaresistenzmonitoring 2009 - Jahresbericht on www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009

B. Antimicrobial resistance in Campylobacter jejuni and coli in poultry

Sampling strategy used in monitoring

Frequency of the sampling

Sampling in the framework of a monitoring programme on antimicrobial resistance in food-producing animals. In total 442 caecal samples were collected evenly throughout the year. The broiler slaughter plants included in the surveillance programme account for 95% of the total production of broilers in Switzerland. The number of samples for each plant has been determined in proportion to the number of animals slaughtered per year. Each sample represents one herd.

Type of specimen taken

Caecal samples

Methods of sampling (description of sampling techniques)

In total 5 intact and full caeca (one each from 5 different broilers) per slaughter batch were collected at the time of evisceration.

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 with direct cultivation on selective culture media. Identification of Campylobacter was carried out according to ISO 10272-1: 2006.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Chloramphenicol, Ciprofloxacin, Erythromycin, Gentamicin, Nalidixic acid, Streptomycin, Tetracyclin

Cut-off values used in testing

Resistance was defined following the epidemiological cut-off values published by the Europaean Committee on Antimicrobial Susceptiblitiy Testing (EUCAST). Chloramphenicol, ≤ 16 µg/ml; Ciprofloxacin, ≤ 1 µg/ml; Erythromycin, ≤ 4 µg/ml for C. jejuni, ≤ 6 µg/ml for C. coli; Gentamicin, ≤ 1 µg/ml for C. jejuni, ≤ 2 µg/ml for C. coli; Nalidixic acid, ≤ 16 µg/ml for C. jejuni, 32µg/ml for C. coli ; Streptomycin, ≤ 2 µg/ml for C. jejuni, 4 µg/ml for C. coli; Tetracycline, ≤ 2 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

Recent actions taken to control the zoonoses

See 2.2.1 A Thermophilic Capylobacter general evaluation

Results of the investigation

131 C. jejuni and 54 C. coli isolates from broilers were subjected to susceptibility testing.

The highest proportions of resistant isolates for both species were found against ciprofloxacin, nalidixic acid and tetracycline. For C. coli additionally high levels of resistance against streptomycin could be detected.
61 % of the C. jejuni isolates and 26 % of the C. coli isolates were fully sensitive to 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 and gentamicin, with an increasing tendency for erythromycin in C. coli (differences between years statistically not significant). The prevalence of resistance to ciprofloxacin increased from about 15% in 2006 to over 30% in C. jejuni and over 40% in C. coli. In the same time period the resistance to streptomycin decreased in C. jejuni and increased in C. coli and the occurrence of resistance to tetracycline stayed stable for C. jejuni and had a tendency to increase in C. coli (difference statistically not significant).

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

Consumption of poultry meat was 10.8 kg per person in 2009, which corresponds to 20.6% of total meat consumption. About 52% of the poultry meat consumed in Switzerland is imported. 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 a favorable resistance situation in campylobacter in broilers and the increase of resistances against ciprofloxacin gives cause for certain concern because quinolones are on the WHO list of critically important antimicrobials and are a preferred empiric treatment for gastrointestinal diseases.

Additional information

See: Antibiotikaresistenzmonitoring 2009 - Jahresbericht on www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009

Table Antimicrobial susceptibility testing of Campylobacter in Gallus gallus (fowl)

Campylobacter	Campylobacter spp., unspecified		C. coli		C. jejuni	
Isolates out of a monitoring program (yes/no)			yes		yes	
Number of isolates available in the laboratory			54		131	
Antimicrobials:	N	n	N	n	N	n
Fluoroquinolones - Ciprofloxacin			54	22	131	41
Quinolones - Nalidixic acid			54	22	131	41
Aminoglycosides - Gentamicin			54	0	131	0
Macrolides - Erythromycin			54	4	131	0
Tetracyclines - Tetracycline			54	18	131	26
Fully sensitive			54	14	131	80
Resistant to 1 antimicrobial			54	13	131	10
Resistant to 2 antimicrobials			54	12	131	25
Resistant to 3 antimicrobials			54	6	131	16
Resistant to 4 antimicrobials			54	8	131	0
Resistant to >4 antimicrobials			54	1	131	0
Aminoglycosides - Streptomycin			54	26	131	0
Amphenicols - Chloramphenicol			54	0	131	0

Table Antimicrobial susceptibility testing of Campylobacter in Pigs

Campylobacter	Campylobacter spp., unspecified		C. coli	
Isolates out of a monitoring program (yes/no)			yes	
Number of isolates available in the laboratory			191	
Antimicrobials:	N	n	N	n
Fluoroquinolones - Ciprofloxacin			191	66
Quinolones - Nalidixic acid			191	67
Aminoglycosides - Gentamicin			191	1
Macrolides - Erythromycin			191	19
Tetracyclines - Tetracycline			191	45
Fully sensitive			191	30
Resistant to 1 antimicrobial			191	65
Resistant to 2 antimicrobials			191	39
Resistant to 3 antimicrobials			191	39
Resistant to 4 antimicrobials			191	12
Resistant to >4 antimicrobials			191	6
Aminoglycosides - Streptomycin			191	140
Amphenicols - Chloramphenicol			191	0

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

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - caecum - Monitoring - official sampling																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	131																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	16	131	0									78	45	8											
Tetracyclines - Tetracycline	2	131	26						85	20					1	25									
Fluoroquinolones - Ciprofloxacin	1	131	41				17	63	8	2			1	40											
Quinolones - Nalidixic acid	16	131	41									27	53	10		1		40							
Aminoglycosides - Streptomycin	2	131	0								130	1													
Aminoglycosides - Gentamicin	1	131	0					61	68	2															
Macrolides - Erythromycin	4	131	0							71	42	16	2												

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

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - caecum - Monitoring - official sampling																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	54																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	16	54	0									4	26	23	1									
Tetracyclines - Tetracycline	2	54	18						20	10	4	2	1	1	1	15								
Fluoroquinolones - Ciprofloxacin	1	54	22				8	17	6	1			1	21										
Quinolones - Nalidixic acid	32	54	22									1	19	11	1			22						
Aminoglycosides - Streptomycin	4	54	26						25			3		3	15	8								
Aminoglycosides - Gentamicin	2	54	0					9	40	5														
Macrolides - Erythromycin	16	54	4							14	11	19	5	1			4							

Table Antimicrobial susceptibility testing of C. coli in Pigs - fattening pigs - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Pigs - fattening pigs - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	191																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	16	191	0									29	122	39	1										
Tetracyclines - Tetracycline	2	191	45						54	64	20	8	3	3	10	29									
Fluoroquinolones - Ciprofloxacin	1	191	66				50	60	13	2			12	54											
Quinolones - Nalidixic acid	32	191	67									4	59	57	3	1	8	59							
Aminoglycosides - Streptomycin	4	191	140						48			3		13	46	81									
Aminoglycosides - Gentamicin	2	191	1					26	140	24			1												
Macrolides - Erythromycin	16	191	19							40	54	61	15	2		1	18								

Table Cut-off values used for antimicrobial susceptibility testing of Campylobacter in Animals

Test Method Used
Broth dilution

Standard methods used for testing
NCCLS/CLSI

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline	EUCAST	2	
Fluoroquinolones	Ciprofloxacin	EUCAST	1	
Quinolones	Nalidixic acid	EUCAST	16	
Aminoglycosides	Gentamicin	EUCAST	1	
	Streptomycin	EUCAST	2	
Macrolides	Erythromycin	EUCAST	4	
Amphenicols	Chloramphenicol	EUCAST	16	

Footnote:

Breakpoints for C. jejuni
Breakpoints for C. coli were adapted in the corresponding tables

Table Cut-off values used for antimicrobial susceptibility testing of Campylobacter in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline		2	
Fluoroquinolones	Ciprofloxacin		1	
Aminoglycosides	Gentamicin		1	
	Streptomycin		2	
Macrolides	Erythromycin		4	

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

Listeriosis in humans is a notifiable disease. The laboratory must report it within one week of detecting Listeria monocytogenes (ordinance of the FDHA on doctor and laboratory reports) to the Federal Office of Public Health.

The biggest epidemic outbreak in Switzerland was in the 1980s 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.
In the 1990s human listeriosis cases fluctuated between 19 (in 1990) and 45 (in 1998) cases per year. Since 2000, cases per year are still unstable and compared to the 1990s noticeably higher with cases between 28 (in 2002) and 76 (in 2006). In the years 2005 and 2006 there was a remarkable increase in listeriosis cases with more than 70 cases in these years.
In 2005, the elevated number of cases was partly due to an outbreak with a particular cheese contaminated with Listeria monocytogenes (serotyp 1/2a). The increased number of cases in 2006 could not be linked to a particular outbreak. After 2005 and 2006 the number of cases decreased 2007 to the level of 2004 with roughly 60 cases. In 2008, it declined further to 45 reported cases. The incidence decreased thus from 1.0 in 2006 to 0.8 in 2007 and 0.6 in 2008 per 100,000 inhabitants. The people mainly affected are infants less than one year old and also people aged over 60.

Listeriosis in animals falls into the category of animal diseases to be monitored (TSV, Article 5), i.e. the suspicion or occurrence of such a disease must be reported to the cantonal veterinarian.

From 2000 until 2009 230 listeriosis cases were reported to the FVO by cantonal veterinarians which occurred in sheep (87), cattle (78), goats (52), chicken (3), “other animals” (4), wild birds (2), foxes (1), deer (1), rabbits (1), donkeys (1), and cats (1). From 1991 until 1995 never more than 3 cases of listeriosis were reported. Most cases occurred in the time period 1999 until 2004 with cases between 27 to 34 per year.

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

In 2009, 41 human cases were reported to the Federal Office of Public Health and as in the year before no cases in newborns were detected.

In animals, the number of 11 listeriosis cases reported to the FVO in 2009 by cantonal veterinarians (5 cases in sheep, 4 cases in goats, 2 cases in cattle) were lower than the year before.
Furthermore, in veterinary diagnostic laboratories 36 tests for listeriosis were carried out in the context of clinical investigations in 2009, mainly in cattle (14), sheep (13), and goats (7) but also in alpacas & lamas

(1) and wild animals (2). 20 animals (9 sheep, 7 cattle and 4 goats) were positive for Listeria due to either detection of antigen or histological changes characteristic of listeriosis.

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

Milk products and cheeses are a potential source of infection. Monitoring the occurrence of Listeria at different stages in the food chain is extremely important to prevent infections with contaminated food.

Recent actions taken to control the zoonoses

In the dairy industry, a Listeria monitoring program (LMP) has been set up by the research institute of Agroscope Liebefeld-Posieux (ALP) with which contaminations can be rapidly identified. Products are tested for Listeria at ALP as part of quality assurance programs. By taking part in the LMP, customers provide important evidence to ensure compliance with legal requirements (CH law and EU hygiene regulations). In 2009, a total of 4’946 samples were tested for Listeria as part of the LMP. 55 samples (1.1%) - namely 1 milk, 7 hard cheeses, 12 semi-hard cheeses, 1 soft cheese, 1 brine, 5 smear water samples and 28 environmental samples - proved positive for Listeria monocytogenes. Most of the cheese samples showed contamination of the cheese surface. Only in the 1 positive soft cheese sample the body of the cheese contained L. monocytogenes.

In addition, a Listeria Advisory Team is provided by the ALP. The team can be called in for planning and consultation in partial or total decontamination of facilities enabling businesses to return to the market. The team further provides a checkup of companies safety concepts for any weaknesses or deficits. An evaluation of the last 12 years showed that consultations by the ALP Listeria Advisory Team are having a sustainable impact: in 85% of cases, the measures taken proved successful over the subsequent years of operation.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2.3.2 Listeriosis in humans

Table Listeria in humans - Species/serotype distribution

Distribution Zoonotic Agent	Cases	Cases Inc.
Listeria	41	0
L. monocytogenes	2	
L. monocytogenes serovar 1/2a	16	
L. monocytogenes serovar 1/2b	3	
L. monocytogenes serovar 1/2c	3	
L. monocytogenes serovar 4b	17	

Table Listeria in humans - Age distribution

Age distribution	L. monocytogenes			Listeria spp., unspecified		
	All	M	F	All	M	F
15 to 24 years	1	1	0			
25 to 44 years	4	1	3			
45 to 64 years	9	8	1			
65 years and older	27	12	15			
Total :	41	22	19	0	0	0

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 a national monitoring program 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 are taken of all dairy products at the end of the production lane. Enterprises to be sampled are selected randomly.

Frequency of the sampling

At the production plant

Selected enterprises are visited once a year.

Type of specimen taken

At the production plant

Specimens are taken from semi-hard and soft cheeses made from cow and goat milk (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 (> 100 per g).

Diagnostic/analytical methods used

At the production plant

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.

Measures in case of the positive findings

The concerned food has to be confiscated and destroyed. Depending on the situation the product is recalled and a public warning is submitted.

Notification system in place

Cantonal food authorities are obliged to report positive cases to the FOPH.

Results of the investigation

139 samples in the context of the national monitoring program were tested, none of them were positive.

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Listeria	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at processing plant	National monitoring program	Single	25g	66	0	66	0	0		
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at processing plant	National monitoring program	Single	25g	24	0	24	0	0		
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - at processing plant	National monitoring program	Single	25g	5	0	5	0	0		
Cheeses made from goats' milk - soft and semi-soft - made from raw or low heat-treated milk - at processing plant	National monitoring program	Single	25g	44	0	44	0	0		

2.3.4 Listeria in animals

Table Listeria in animals

	Source of information	Sampling unit	Units tested	Total units positive for Listeria	L. monocytogenes	Listeria spp., unspecified
Alpacas - Clinical investigations	ILD	Animal	1	0		
Cattle (bovine animals) - Clinical investigations	ILD	Animal	14	7		7
Goats - Clinical investigations	ILD	Animal	7	4		4
Sheep - Clinical investigations	ILD	Animal	13	9		9
Wild animals - Clinical investigations	ILD	Animal	1	0		

Footnote:

ILD = Informationssystem Labordiagnostik in der Schweiz - information system of laboratory information in Switzerland

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

Enterohaemorrhagic Escherichia coli (EHEC) infections in humans are notifiable since 1999. Laboratories report the detection of EHEC and report EHEC diseases within one week to the cantonal health authorities and medical doctors to the Federal Office of Public Health (FOPH).

Since the first reporting in 1999 confirmed human VTEC cases are fluctuating between 28 and 67 cases per year. The incidence of VTEC infections was never above 0.9 reports per 100'000 inhabitants. Babies and infants aged up to 4 years old are the most frequently affected and disease often develops to the severe form of haemolytic-uraemic syndrome (HUS). From 114 cases occurring from 1997 to 2004 81.5% involved pre-school children suggesting that VTEC is primarily a paediatric problem.

Figures from food producing animals show that ruminants, especially small ruminants, are an important reservoir for STEC infections in Switzerland. A survey at slaughter in 2000 showed that 14% of faecal samples from cattle, 30% from sheep and 22% from pigs were STEC-positive. 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. In swine the virulence factors of the majority of the found strains seem to be of low virulence.
A study in the 1990s showed that 2.4% of minced meat samples and 21.6% of uncooked, deep-frozen hamburgers were positive for STEC.

Raw milk cheese was tested for STEC from 2006 to 2008 as part of the “national monitoring program for dairy products” (Zweifel et al. 2010). In 1422 samples of raw milk cheese from all over Switzerland, STEC strains could be isolated from 29 of these cheeses in cultures involving 24 semi-hard cheeses and 5 soft cheeses. Thirteen of the 24 strains typeable with O antisera belonged to the serogroups O2, O22 and O91. Nine strains harbored hlyA (enterohemorrhagic E. coli hemolysin), whereas none of the strains tested positive for eae (intimin).

Furthermore, it is known that VTEC infections also occur frequently after trips abroad to warmer climes. From 1999 to 2006 in 249 cases of EHEC diseases it was found that 62.7% of the patients had been abroad in the week before the onset of the disease. The most common regions mentioned were Southern Europe (incl. Turkey), North Africa, Central America and India.

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

In 2009 42 cases of STEC were reported (2008, 67 cases). Babies and infants aged up to 4 years old were alike previous years the most frequently affected.

The data from the national monitoring program for dairy products confirm a low prevalence of STEC-strains in semi-hard and soft cheese from raw milk. All isolated strains belonged to non-O157 serotypes. These findings confirm that raw milk cheese may constitute a possible source of infection for STEC.

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

In view of the low infectious dose of STEC (<100 microorganisms) an infection via contaminated food is easily possible. Thorough cooking of critical foods prevents infection with the STEC originally present in the raw products. Furthermore, it is extremely important to comply with milking hygiene to keep the contamination of raw milk to a minimum. The effectiveness of heat treatment, as it is often used in the production of raw milk cheese, requires further systematic investigation.

Additional information

1. Federal Office of Public Health (2008). Enterohämorrhagische Escherichia coli (EHEC), epidemiologische Daten in der Schweiz von 1996 bis 2006. Bulletin of the FOPH; No. 14: 240-246.

2. Stephan et al., Schweiz. Arch. Tierheilkd. 142, 110-114 (2000), Zweifel et al., Int. J. Food Microbiol. 92, 45-53 (2004), Kaufmann et al., J. Food. Prot. 69/2, 260-266 (2006).

3. 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. 91, 2561-2565.

4. Zweifel C. et al. (2010). Characteristics of Shiga Toxin-Producing Escherichia coli Isolated from Swiss Raw Milk Cheese within a 3-Year Monitoring Program. Journal of Food Protection, Vol. 73, No. 1, 88-91.

5. Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009).

2.4.2 E. coli infections in humans

Table Escherichia coli, pathogenic in humans - Species/serotype distribution

Distribution Zoonotic Agent	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
Escherichia coli, pathogenic	84	0	0	0	0	0
HUS	7					
- caused by O157 (VT+)	7					
E.coli infect. (except HUS)	35					
- caused by 0157 (VT+)	30					
- caused by other VTEC	5					

Footnote:

The E. coli infect. (except HUS) caused by O157 (VT+)(= 30) and caused by other VTEC cases (= 5)are only labratory results, no confirmed cases. The total of 35 E. coli infections (except HUS) are confirmed cases, though the allocation of the serovars O157 or non-O157 is not clear.

Table Escherichia coli, pathogenic in humans - Age distribution

Age distribution	Verotoxigenic E. coli (VTEC)			VTEC O157:H7			VTEC non-O157		
	All	M	F	All	M	F	F	M	All
<1 year	1	0	1						
1 to 4 years	14	9	5	6	4	2	1	1	2
5 to 14 years	4	4	0						
15 to 24 years	1	0	1				1	0	1
25 to 44 years	10	6	4						
45 to 64 years	9	4	5				1	1	2
65 years and older	3	1	2	1	1				
Total :	42	24	18	7	5	2	3	2	5

Footnote:

All VTEC O157 cases are also HUS cases.
The VTEC non-O157 cases are not confirmed, only positive labratory results.

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

Tuberculosis in humans is a notifiable disease. Medical doctors have to report within one week the detection of mycobacteria (of the Mycobacterium tuberculosis complex) in culture or the start of a treatment with more than 3 different antituberculosis agents. Laboratories have to report the detection of mycobacteria of the Mycobacterium tuberculosis complex as well (ordinance of the FDHA on medical doctor and laboratory reporting). It should be noted that among the reported tuberculosis cases each year, the proportion of tuberculosis cases attributable to Mycobacterium bovis has been constantly lower than 2% since many years.

In animals, tuberculosis is defined as the detection of Mycobacterium bovis or Mycobacterium tuberculosis (TSV, Articles 158 – 159) and falls into the category of animal diseases to be eradicated (TSV, Article 3).

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.

From 2000 until 2009 in total 8 tuberculosis cases in animals were reported to the FVO by cantonal veterinarians which occurred in cats (2), in birds (2), in chicken (1), monkey (1), cattle (1) and dog (1).

In addition, 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.

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

In 2009, the Federal Office of Public Health received reports of 556 cases of tuberculosis. Among these cases, Mycobacterium tuberculosis was isolated in 360 patients, Mycobacterium bovis in 4 patients and Mycobacterium africanum in 8 patients (provisional figures).

Humans can be infected by tuberculosis through the consumption of food containing mycobacteria (milk, raw meat etc.). However, it should be noted that in the recent years not more than 2% of the human tuberculosis cases were caused by M. bovis. And as Swiss cattle are recognised as free from tuberculosis this transmission route is considered to be of no relevance for afore mentioned foods originating of Switzerland.

In Austria (Tyrolia and Vorarlberg) M. caprae infection is endemic in red deer since the 90ties. In the last few years cattle has been infected on the alpine pastures in these regions. Thus the summer grazing of Swiss cattle in these regions is a certain risk. Other risk factor are wild animals living close to the Austrian or German border and the international trade with animals.

No cases of tuberculosis in cattle were reported to the FVO by the cantonal veterinarians in 2009, however 1 cat and 1 dog from the same farm were infected.

Furthermore, in veterinary diagnostic laboratories 31 animals (28 cattle, 1 dog, 1 pig and 1 other animal) were tested for Mycobacterium bovis and/or Mycobacterium tuberculosis in the context of clinical investigations by antigen assay. The dog had a positive testing result.

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

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2.5.2 Tuberculosis, mycobacterial diseases in humans

Table Mycobacterium in humans - Species/serotype distribution

Distribution Zoonotic Agent	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
Mycobacterium	372	0	0	0	0	0
M. bovis	4					
M. tuberculosis	360					
M. africanum	8					

Table Mycobacterium in humans - Age distribution

Age distribution	M. bovis		
	All	M	F
15 to 24 years	1		
25 to 44 years	1		
45 to 64 years	1		
65 years and older	1		
Total :	4	0	0

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.

Notification system in place

Bovine tuberculosis is notifiable since 1950. Bovine tuberculosis is regulated as 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. 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.

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.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Cattle (bovine animals) - unspecified - Clinical investigations	ILD	Animal	28	0			
Dogs - Clinical investigations	ILD	Animal	1	1			1
Other animals - unspecified - Clinical investigations	ILD	Animal	1	0			
Pigs - Clinical investigations	ILD	Animal	1	0			

Footnote:

1) ILD = Informationssystem Labordiagnostik in der Schweiz - information system of laboratory information in Switzerland

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
Schweiz/Suisse/Svizzera	42584	1602513	42584	100	0	0	see footnote	111394	0	0	0
Total : [1)]	42584	1602513	42584	100	0	0	N.A.	111394	0	0	0

Comments:

[1)] N.A.

Footnote:

1) The last survey was done in 1997. Data from the last survey indicated.

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

Brucellosis in humans is a notifiable disease. Laboratories must report the detection of Brucella within one week (ordinance of the FOHA on medical doctor and laboratory reports). The detection numbers of Brucella spp. in humans have been rare for many years.
Brucellosis in animals falls into the category of a “disease to be eradicated“ (TSV, Article 3). Government measures are applied to control brucellosis in sheep and goats (Brucella melitensis, TSV, Articles 190-195), in cattle (Brucella abortus, TSV, Articles 150-157) and in pigs (Brucella suis as well as Brucella abortus and Brucella melitensis, TSV, Articles 207 – 211). These animal species must be tested for brucellosis in cases where the causes of abortion are being investigated (TSV, Article 129). Bovine brucellosis is notifiable since 1956, in sheep and goats since 1966.
Switzerland is officially recognised as free of brucellosis in cattle, sheep and goats. Brucella suis in pigs is very rare: three cases in pigs in 2009 were the first ones since the last reported infection in 2001 in a wild boar. The last case of bovine Brucella abortus infection was reported in 1996, the last case of Brucella melitensis infection in small ruminants in 1985. Freedom from bovine brucellosis has been proven the last time in 1997 conducting a survey in a randomized sample of 4874 farms. 139‘655 cows (in general older than 24 months) were tested using a serological test. There were no positive findings in these samples.
Since 1998 the freedom of the sheep and goat population from disease is documented annually in National Surveys with serological testing (TSV, Article 130). The farms to be tested are randomly selected. EU regulation 91/68/EEC that defines populations of sheep and goat as one epidemiological unit is the basis of the survey.
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 evaluation of the recent situation, the trends and sources of infection

In humans 14 brucellosis cases were reported in 2009 of which 11 had been identified as Brucella melitensis and one as Brucella abortus.
Human infections with Brucella through the consumption of Swiss raw milk or dairy products from non-heat-treated milk (for example sheep or goat’s cheese) is considered to be of no relevance in Switzerland, because the Swiss animal population is free of this pathogen. Cases of brucellosis in humans are anticipated to be attributable either to stays abroad or to the consumption of foreign products.
In the yearly National Survey, in 2009 a total of 700 sheep and 585 goat farms were tested negative for Brucella melitensis. Furthermore, no cases of brucellosis in sheep and goat were reported by the cantonal veterinarians in 2009.
At insemination stations, 1377 bulls were tested on B. abortus in 2009. One animal had a serological positive result but in a confirmation test it became negative.
In addition, in diagnostic laboratories in total 2471 animals were tested in the context of clinical investigations or abortions in 2009 including mainly cattle (2123), pigs (205), sheep (75) and goats (25), but also horses (8), wild animals (9), buffalos (3), alpacas (3), dogs (2) and other domestic animals (18). One pig was tested positive for B. suis.
Three cases of Brucellla suis Biovar 2 in pig farms were notified. The primary outbreak was in a farm

where the pigs were reared outdoor and contact to wild boars was very likely. Two secondary farms had contact to the first one via animal traffic. In recent studies it was shown that B. suis Biovar 2 is prevalent in wild boars (Leuenberger et al. 2007). The literature shows that in contrast to Biovar 1 and Biovar 3, B. suis Biovar 2 is very rarely notified in humans.

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.
A research study was initiated to evaluate risk factors for the infection of pigs which are reared outdoor.

Additional information

1. Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2. Leuenberger R, Boujon P, Thür B, Miserez R, Garin-Bastuji B, Rüfenacht J, Stärk KD. Prevalence of classical swine fever, Aujeszky's disease and brucellosis in a population of wild boar in Switzerland, Vet Rec; 160(11):362-8. 2007

2.6.2 Brucellosis in humans

Table Brucella in humans - Species/serotype distribution

Distribution Zoonotic Agent	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
Brucella	14	0	0	0	0	0
B. abortus	1					
B. melitensis	11					
Brucella spp., unspecified	2					

Table Brucella in humans - Age distribution

Age distribution	B. abortus			B. melitensis			Brucella spp., unspecified		
	All	M	F	All	M	F	All	M	F
Age unknown	1			11			2		
Total :	1	0	0	11	0	0	2	0	0

2.6.3 Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Switzerland is officially acknowledged as free from bovine brucellosis since 1959. Bovine brucellosis is notifiable since 1956. 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.

Vaccination policy

Vaccination is prohibited since 1961.

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.

Furthermore, 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.

Notification system in place

Notification of suspicious cases and outbreaks is mandatory since 1956. 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.

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 goats

Status as officially free of caprine brucellosis during the reporting year

The entire country free

Switzerland is officially acknowledged as free from ovine and caprine brucellosis.
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).

Additional information

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.

Vaccination policy

Vaccination is prohibited since 1961.

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. 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.

Results of the investigation

In 2009 a randomized sample of 700 farms with sheep and 558 farms with goats were included in the survey. 10’651 samples from sheep and 4’679 samples from goats were tested using serological test. There were no positive findings in these samples.

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

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

C. Brucella melitensis in sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

see Brucella melitensis in goats.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella	B. abortus	B. melitensis	B. suis	Brucella spp., unspecified
Alpacas - Clinical investigations	ILD	Animal	3	0				
Buffalos - Clinical investigations	ILD	Animal	3	0				
Cattle (bovine animals) - Clinical investigations	ILD	Animal	2123	0				
Dogs - Clinical investigations	ILD	Animal	2	0				
Goats - Clinical investigations	ILD	Animal	25	0				
Other animals - unspecified - Clinical investigations	ILD	Animal	18	0				
Pigs - in total - Clinical investigations	ILD	Animal	204	1			1	
Sheep - Clinical investigations	ILD	Animal	75	0				
Solipeds, domestic - Clinical investigations	ILD	Animal	8	0				
Wild animals - Clinical investigations	ILD	Animal	9	0				

Footnote:

ILD = Inofrmationssystem Labordiagnostik in der Schweiz - information system of laboratory information in Switzerland

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

Region	Total number of existing		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	17154	504678	17154	100	0	0	1285	15330	0	0	0	0	0	0
Total : [1)]	17154	504678	17154	100	0	0	1285	15330	0	0	0	0	0	0

Comments:

[1)] N.A.

Footnote:

A randomized sample of 700 farms with sheep and 558 farms with goats were included in the survey. 22'892 samples from sheep and 6'093 samples from goats were tested using serological test. There were no positive findings in these samples.

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			Information about			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds	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
																		Sero logically	BST		
Schweiz/Suisse/Svizzera	42584	1602513	42584	100	0	0	4847	31042	0	4847	18952	0									
Total : [1)]	42584	1602513	42584	100	0	0	4847	31042	0	4847	18952	0	0	0	0	0	0	0	0	0	0

Comments:

[1)] N.A.

Footnote:

The last survey was done in 1997. Data from the last survey indicated.

2.7 YERSINIOSIS

2.7.1 General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

History of the disease and/or infection in the country

Yersiniosis in humans is not a notifiable disease. Therefore no data on the incidence of such infections are available.

In animals, yersiniosis falls into the category of diseases to be monitored (TSV, Article 5) and, if the disease is either diagnosed or suspected, it must be reported to the cantonal veterinarian (TSV, Article 291), who may issue an order for a suspected case to be investigated. In most cases, yersiniosis is caused by Yersinia enterocolitica and, in rare cases, also by Yersinia pseudotuberculosis.
From 2000 until 2009 17 yersiniosis cases and never more than 3 cases per year were reported. Affected species were mainly monkeys. The last case was found in 2008 as the cantonal veterinarians reported 1 case of yersiniosis to the FVO, which involved a monkey.
Furthermore, research of Yersinia in slaughter pigs conducted in 2003-2004 showed low rates of infection in this period in slaughter pigs.

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

No animal cases were reported in the year 2009. The number of reported cases in the recent years has been at a constantly low level.

In veterinary diagnostic laboratories 2622 tests for yersiniosis were carried out in the context of clinical investigations in 2009, mainly in dogs (1231), cats (879) and cattle (207) (see table). Except for 1 cat, 1 dog and 1 Callitrix jacchus, all laboratory results were negative.

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

The risk of infection for humans is estimated to be minimal in Switzerland.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2.7.2 Yersinia in animals

Table Yersinia in animals

	Source of information	Sampling unit	Units tested	Total units positive for Yersinia	Y. enterocolitica	Y. pseudotuberculosis	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - Y. enterocolitica, unspecified
Alpacas - Clinical investigations	ILD	Animal	1	0						
Birds - Clinical investigations	ILD	Animal	61	0						
Camels - Clinical investigations	ILD	Animal	1	0						
Cats - Clinical investigations	ILD	Animal	879	1			1			
Cattle (bovine animals) - Clinical investigations	ILD	Animal	207	0						
Dogs - Clinical investigations	ILD	Animal	1231	1			1			
Fur animals - Clinical investigations	ILD	Animal	11	0						
Goats - Clinical investigations	ILD	Animal	10	0						
Other animals - unspecified - Clinical investigations [1)]	ILD	Animal	95	1			1			
Pigs - Clinical investigations	ILD	Animal	13	0						
Rabbits - Clinical investigations	ILD	Animal	26	0						
Sheep - Clinical investigations	ILD	Animal	14	0						
Solipeds, domestic - Clinical investigations	ILD	Animal	71	0						
Wild animals - Clinical investigations	ILD	Animal	2	0						

Comments:

[1)] The positive tested animal was a callitrix jacchus

Footnote:

ILD = Informationssystem Labordiagnostik in der Schweiz - information system of laboratory information in Switzerland

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

Trichinellosis in humans is a notifiable disease in Switzerland since 1st January 2009. Medical doctors have to report the disease and laboratories the detection of Trichinella spp. (ordinance of the FDHA on doctor and laboratory reporting).

Trichinella infections and suspicion of Trichinella infections in animals are notifiable since 1966. Trichinella infections in animals fall in the category of animal diseases to be monitored (TSV, Article 5).

The testing on trichinellosis of all slaughter pigs is mandatory since 1st January 2007. At that time Switzerland's regulations got aequivalent to Commission Regulation (EC) No. 2075/2005. Exceptions from this obligation 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 since then labeled with a special stamp, so it can be guaranteed that such meat is not exported to the EU.

Trichinella infections in pigs have not been detected 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. Since 2005 the number of pigs tested in abattoirs increased steadily, all with negative results: 916'791 pigs in 2005 (34% of the pigs slaughtered), 1.25 Mio pigs in 2006 (44% of the pigs slaughtered) and in 2007 and 2008 2.36 Mio resp. 2.42 Mio (almost 90% of all slaughtered pigs) were tested.

From 2000 until 2009, 13 cases of infected wildlife were reported to the FVO by cantonal veterinarians concerning the following species: lynx (11), foxes (1) and wolves (1). The nematodes involved were of a single species, namely Trichinella britovi.
A study of the University of Berne conducted from 1999 until 2007 found that 15 (27.3%) of 55 assessed lynxes harbored Trichinella britovi larvae. Furthermore, in 2006/2007 21 (1.6%) of 1298 assessed foxes proved positive for Trichinella britovi larvae (Frey et al., Veterinary Parasitology, 2009).
In another study of the University of Berne, 1458 wild boars were tested for Trichinella spp. in 2008. Although all 1458 wild boars have been tested negative for Trichinella by artificial digestion, 3 wild boars had antibodies against Trichinella (seroprevalence 0.2%) illustrating that wild boars can have contact with this nematode (Frey et al., 2009, Schweiz. Archiv für Tierheilkunde).

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

In 2009, the Federal Office of Public Health received reports of 4 human cases of trichinellosis. It is suggested that at least 3 of the 4 patients did acquire the infection in foreign countries.

In 2009 almost 90% of the slaughtered pigs were tested for Trichinella with a negative result (2.42 Mio slaughter pigs). Due to the extensive testing of the last years with only negative results, Swiss slaughter pigs are projected to be free of Trichinella.
A study in 2009 confirms this declaration. 20'000 slaughter pigs were tested with an improved digestion method and all animals were free of antibodies against Trichinella spp. (Schuppers et al., 2009, Zoonoses

and Public Health).

3 cases of Trichinella infections in lynxes were reported to the FVO by the cantonal veterinarians in 2009. Since 2001, reported cases range between 0 and 3 cases per year and always concerned carnivorous wildlife, never domestic animals. All infections were caused by Trichinella britovi. Switzerland is therefore free of Trichinella spiralis.

Additional information

1. Jakob et al., Schweiz. Arch. Tierheilk. 136: 298-308,1994

2. Frey et al., Veterinary Parasitology, 2009

3. Frey et al., Schweiz. Archiv für Tierheilkunde, 2009

4. Schuppers et al., Zoonoses and Public Health, 2009

2.8.2 Trichinellosis in humans

Table Trichinella in humans - Species/serotype distribution

Distribution Zoonotic Agent	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
Trichinella	4	0	0	0	3	0
Trichinella spp., unspecified	4				3	

Table Trichinella in humans - Age distribution

Age distribution	Trichinella spp., unspecified		
	All	M	F
25 to 44 years	3	3	
45 to 64 years	1	1	
Total :	4	4	0

2.8.3 Trichinella in animals

A. 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

All slaughtered horses are tested during or immediately after the slaughter process.

Type of specimen taken

Piece of tongue

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

Switzerland has no database where all trichinellosis testings on horses are gathered. Therefore only data from a part of all testings is available. It can be stated that in 2009 at least 2017 slaughtered horses were tested for Trichinella with negative results.

Notification system in place

Trichinellosis in animals falls in the category of animal diseases to be monitored (TSV, Article 5).

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

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

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

B. 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. Exception of this test obligation is made for small slaughterhouses of the national market which do not export to the EU.

Frequency of the sampling

General

Census sampling with the exception of pigs slaughtered in small slaughterhouses and only produced for the local market, is done during or immediately after the slaughter process.

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.

Measures in case of the positive findings or single cases

A positive tested batch at a slaughter house would be traced back and contaminated carcasses disposed.

Notification system in place

Trichinellosis in animals falls in the category of animal diseases to be monitored (TSV, Article 5).

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

In 2009, about 2.42 Mio slaughter pigs (almost 90% of the total slaughter population) were tested and no Trichinella larvae were found.
In addition, 2558 wild boars were tested with negative results.

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

Although the risk of the parasite cycle crossing from the wild animal population into the conventional domestic pig population can be regarded as negligible, the risk has to be categorised differently or higher with regard to the special situation of grazing pigs.

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

source of infection)

As all results were negative since many years, it is highly unlikely that Trichinella infections acquired in Switzerland do occur.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2.9 ECHINOCOCCOSIS

2.9.1 General evaluation of the national situation

A. Echinococcus spp. general evaluation

History of the disease and/or infection in the country

Alveolar echinococcosis (AE) is caused by the “dangerous” fox tapeworm Echinococcus multilocularis. Human cases were notifiable to FOPH only until 1998. But exact figures on the incidence of infestation in humans are collected in Switzerland since 1956 at the Institute of Parasitology of the University of Zurich being the National Reference Centre for echinococcosis. Data originates from cohorts of the large treatment centres as well as analysis of seropositive patients originating from the 3 centres for serodiagnosis of the disease. In comparison to earlier years (1990 until 2000), the frequency of AE increased from the beginning of 2001 until the end of 2008 by the 2.5-fold. The annual average counted 19 new cases (each year 10 – 29 cases).

In animals, echinococcosis falls in the category of animal diseases to be monitored (TSV, SR 916.401, Article 291).
From 2000 until 2009 45 echinococcosis cases were reported to the FVO by cantonal veterinarians which occurred in dogs (19), foxes (17), monkeys (4), pigs (1) and “other animals” (4).
The Institute of Parasitology of the University of Zurich tested mice and feacal fox samples in the region of Zurich in the years 2007 and 2008. About 17% of the mice (100 mice from 634 in 2007 resp. 66 from 393 in 2008) were positive for E. multilocularis. In the faecal fox samples the number of positive samples declined from 26% in 2007 to 19% in 2008 (361 from 1376 in 2007 resp. 202 from 1044 in 2008). However, faecal fox samples from regions without deworming bait containing praziquantel remained at the level of the previous year (63 from 254 (25%) samples were positive).

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

The pathogen Echinococcus granulosus is not of relevance in Switzerland. An infection of humans with Echinococcus multilocularis, the causative agent of AE, remains rare. Generally, the risk of an infection increased in the last few years, mainly through the encroachment of foxes to the urban areas. The situation for animals seems unchanged since many years.

In the year 2009 only 1 case in a dog was reported to the FVO by the cantonal chief veterinarians.

Furthermore, in veterinary diagnostic laboratories 49 tests for echinococcosis were carried out in the context of clinical investigations mainly in dogs and wild animals. 8 dogs (out of 24) and 5 wild animals (out of 18) as well as 1 other animal proved positive for Echinococcus multilocularis.

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

In fresh foodstuffs, outdoor cultivation for example can lead to the occurrence of fox tapeworm eggs, but there are no figures on the degree of contamination of individual foods. Moreover, people can also become infected through contact with soil, shoes and also dogs that are contaminated with fox tapeworm.

The burden of infection from E. multilocularis has increased in the recent years because the fox population has increased after having eradicated fox rabies from 1984 to 2000 by a factor of 2.6 (mean numbers of foxes shot or found dead: 19’500 from 1977-1987 and 51’500 from 1997-2007).

Recent actions taken to control the zoonoses

An infection of humans with Echinococcus multilocularis, the causative agent in AE, remains rare, but when it does occur it results in disease with severe consequences for the person concerned. For this reason, the FVO is funding a project entitled ‘Control of alveolar echinococcosis & management of foxes in urban areas’. New methods in the management of urban foxes are to be tried out along with active communication to encourage dealing with foxes in a way that is appropriate to wild animals.

The Institute of Parasitology of the University of Zurich currently runs a study to control the disease in foxes in the urban area of Zurich. Fox baits are distributed once a month by hand on places that are visited by many foxes. The baits contain a pharmaceutical for the deworming of the foxes. The method has been proved to be effective, thus foxes in areas with baits showed a decreased infection rate. The practicability of the method in a larger scale is under investigation.

Additional information

1. Information on fox tapeworm: www.paras.uzh.ch/infos.

2. Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

3. Torgerson, P.R., Schweiger, A., Deplazes, et al., 2008, Alveolar echinococcosis: From a deadly disease to a well-controlled infection. Relative survival and economic analysis in Switzerland over the last 35 years. J. of Hepatol. 49: 72-77

4. Schweiger A, Ammann RW, Candinas D, Clavien P-A, Eckert J, Gottstein B, et al. Human alveolar echinococcosis after fox population increase, Switzerland. Emerg Infect Dis. 2007 Jun. Available from http://www.cdc.gov/EID/content/13/6/878.htm

2.9.2 Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling unit	Units tested	Total units positive for Echinococcus	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Alpacas - Clinical investigations	ILD	Animal	1	0			
Cats - Clinical investigations	ILD	Animal	3	0			
Cattle (bovine animals) - Clinical investigations	ILD	Animal	1	0			
Dogs - Clinical investigations	ILD	Animal	24	8			8
Other animals - unspecified - Clinical investigations	ILD	Animal	1	1			1
Pigs - Clinical investigations	ILD	Animal	1	0			
Wild animals - Clinical investigations	ILD	Animal	18	5			5

Footnote:

ILD = Informationssystem Labordiagnostik in der Schweiz - information system of laboratory information in Switzerland

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

Toxoplasmosis in humans is not a notifiable disease, thus it doesn't have to be reported to the Federal Office of Public Health. Therefore no data on the incidence are available.

In animals, toxoplasmosis falls in the category of animal diseases to be monitored (TSV, Article 5). Veterinarians and diagnostic laboratories must report any suspected cases of toxoplasmosis to the cantonal veterinarian, who may issue an order for the suspected cases to be investigated (TSV, Article 291).
From 2000 until 2009 in total 15 cases were reported to the FVO by cantonal veterinarians which occurred in sheep (4), goats (4), cats (3), monkeys (2), cattle (1) and "other animal" (1).

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

In 2009, the cantonal veterinarians reported 1 case of toxoplasmosis in animals to the FVO, namely in a goat.

Furthermore, in veterinary diagnostic laboratories 511 tests for toxoplasmosis were carried out in the context of clinical investigations in 2009, mainly in cats (477), but also in goats (9), sheep (6), cattle (4), dogs (3), wild animals (1) and "other animal" (11) (see table). 11 animals were tested positive for toxoplasmosis (6 cats, 1 sheep, 1 goat, 1 dog and 2 "other animal").

In the context of a national survey on sources of Toxoplasma gondii, meat from various animal categories was sampled at the slaughterhouse. Using real time PCR technique it could be shown that DNA of T. gondii was prevalent in 4.7% of bovine samples, in 2.2% of porcine samples, in 2.0% of sheep samples and in 0.7% of wild boar samples. Since the last survey in 1999 an increase of the T. gondii prevalence in pigs and cattle was found, the prevalence in sheep decreased slightly. As another source of human infection, faeces of 252 cats was investigated. Oocytes of T. gondii were found in 0.4% of the samples. (Berger-Schoch et al. 2010 (submitted), Wyss, et al. 2000).
The recommendations from the FOPH that pregnant women should disclaim on raw or insufficient cooked meat could be confirmed.

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

In non-immune sheep and goats (first-time infection) Toxoplasma gondii is regarded as a major cause of abortion and loss of lambs.

Recent actions taken to control the zoonoses

A national survey on sources of Toxoplasma gondii was accomplished (see chapter National evaluation of the recent situation).

Additional information

1. Berger-Schoch A.E., Frey C.F. et al., submitted, Toxoplasma gondii in Switzerland: A serosurvey based on meat juice analysis of slaughter pigs, wild boar, sheep and cattle

2. Berger-Schoch A.E., Frey C.F. et al., in preparation, Molecular prevalence and genotypes of Toxoplasma gondii in feline faeces (oocysts) and meat from sheep, cattle and pigs in Switzerland

3. Wyss R., Sager H. et al. (2000) the occurrence of Toxoplasma gondii and neospora caninum as regards meat hygiene. Schweiz. Arch. tierheilkd 142(3): 95-108.

4. Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2.10.2 Toxoplasma in foodstuffs

Table Toxoplasma in Food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Toxoplasma	T. gondii
Meat from bovine animals - carcass - chilled - Survey - national survey	IPB	Single	1gr	406	19	19
Meat from pig - carcass - chilled - Survey - national survey	IPB	Single	1gr	270	6	6
Meat from sheep - carcass - chilled - at slaughterhouse - Survey - national survey	IPB	Single	1gr	250	5	5
Meat from wild boar - carcass - chilled - Survey - national survey	IPB	Single	1gr	150	1	1

Footnote:

Results of a national survey at the IPB using real-time PCR to detect DNA of T. gondii in meat of various food producing animal categories. (Berger-Schoch et al., submitted)

2.10.3 Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii	Toxoplasma spp., unspecified
Cats - Clinical investigations	ILD	Animal	477	6		6
Cattle (bovine animals) - Clinical investigations	ILD	Animal	4	0		
Dogs - Clinical investigations	ILD	Animal	3	1		1
Goats - Clinical investigations	ILD	Animal	9	1		1
Other animals - unspecified - Clinical investigations	ILD	Animal	11	2		2
Sheep - Clinical investigations	ILD	Animal	6	1		1
Wild animals - Clinical investigations	ILD	Animal	1	0		

Footnote:

ILD = Informationssystem Labordiagnostik in der Schweiz - information system of laboratory information in Switzerland

2.11 RABIES

2.11.1 General evaluation of the national situation

A. Rabies general evaluation

History of the disease and/or infection in the country

Rabies in humans is a notifiable disease. It has to be reported within one day of rabies being clinically suspected by a medical doctor or the Lyssavirus being detected in culture by a laboratory (ordinance of the FDHA on doctor and laboratory reporting).
In the period from 1967 until 1999, an estimated number of some 25 000 postexposure treatments in humans were done due to the increased risk of rabies infections. Rabies caused in 1977 three human deaths.

Rabies in animals falls into the category of an animal disease to be eradicated (TSV, Article 3). According to Articles 142-149 of the animal health ordinance, government action is taken to control the disease. Anyone who sees a wild animal or stray pet that behaves in a way that appears suspiciously like rabies is required to report this to the police, hunting authorities or a veterinarian. Animal keepers must also report pets that behave in a way that is suspiciously like rabies to a veterinarian. (Re-)Import conditions for cats, dogs and ferrets were implemented in 2003 and adapted in 2004 according to the EU regulation 998/2003/EC.
The European fox rabies epizootic starting in 1939 at the eastern border of Poland reached Switzerland on March 3, 1967. In the period from 1967 until 1999 a total of 17’108 rabies cases, of which 73% in foxes and 14% in domestic animals were diagnosed. To eliminate rabies, in 1978 the first field trial world-wide for the oral immunization of foxes against rabies was conducted in Switzerland with a total of 2.8 million baits containing a modified live virus. The 1990s were characterized by a recrudescence of rabies in spite of regular oral immunization of foxes. The last case of fox rabies occurred in 1996. Bat rabies has been diagnosed in 3 cases in the past fifteen years (1992, 1993, 2002). Therefore, bat rabies remains a source, albeit little, of infection for animals and humans.
According to the definitions of the OIE and WHO (no cases for at least two years) the territory of Switzerland has been officially recognised as free of rabies since 1999. 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.

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

In 2009, three human samples (salivary, liquor or brain) were tested for rabies virus as a differential diagnosis with negative results. Furthermore, 527 human sera were analysed if the level of protecting antibodies is sufficient: 299 sera were a control after a rabies vaccination, 173 sera a control of postexposure treatments, 6 sera from clinical suspects and 49 sera without a mentioned reason.
The national reference laboratory for rabies investigated 110 animal samples in the year 2009, all of which proved negative for the presence of Lyssavirus in the brain. The samples came mostly from bats (37%), foxes (28%), dogs and cats (24%) and badgers (4%). Single samples were tested from a donkey (1), hedgehog (1), polecat (1), deer (1), cattle (1), sheep (1), goat (1) and a rat (1).
The 2003 implemented import conditions reduce the risk of imported rabies cases in domestic animals to

a very low level. In the Swiss Rabies Center an adequate protection against rabies infection was determined by detection of neutralising antibodies in a total of 2307 serum samples from dogs and cats that accompanied their owners on trips. However, illegal imports as well as bat rabies remain a certain risk to Switzerland.

Switzerland and most of the neighboring countries were free from European fox rabies in 2009. In northeastern Italy two foxes were diagnosed positive in October 2008, and more cases spread to the north of Italy close to the Swiss border. Switzerland precautionary prepares an oral immunization campaign at the moment to react quickly if the rabies should spread further to the Swiss border.

Recent actions taken to control the zoonoses

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

Suggestions to the Community for the actions to be taken

Switzerland prepares an oral immunization campaign at the moment to react quickly if the rabies should spread further from Italy to the Swiss border.

Additional information

1. Diagnostic/analytical methods used:
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.

2. Swiss Rabies Center: http://www.cx.unibe.ch/ivv/Swiss_Rabies_Center/swiss_rabies_center.html

3. Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2.11.2 Lyssavirus (rabies) in animals

A. Rabies in dogs

Monitoring system

Case definition

An animal is rabies diseased if the analytical method (see below) gives a positive result.

Vaccination policy

Vaccination of the Swiss dog population is recommended (and common), but not mandatory.

Other preventive measures than vaccination in place

(Re-)Import conditions for cats, dogs and ferrets according to the EU regulation 998/2003/EC.

Notification system in place

Rabies in animals falls into the category of an animal disease to be eradicated (TSV, Article 3). According to Articles 142-149 of the animal health ordinance, government action is taken to control the disease. Animal keepers must report pets that behave in a way that is suspiciously like rabies to a veterinarian.

Additional information

1. Diagnostic/analytical methods used
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.

2. Swiss Rabies Center: http://www.cx.unibe.ch/ivv/Swiss_Rabies_Center/swiss_rabies_center.html

3. Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	Lyssavirus, unspecified	Classical rabies virus (genotype 1)	European Bat Lyssavirus - unspecified
Badgers - wild	Swiss Rabies Centre	Animal	4	0			
Bats - wild	Swiss Rabies Centre	Animal	41	0			
Cats	Swiss Rabies Centre	Animal	10	0			
Cattle (bovine animals)	Swiss Rabies Centre	Animal	1	0			
Deer	Swiss Rabies Centre	Animal	1	0			
Dogs	Swiss Rabies Centre	Animal	16	0			
Foxes - wild	Swiss Rabies Centre	Animal	31	0			
Goats	Swiss Rabies Centre	Animal	1	0			
Sheep	Swiss Rabies Centre	Animal	1	0			
Solipeds, domestic	Swiss Rabies Centre	Animal	1	0			
Hedgehogs	Swiss Rabies Centre	Animal	1	0			
Polecats	Swiss Rabies Centre	Animal	1	0			
Rats	Swiss Rabies Centre	Animal	1	0			

2.12 Q-FEVER

2.12.1 General evaluation of the national situation

A. Coxiella burnetii (Q-fever) general evaluation

History of the disease and/or infection in the country

Q fever (pathogen: Coxiella burnetii) is not a notifiable disease in humans. There is no data available on the frequency of the illness.

Coxiellosis in animals is a notifiable disease. Since March 2009 it falls under the category of diseases to be monitored (TSV, Article 5). Before it was a disease to be controlled. Coxiella burnetii plays a certain role as a causative pathogen for abortions in biungulate animals. Following specifications in TSV, Articles 217-221 abortions in cattle after three months of pregnancy have to be reported to a veterinarian. In sheep, goats and pigs, every abortion must be reported. If more than one animal in a holding of ruminants aborts within the space of four months, or if an abortion occurs in a dealer's stable or during alpine pasturing, then cattle, sheep and goats amongst other also undergo laboratory investigation for Coxiella burnetii (TSV, Article 129). If clinically suspected cases are confirmed by laboratory diagnostic tests, the cantonal veterinary office is notified.

From 2000 until 2009 508 coxiellosis cases were reported to the FVO by cantonal veterinarians which occurred mainly in cattle (405), but also in goats (66) and sheep (37). Especially in the first two years in the 1990s numbers per year were high with about 100 reported cases a year. In the years 1993 to 1995 numbers declined to roughly 70 cases per year and decreased further to about 40 cases per year in the period 1996 until 2005. In 2006 reported coxiellosis cases rose again to the level of around 70 cases per year and stayed at this level in 2008 and 2009.

The last study in animals and in predestinated humans was performed in 1983. Results are published in Metzler AE et al., 1983: Distribution of Coxiella burnetii: a seroepidemiological study of domestic animals and veterinarians [in German]. Schweizer Archiv für Tierheilkunde, 125, 507-517.

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

77 cases of coxiellosis in ruminants were reported to the FVO by cantonal veterinarians in 2009 of which 66 cases occurred in cattle, 6 in goats and 5 in sheep.

Furthermore, in veterinary diagnostic laboratories 3831 tests for coxiellosis were carried out in the context of clinical investigations, mainly in cattle (3294), sheep (166), pigs (212) and goats (127), but also in horses (7), wild animals (4), buffalo (3), alpacas & lamas (3), dog (1) and other species (14). 87 samples (81 cattle, 4 goats, 2 pigs) were tested positive for Coxiella burnetii.

The role of Coxiella burnetti as abortion cause is mainly of significance for cattle. Infected cattle are less dangerous for humans than infected sheep. The risk of a high epidemic appearance seems to be small for Switzerland.

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

In cases of abortion among ruminants coxiellosis is especially important in cattle.

Additional information

Swiss Zoonoses Report 2009 (www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009)

2.12.2 Coxiella (Q-fever) in animals

Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii	Coxiella spp., unspecified
Alpacas - Clinical investigations	ILD	Animal	3	0		
Buffalos - Clinical investigations	ILD	Animal	3	0		
Cattle (bovine animals) - Clinical investigations	ILD	Animal	3294	81		81
Dogs - Clinical investigations	ILD	Animal	1	0		
Goats - Clinical investigations	ILD	Animal	127	4		4
Other animals - unspecified - Clinical investigations	ILD	Animal	14	0		
Pigs - Clinical investigations	ILD	Animal	212	2		2
Sheep - Clinical investigations	ILD	Animal	166	0		
Solipeds, domestic - Clinical investigations	ILD	Animal	7	0		
Wild animals - Clinical investigations	ILD	Animal	4	0		

Footnote:

ILD = Informationssystem Labordiagnostik in der Schweiz - information system of laboratory information in Switzerland

Diagnostic method used was mainly direct detecion of the bacteria

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1 ESCHERICHIA COLI, NON-PATHOGENIC

3.1.1 General evaluation of the national situation

3.1.2 Antimicrobial resistance in Escherichia coli, non-pathogenic

A. Antimicrobial resistance of E.coli in animal

Sampling strategy used in monitoring

Frequency of the sampling

E. coli were analyzed for antimicrobial resistance in 202 samples from fattening pigs, 188 samples from cattle and 238 samples from broilers. The samples were evenly collected throughout the year in a stratified and randomized sample scheme in the framework of a permanent national monitoring programme on antimicrobial resistance in Swiss food-producing animals. The slaughter plants included in the surveillance programme account for 95% of the total broiler, > 85 % of the total pig and > 80% of the total cattle production in Switzerland. The number of samples for each plant has been determined in proportion to the number of animals slaughtered per year.

Type of specimen taken

Fecal samples from pigs and cattle, caecal samples 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). In total 5 intact and full caeca (one each from 5 different broilers) per slaughter batch were collected at the time of evisceration. Immediately after collection, the samples were 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, Cefotaxime, Ceftazidime, Chloramphenicol, Ciprofloxacin, Colistin, Florfenicol, Gentamicin, Kanamycin, Nalidixic Acid, Sulfamethoxazole, Streptomycin, Trimethoprim, Tetracyclin

Cut-off values used in testing

Wherever possible the epidemiological cut-off values according to EUCAST were used:
Ampicillin, > 8 µg/ml; Cefotaxime, > 0.25 µg/ml; Ceftazidime, > 0.5 µg/ml; Chloramphenicol, > 16 µg/ml; Ciprofloxacin, > 0.03 µg/ml; Colistin, > 8 µg/ml; Florfenicol, > 16 µg/ml; Gentamicin, > 2 µg/ml; Kanamycin, > 8 µg/ml; Nalidixic Acid > 16 µg/ml; Sulfamethoxazole, > 256 µg/ml; Spectinomycin, > 128 µg/ml; Streptomycin, > 16 µg/ml; Trimethoprim, > 2 µg/ml; Tetrazyklin,> 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 and limitation of use of antimicrobials to veterinary prescription.

Results of the investigation

136 isolates from broilers, 181 isolates from pigs and 132 isolates from cattle were subjected to susceptibility testing. Prevalence of resistance in broilers and fattening pigs is significantly higher than in cattle. The highest levels of resistance were found for tetracycline, sulfomethoxazole, streptomycin, ampicillin and trimethoprim. In broilers levels of resistance were also high for ciprofloxacin and nalidixic acid (25% for both).

Three strains from broilers an one from cattle were resistant to cefotaxime and ceftazidime and must therefore be considered as ESBL producing strains, but no ESBL-confirmatory test has been done.

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

The results were similar to those of previous years.

In general, the resistance situation of indicator bacteria in Switzerland is still favorable compared to other european countries. Resistance was most frequently observed against antimicrobials that have been used in food animals for many years, such as trimethoprim/sulfonamide, tetracycline and streptomycin.

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

The relatively high prevalence of resistance to ciprofloxacin and nalidixic acid in E. coli from broilers, is a potential public health concern. The occurence of ESBL genes in E. coli of food producing animals in Switzerland should be further investigated.

Additional information

See: Antibiotikaresistenzmonitoring 2009 - Jahresbericht on www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009

Table Antimicrobial susceptibility testing of E. coli in Pigs

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	181	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	181	11
Amphenicols - Florfenicol	181	0
Fluoroquinolones - Ciprofloxacin	181	6
Quinolones - Nalidixic acid	181	4
Trimethoprim	181	54
Aminoglycosides - Streptomycin	181	75
Aminoglycosides - Gentamicin	181	5
Aminoglycosides - Kanamycin	181	7
Penicillins - Ampicillin	181	35
Tetracyclines - Tetracycline	181	52
Fully sensitive	181	74
Resistant to 1 antimicrobial	181	26
Resistant to 2 antimicrobials	181	17
Resistant to 3 antimicrobials	181	19
Resistant to 4 antimicrobials	181	31
Resistant to >4 antimicrobials	181	14
Cephalosporins - Cefotaxim	181	0
Cephalosporins - Ceftazidim	181	0
Polymyxins - Colistin	181	0
Sulfonamides - Sulfamethoxazol	181	70

Table Antimicrobial susceptibility testing of E. coli in Cattle (bovine animals)

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	132	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	132	1
Amphenicols - Florfenicol	132	0
Fluoroquinolones - Ciprofloxacin	132	2
Quinolones - Nalidixic acid	132	1
Trimethoprim	132	6
Aminoglycosides - Streptomycin	132	17
Aminoglycosides - Gentamicin	132	0
Aminoglycosides - Kanamycin	132	3
Penicillins - Ampicillin	132	9
Tetracyclines - Tetracycline	132	22
Fully sensitive	132	104
Resistant to 1 antimicrobial	132	5
Resistant to 2 antimicrobials	132	2
Resistant to 3 antimicrobials	132	13
Resistant to 4 antimicrobials	132	3
Resistant to >4 antimicrobials	132	4
Cephalosporins - Cefotaxim	132	0
Cephalosporins - Ceftazidim	132	0
Polymyxins - Colistin	132	0
Sulfonamides - Sulfamethoxazol	132	21

Table Antimicrobial susceptibility testing of E. coli in Gallus gallus (fowl)

Escherichia coli, non-pathogenic	E.coli, non-pathogenic, unspecified	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	136	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	136	5
Amphenicols - Florfenicol	136	1
Fluoroquinolones - Ciprofloxacin	136	35
Quinolones - Nalidixic acid	136	33
Trimethoprim	136	19
Aminoglycosides - Streptomycin	136	41
Aminoglycosides - Gentamicin	136	0
Aminoglycosides - Kanamycin	136	2
Penicillins - Ampicillin	136	28
Tetracyclines - Tetracycline	136	34
Fully sensitive	136	45
Resistant to 1 antimicrobial	136	23
Resistant to 2 antimicrobials	136	27
Resistant to 3 antimicrobials	136	20
Resistant to 4 antimicrobials	136	11
Resistant to >4 antimicrobials	136	10
Cephalosporins - Cefotaxim	136	3
Cephalosporins - Ceftazidim	136	3
Polymyxins - Colistin	136	1
Sulfonamides - Sulfamethoxazol	136	37

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

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

E.coli, non-pathogenic, unspecified	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - caecum - Monitoring - official sampling																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	136																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	16	136	5										44	83	4	3	1	1							
Amphenicols - Florfenicol	16	136	1									2	56	72	5	1									
Tetracyclines - Tetracycline	8	136	34								15	74	11	2			9	25							
Fluoroquinolones - Ciprofloxacin	0.03	136	35		80	21	2	5	20	3	4			1											
Quinolones - Nalidixic acid	16	136	33										100	2	1	2	7	24							
Trimethoprim	2	136	19							100	15	2					19								
Aminoglycosides - Streptomycin	16	136	41									2	43	40	10	12	18	5	6						
Aminoglycosides - Gentamicin	2	136	0						42	82	12														
Aminoglycosides - Kanamycin	8	136	2										128	6	1				1						
Penicillins - Ampicillin	8	136	28							1	10	54	42	1			28								
Cephalosporins - Cefotaxim	0.25	136	3				122	11		1		1		1											
Cephalosporins - Ceftazidim	8	136	3						132	1				3											
Polymyxins - Colistin	8	136	1											135	1										
Sulfonamides - Sulfamethoxazol	256	136	37											35	25	20	14	3	2	4			33		

Table Antimicrobial susceptibility testing of E. coli in Pigs - fattening pigs - unspecified - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

E.coli, non-pathogenic, unspecified	Pigs - fattening pigs - unspecified - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	181																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	16	181	11									5	63	91	11	7	1	3							
Amphenicols - Florfenicol	16	181	0									4	89	85	3										
Tetracyclines - Tetracycline	8	181	52								11	97	21		2	1	14	35							
Fluoroquinolones - Ciprofloxacin	0.03	181	6		137	38	1		1	1				1	2										
Quinolones - Nalidixic acid	16	181	4										175	1	1			4							
Trimethoprim	2	181	54							109	14	4					54								
Aminoglycosides - Streptomycin	16	181	75									1	37	55	13	13	21	18	23						
Aminoglycosides - Gentamicin	2	181	5						42	104	29	1			3	1	1								
Aminoglycosides - Kanamycin	8	181	7										165	9	3	1			3						
Penicillins - Ampicillin	8	181	35							1	11	75	54	5			35								
Cephalosporins - Cefotaxim	0.25	181	0				176	5																	
Cephalosporins - Ceftazidim	8	181	0					181																	
Polymyxins - Colistin	2	181	0											181											
Sulfonamides - Sulfamethoxazol	256	181	70											57	33	9	7	4	1	1	2	67			

Table Antimicrobial susceptibility testing of E. coli in Cattle (bovine animals) - young cattle (1-2 years) - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

E.coli, non-pathogenic, unspecified	Cattle (bovine animals) - young cattle (1-2 years) - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	132																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	16	132	1									3	50	76	2			1						
Amphenicols - Florfenicol	16	132	0									7	62	61	2									
Tetracyclines - Tetracycline	8	132	22								14	69	27		1	1	4	16						
Fluoroquinolones - Ciprofloxacin	0.03	132	2		95	35	1		1															
Quinolones - Nalidixic acid	16	132	1										125	6				1						
Trimethoprim	2	132	6							103	22	1	1		1		4							
Aminoglycosides - Streptomycin	16	132	17									3	50	60	2	6	6	2	3					
Aminoglycosides - Gentamicin	2	132	0						38	88	6													
Aminoglycosides - Kanamycin	8	132	3										127	2					3					
Penicillins - Ampicillin	8	132	9							1	9	49	61	3			9							
Cephalosporins - Cefotaxim	0.25	132	0				127	5																
Cephalosporins - Ceftazidim	8	132	0						132															
Polymyxins - Colistin	8	132	0											132										
Sulfonamides - Sulfamethoxazol	256	132	21											57	24	19	9	2		1	1	19		

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Animals

Test Method Used
Broth dilution

Standard methods used for testing
NCCLS/CLSI

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol	EUCAST	16	
	Florfenicol	EUCAST	16	
Tetracyclines	Tetracycline	EUCAST	8	
Fluoroquinolones	Ciprofloxacin	EUCAST	0.03	
Quinolones	Nalidixic acid	EUCAST	16	
Trimethoprim	Trimethoprim	EUCAST	2	
Sulfonamides	Sulfamethoxazol	CLSI	256	
Aminoglycosides	Streptomycin	EUCAST	16	
	Gentamicin	EUCAST	2	
	Kanamycin	EUCAST	8	
Cephalosporins	Cefotaxim	EUCAST	0.25	
	Ceftazidim	EUCAST	0.5	
Penicillins	Ampicillin	EUCAST	8	
Polymyxins	Colistin	DANMAP	8	

3.2 ENTEROCOCCUS, NON-PATHOGENIC

3.2.1 General evaluation of the national situation

3.2.2 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

Enterococci were analyzed for antimicrobial resistance in 392 samples from fattening pigs, 188 samples from cattle and 206 samples from broilers. The samples were evenly collected throughout the year in a stratified and randomized sample scheme in the framework of a permanent national monitoring programme on antimicrobial resistance in Swiss food-producing animals. The slaughter plants included in the surveillance programme account for 95% of the total broiler, > 85% of the total pig and > 80% of the total cattle production in Switzerland. The number of samples for each plant has been determined in proportion to the number of animals slaughtered per year.

Type of specimen taken

Fecal samples from fattening pigs and cattle, caecal samples 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). In total 5 intact and full caeca (one each from 5 different broilers) per slaughter batch were collected at the time of evisceration. Immediately after collection, the samples were 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, Gentamicin, Linezolid, Neomycin, Nitrofurantoin, Salinomycin, Streptomycin, Quinupristin/Dalfopristin, Tetracyclin, Vancomycin

Cut-off values used in testing

Wherever possible the epidemiological cut-off values according to EUCAST were used:
Ampicillin, > 4 µg/ml; Amoxicillin/Clavolanic acid, > 4 µg/ml; Bacitracin, >64 µg/ml; Chloramphenicol, > 32 µg/ml; Ciprofloxacin, > 4 µg/ml; Erythromycin, > 4 µg/ml; Florfenicol, > 8 µg/ml; Gentamicin, > 512 µg/ml; Linezolid, > 4 µg/ml; Neomycin, > 16 µg/ml; Nitrofurantoin, > 64 µg/ml for E. faecalis, > 256 µg/ml for E. faecium ; Salinomycin, > 8 µg/ml; Streptomycin, > 512 µg/ml for E. faecalis, > 128 µg/ml for E. faecium;

Quinupristin/Dalfopristin, > 1 µg/ml; Tetracycline, > 2 µg/ml; Vancomycin, > 4 µg/ml

Preventive measures in place

No specific measures for antimicrobial resistance in Enterococcus spp. General preventive measures include education of veterinarians and farmers and limitation of use of antimicrobials to veterinary prescription.

Results of the investigation

73 Enterococcus faecalis and 110 Enterococcus faecium isolates from broilers, 89 Enterococcus faecalis and 52 Enterococcus faecium from pigs, as well as 20 Enterococcus faecalis and 8 Enterococcus faecium isolates from cattle were subjected to susceptibility testing.

High to very high levels of resistance to bacitracin, erythromycin, neomycin and tetracycline were observed in E. faecalis and E. faecium from broilers, pigs and cattle with prevalences from 28% – 88%. Additionally a high percentage of E. faecium isolates from broilers showed resistance to quinupristin/dalfopristin (57%).

Resistance against vancomycin was rare, only two E. faecalis strains isolated from pigs showed resistance.

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

The results are similar to those in previous years.
In general, the resistance situation of indicator bacteria in Switzerland is still favourable compared to other european countries.

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 2009 - Jahresbericht on www.bvet.admin.ch > Documentation > Publications > FVO Reports > Reports 2009

Table Antimicrobial susceptibility testing of Enterococcus, non-pathogenic in Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - caecum - Monitoring - official sampling

Enterococcus, non-pathogenic	E. faecalis		E. faecium	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	73		110	
Antimicrobials:	N	n	N	n
Amphenicols - Chloramphenicol	73	1	110	0
Amphenicols - Florfenicol	73	1	110	2
Tetracyclines - Tetracycline	73	50	110	31
Fluoroquinolones - Ciprofloxacin	73	1	110	1
Aminoglycosides - Streptomycin	73	6	110	3
Aminoglycosides - Gentamicin	73	0	110	0
Aminoglycosides - Neomycin	73	64	110	69
Penicillins - Ampicillin	73	0	110	4
Fully sensitive	73	3	110	7
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	73	23	110	51
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	73	0	110	0
Ionophores - Salinomycin	73	0	110	2
Macrolides - Erythromycin	73	21	110	30
Nitroimidazoles and Nitrofurans - Nitrofurantoin	73	0	110	1
Oxazolidines - Linezolid	73	0	110	0
Penicillins - Amoxicillin / Clavulanic acid	73	0	110	0
Resistant to 1 antimicrobial	73	12	110	21
Resistant to 2 antimicrobials	73	31	110	35
Resistant to 3 antimicrobials	73	18	110	29

Table Antimicrobial susceptibility testing of Enterococcus, non-pathogenic in Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - caecum - Monitoring - official sampling

Enterococcus, non-pathogenic	E. faecalis		E. faecium	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	73		110	
Antimicrobials:	N	n	N	n
Resistant to 4 antimicrobials	73	6	110	13
Resistant to >4 antimicrobials	73	3	110	5
Streptogramins - Quinupristin/Dalfopristin			110	63

Table Antimicrobial susceptibility testing of Enterococcus, non-pathogenic in Pigs - fattening pigs - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling

Enterococcus, non-pathogenic	E. faecalis		E. faecium	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	89		52	
Antimicrobials:	N	n	N	n
Amphenicols - Chloramphenicol	89	12	52	0
Amphenicols - Florfenicol	89	1	52	0
Tetracyclines - Tetracycline	89	48	52	19
Fluoroquinolones - Ciprofloxacin	89	1	52	2
Aminoglycosides - Streptomycin	89	34	52	5
Aminoglycosides - Gentamicin	89	6	52	1
Aminoglycosides - Neomycin	89	84	52	25
Penicillins - Ampicillin	89	0	52	5
Fully sensitive	89	1	52	4
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	89	42	52	32
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	89	2	52	0
Ionophores - Salinomycin	89	0	52	0
Macrolides - Erythromycin	89	21	52	7
Nitroimidazoles and Nitrofurans - Nitrofurantoin	89	1	52	0
Oxazolidines - Linezolid	89	1	52	0
Penicillins - Amoxicillin / Clavulanic acid	89	0	52	0
Resistant to 1 antimicrobial	89	19	52	8
Resistant to 2 antimicrobials	89	22	52	12
Resistant to 3 antimicrobials	89	23	52	15

Table Antimicrobial susceptibility testing of Enterococcus, non-pathogenic in Pigs - fattening pigs - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling

Enterococcus, non-pathogenic	E. faecalis		E. faecium	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	89		52	
Antimicrobials:	N	n	N	n
Resistant to 4 antimicrobials	89	8	52	7
Resistant to >4 antimicrobials	89	16	52	6
Streptogramins - Quinupristin/Dalfopristin			52	40

Table Antimicrobial susceptibility testing of Enterococcus, non-pathogenic in Cattle (bovine animals) - young cattle (1-2 years) - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling

Enterococcus, non-pathogenic	E. faecalis		E. faecium	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	20		18	
Antimicrobials:	N	n	N	n
Amphenicols - Chloramphenicol	20	2	18	0
Amphenicols - Florfenicol	20	1	18	0
Tetracyclines - Tetracycline	20	12	18	2
Fluoroquinolones - Ciprofloxacin	20	0	18	0
Aminoglycosides - Streptomycin	20	7	18	0
Aminoglycosides - Gentamicin	20	3	18	0
Aminoglycosides - Neomycin	20	18	18	8
Penicillins - Ampicillin	20	0	18	0
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	20	10	18	12
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	20	0	18	0
Ionophores - Salinomycin	20	0	18	0
Macrolides - Erythromycin	20	4	18	1
Nitroimidazoles and Nitrofurans - Nitrofurantoin	20	0	18	0
Oxazolidines - Linezolid	20	0	18	0
Penicillins - Amoxicillin / Clavulanic acid	20	0	18	0
Resistant to 1 antimicrobial	20	2	18	9
Resistant to 2 antimicrobials	20	5	18	3
Resistant to 3 antimicrobials	20	6	18	5
Resistant to 4 antimicrobials	20	1	18	0

Table Antimicrobial susceptibility testing of Enterococcus, non-pathogenic in Cattle (bovine animals) - young cattle (1-2 years) - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling

Enterococcus, non-pathogenic	E. faecalis		E. faecium	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	20		18	
Antimicrobials:	N	n	N	n
Resistant to >4 antimicrobials	20	4	18	0
Streptogramins - Quinupristin/Dalfopristin			18	7

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

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

E. faecalis	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - caecum - Monitoring - official sampling																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	73																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	32	73	1										9	63			1							
Amphenicols - Florfenicol	8	73	1									30	42		1									
Tetracyclines - Tetracycline	2	73	50								23				1	7	42							
Fluoroquinolones - Ciprofloxacin	4	73	1							14	48	10				1								
Aminoglycosides - Streptomycin	512	73	6															66	1			6		
Aminoglycosides - Gentamicin	32	73	0															73						
Aminoglycosides - Neomycin	16	73	64											4	5	54	6	2	2					
Penicillins - Ampicillin	4	73	0									73												
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	73	23											2	3	19	26	9		14				
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	73	0								36	30	7											
Ionophores - Salinomycin	4	73	0								55	5	12	1										
Macrolides - Erythromycin	4	73	21							32	11	9		4	5	12								
Nitroimidazoles and Nitrofurans - Nitrofurantoin	64	73	0													66	7							
Oxazolidines - Linezolid	4	73	0								15	57	1											
Penicillins - Amoxicillin / Clavulanic acid	4	73	0									72	1											

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

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

E. faecium	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - caecum - Monitoring - official sampling																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	110																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	32	110	0									4	21	81	3	1									
Amphenicols - Florfenicol	8	110	2									49	58	1	1	1									
Tetracyclines - Tetracycline	8	110	31								78	1	2	3	4	1	21								
Fluoroquinolones - Ciprofloxacin	4	110	1							6	25	49	29	1											
Aminoglycosides - Streptomycin	128	110	3															107				3			
Aminoglycosides - Gentamicin	512	110	0															108	2						
Aminoglycosides - Neomycin	16	110	69											25	16	68			1						
Penicillins - Ampicillin	4	110	4									93	13	4											
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	64	110	51											36	4	5	14	13	1	37					
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	110	0								103	4	3												
Ionophores - Salinomycin	4	110	2								10	4	34	60	2										
Macrolides - Erythromycin	4	110	30							47	20	8	5	4		26									
Nitroimidazoles and Nitrofurans - Nitrofurantoin	256	110	1													77	17	14	1	1					
Oxazolidines - Linezolid	4	110	0								5	86	19												
Penicillins - Amoxicillin / Clavulanic acid	4	110	0									108	2												
Streptogramins - Quinupristin/Dalfopristin	1	110	63							22	25	49	10	4											

Table Antimicrobial susceptibility testing of E. faecalis in Pigs - fattening pigs - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

E. faecalis	Pigs - fattening pigs - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	89																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	32	89	12										4	65	7	1	5	7						
Amphenicols - Florfenicol	8	89	1									25	54	9		1								
Tetracyclines - Tetracycline	8	89	48								39	2			1	3	44							
Fluoroquinolones - Ciprofloxacin	4	89	1							6	60	21	1			1								
Aminoglycosides - Streptomycin	512	89	34															50	5			34		
Aminoglycosides - Gentamicin	32	89	6															81	2		2	4		
Aminoglycosides - Neomycin	16	89	84											4	1	42	24	1	17					
Penicillins - Ampicillin	4	89	0									89												
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	89	42											1	2	10	34	37	4	1				
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	89	2								39	40	8	2										
Ionophores - Salinomycin	4	89	0								80	9												
Macrolides - Erythromycin	4	89	21							21	19	25	3			21								
Nitroimidazoles and Nitrofurans - Nitrofurantoin	64	89	1												83		5	1						
Oxazolidines - Linezolid	4	89	1								8	77	3	1										
Penicillins - Amoxicillin / Clavulanic acid	4	89	0									88	1											

Table Antimicrobial susceptibility testing of E. faecium in Pigs - fattening pigs - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

E. faecium	Pigs - fattening pigs - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling																							
Isolates out of a monitoring program (yes/no)	yes																							
Number of isolates available in the laboratory	52																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	32	52	0										2	48	2									
Amphenicols - Florfenicol	8	52	0									5	46	1										
Tetracyclines - Tetracycline	2	52	19								31	2	2			1	16							
Fluoroquinolones - Ciprofloxacin	4	52	2							10	23	14	3	1	1									
Aminoglycosides - Streptomycin	128	52	5															47				5		
Aminoglycosides - Gentamicin	32	52	1															51				1		
Aminoglycosides - Neomycin	16	52	25											12	15	19	2	1	3					
Penicillins - Ampicillin	4	52	5									35	12	5										
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	52	32											6		2	12	21	5	6				
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	52	0								43	9												
Ionophores - Salinomycin	4	52	0								29	20	2	1										
Macrolides - Erythromycin	4	52	7							10	9	22	4	2	1	4								
Nitroimidazoles and Nitrofurans - Nitrofurantoin	256	52	0													4	35	12	1					
Oxazolidines - Linezolid	4	52	0								1	30	21											
Penicillins - Amoxicillin / Clavulanic acid	4	52	0									51	1											
Streptogramins - Quinupristin/Dalfopristin	1	52	40							6	6	22	16	2										

Table Antimicrobial susceptibility testing of E. faecalis in Cattle (bovine animals) - young cattle (1-2 years) - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

E. faecalis	Cattle (bovine animals) - young cattle (1-2 years) - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	20																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	32	20	2										5	12	1		2								
Amphenicols - Florfenicol	8	20	1									8	10	1		1									
Tetracyclines - Tetracycline	8	20	12								8					12									
Fluoroquinolones - Ciprofloxacin	4	20	0							6	14														
Aminoglycosides - Streptomycin	512	20	7															13				7			
Aminoglycosides - Gentamicin	512	20	3														17					3			
Aminoglycosides - Neomycin	16	20	18												2	7	5		6						
Penicillins - Ampicillin	4	20	0									19	1												
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	20	10											1		1	8	6	4						
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin		20	0								9	10	1												
Ionophores - Salinomycin	4	20	0								20														
Macrolides - Erythromycin	4	20	4							5	6	4	1		4										
Nitroimidazoles and Nitrofurans - Nitrofurantoin	64	20	0													20									
Oxazolidines - Linezolid	4	20	0								1	18	1												
Penicillins - Amoxicillin / Clavulanic acid	4	20	0									20													

Table Antimicrobial susceptibility testing of E. faecium in Cattle (bovine animals) - young cattle (1-2 years) - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

E. faecium	Cattle (bovine animals) - young cattle (1-2 years) - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	18																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	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
Amphenicols - Chloramphenicol	32	18	0										1	16	1										
Amphenicols - Florfenicol	8	18	0									2	15	1											
Tetracyclines - Tetracycline	2	18	2								15	1					2								
Fluoroquinolones - Ciprofloxacin	4	18	0							2	2	3	11												
Aminoglycosides - Streptomycin	128	18	0														18								
Aminoglycosides - Gentamicin	512	18	0															18							
Aminoglycosides - Neomycin	16	18	8											2	8	8									
Penicillins - Ampicillin	4	18	0									17	1												
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	18	12											2			4	10	2						
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	18	0								18														
Ionophores - Salinomycin	4	18	0									11	6	1											
Macrolides - Erythromycin	4	18	1							3	4	8	2	1											
Nitroimidazoles and Nitrofurans - Nitrofurantoin	256	18	0												4		11	3							
Oxazolidines - Linezolid	4	18	0									11	7												
Penicillins - Amoxicillin / Clavulanic acid	4	18	0									17	1												
Streptogramins - Quinupristin/Dalfopristin	1	18	7							8	3	3	4												

Table Cut-off values for antibiotic resistance of Enterococcus, non-pathogenic in Animals

Test Method Used	Standard methods used for testing
Broth dilution	NCCLS/CLSI

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin	EUCAST	512	
	Gentamicin	CLSI	512	
	Neomycin	ARBAO-II	16	
Amphenicols	Chloramphenicol	EUCAST	32	
	Florfenicol	EUCAST	8	
Penicillins	Ampicillin	EUCAST	4	
	Amoxicillin / Clavulanic acid	EUCAST	4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin	EUCAST	4	
	Bacitracin	ARBAO-II	64	
Macrolides	Erythromycin	EUCAST	4	
Streptogramins	Quinupristin/Dalfopristin	EUCAST	32	
Tetracyclines	Tetracycline	EUCAST	2	
Oxazolidines	Linezolid	EUCAST	4	
Fluoroquinolones	Ciprofloxacin	EUCAST	4	

Table Cut-off values for antibiotic resistance of Enterococcus, non-pathogenic in Animals

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Nitroimidazoles and Nitrofurans	Nitrofurantoin	EUCAST	64	
Ionophores	Salinomycin	DANMAP	8	

Footnote:

Breakpoints for Enterococcus faecalis
Breakpoints for Enterococcus feacium were adapted in the corresponding tables

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1 ENTEROBACTER SAKAZAKII

4.1.1 General evaluation of the national situation

4.2 HISTAMINE

4.2.1 General evaluation of the national situation

4.3 STAPHYLOCOCCAL ENTEROTOXINS

4.3.1 General evaluation of the national situation

5. FOODBORNE

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. Following a modification of the Ordinance on Disease Notification, laboratories are additionally required to report identifications of Trichinella spp. since 1st January 2009.

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 (NENT) and the National Centre for Listeria (CNRL). 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:

Trends in numbers of outbreaks and numbers of human cases involved

The number of outbreaks is too low to calculate precise trends. However, it can be clearly stated that outbreaks in the past 10 years decreased by around 50% in comparison to the first half of the 1990 ies. One reason for that is certainly the successful eradication of S. Enteritidis in layer flocks where the prevalence became very low. The implementation of HACCP-systems in food businesses may also have had an influence.e

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

Restaurants and similar places for collective catering were the most frequent settings of outbreaks.

Evaluation of the severity and clinical picture of the human cases

The available clinical data are not very good since this aspect is not in the main focus of the competent authorities. Surprisingly, there were also short hospitalizations in cases of intoxications with histamines. Probably, persons with symptoms more often directly go to emergency stations of hospitals.

Control measures or other actions taken to improve the situation

In Switzerland, the number of outbreaks is already quite low. Therefore, it will be difficult to get a further decrease. An additional improvement of the situation could be possible by actions to lower the infection frequencies with Campylobacter in life stock animals. For this purpose, a national platform with all the stakeholders and competent authorities was established. The target of the platform is exchange of information, launching research projects, coordination of preventive actions and evaluation of legal measures.

Suggestions to the community for the actions to be taken

In the coming years, ways must be found to reduce the high prevalence of Campylobacter especially in poultry flocks.

Table Foodborne Outbreaks: summarised data

	Total number of outbreaks	Outbreaks	Human cases	Hospitalized	Deaths	Number of verified outbreaks
Bacillus	0	0	unknown	unknown	unknown	0
Campylobacter	2	2	7	1	0	0
Clostridium	0	0	unknown	unknown	unknown	0
Escherichia coli, pathogenic	0	0	unknown	unknown	unknown	0
Foodborne viruses	1	1	12	0	0	0
Listeria	0	0	unknown	unknown	unknown	0
Other agents	4	0	unknown	unknown	unknown	4
Parasites	0	0	unknown	unknown	unknown	0
Salmonella	1	1	3	1	0	0
Staphylococcus	3	1	unknown	0	0	2
Unknown	2	2	180	0	0	0
Yersinia	0	0	unknown	unknown	unknown	0

Table Verified Foodborne Outbreaks: detailed data for Other agents

Please use CTRL for multiple selection fields

Histamine

	Value
Code	07
Outbreaks	1
Human cases	2
Hospitalized	0
Deaths	0
Foodstuff implicated	Fish and fish products
More Foodstuff information	Tuna fish salad
Type of evidence	Laboratory detection in implicated food
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	unknown
Contributory factors	Storage time/temperature abuse
Other Agent (Mixed Outbreaks)	
Comment	Amount of histamine: 8840 mg/kg

Histamine

	Value
Code	10
Outbreaks	1
Human cases	2
Hospitalized	0
Deaths	0
Foodstuff implicated	Fish and fish products
More Foodstuff information	Pizza with tuna
Type of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	unknown
Contributory factors	Unknown
Other Agent (Mixed Outbreaks)	
Comment	

Histamine

	Value
Code	09
Outbreaks	1
Human cases	2
Hospitalized	0
Deaths	0
Foodstuff implicated	Fish and fish products
More Foodstuff information	Tuna fish grilled
Type of evidence	Laboratory detection in implicated food
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	unknown
Contributory factors	Storage time/temperature abuse
Other Agent (Mixed Outbreaks)	
Comment	Amount of histamine: 5570 mg /kg

Histamine

	Value
Code	08
Outbreaks	1
Human cases	3
Hospitalized	3
Deaths	0
Foodstuff implicated	Fish and fish products
More Foodstuff information	Tuna
Type of evidence	Laboratory detection in implicated food
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of foodstuff	unknown
Contributory factors	Storage time/temperature abuse
Other Agent (Mixed Outbreaks)	
Comment	Amount of histamine: 7420 mg/kg

Table Verified Foodborne Outbreaks: detailed data for Staphylococcus

Please use CTRL for multiple selection fields

S. aureus

	Value
Code	03
Outbreaks	1
Human cases	39
Hospitalized	0
Deaths	0
Foodstuff implicated	Other foods
More Foodstuff information	Potato soup with raw milk
Type of evidence	Laboratory detection in implicated food
Outbreak type	General
Setting	School, kindergarten
Place of origin of problem	Farm (primary production)
Origin of foodstuff	unknown
Contributory factors	Inadequate chilling
Other Agent (Mixed Outbreaks)	
Comment	

S. aureus

	Value
Code	04
Outbreaks	1
Human cases	30
Hospitalized	0
Deaths	0
Foodstuff implicated	Other foods
More Foodstuff information	Potato salad
Type of evidence	Laboratory detection in implicated food
Outbreak type	General
Setting	Temporary mass catering (fairs, festivals)
Place of origin of problem	unknown
Origin of foodstuff	unknown
Contributory factors	Inadequate chilling
Other Agent (Mixed Outbreaks)	
Comment	