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 2010

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
ILS	Institute for Food Safety and Hygiene , Vetsuisse Faculty University of Zurich	STEC, enteropathogenic Bacteria
IVB	Institute of Veterinary Bacteriology Vetsuisse Faculty University of Zurich	Coxiellosis, Tuberculosis
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 Listeria Monitoring

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 2010 .

The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given. The information given covers both zoonoses that are important for the public health in the whole European Community as well as zoonoses, which are relevant on the basis of the national epidemiological situation.

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

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

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

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

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1. ANIMAL POPULATIONS

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

A. Information on susceptible animal population

Sources of information

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

Dates the figures relate to and the content of the figures

Number of animals hold in farms in Switzerland at 3th of May 2010. Number of animals slaughtered in the year 2010.

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. 37 holdings with more than 100 breeding hens keep 90% of all breeding hens. The number of laying hens is slightly increasing. Broiler production increased since 2009 by 5.8%.

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

Average size of the farms in 2010: 38 cattle, 173 pigs, 44 sheep, 13 goats, 196 laying hens, 5529 broilers.

Additional information

One-day chicks and fertilised eggs are imported on a large scale from the EU and reared in Switzerland. In 2010 about 719,304 one-day chicks (mainly from France, Italy and Germany) and 23.5 million fertilised eggs of the broiler type (mainly from France, Holland and Denmark) were imported. In general, there is a trend to import each year less one-day chicks but more fertilized eggs (Source of information: Swiss federal office of agriculture).

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			650788		1600563		41871	
Gallus gallus (fowl)	breeding flocks, unspecified - in total					123560		1137	
	broilers			52998413		5567269		1007	
	laying hens					3229448		16504	
Goats	- in total			28320		81232		6064	
Pigs	- in total			2846016		1580215		9122	
Sheep	- in total			242818		423800		9560	
Solipeds, domestic	horses - in total			3051		55315		9073	
Turkeys	- in total [1)]					58483		270	

Comments:

[1)] Number of slaughtered turkeys is not available. 1383 tons of turkey meat was produced.

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 113.4 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 1995. 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.

In a Salmonella Kentucky study conducted in 2010 (Bonalli et al.) 106 human Salmonella Kentucky strains, isolated from patients between 2004 and 2009, were genotyped using PFGE. There was some evidence of an non-recognised outbreak of S. Kentucky in 2006. Travels to North Africa were a risk factor for Salmonella Kentucky infection.

It is the responsibility of the producers to implement a hygiene concept that guarantees the safety of their products.
The Hygiene Ordinance lays down limits for Salmonella in various foods. If these limits are exceeded, the cantonal laboratories are required to report this to the FOPH. The foods affected are confiscated and destroyed. Depending on the situation, the products may be recalled, and a warning is issued to the population.
All the larger cheese manufacturers have a hygiene management system in place that conforms to ISO 9000. From 2002 until 2009 cheese production in cheese-making facilities was also officially sampled and monitored for Salmonella in a national surveillance programme. As in the recent years no Salmonella were detected, the official testing on Salmonella in dairy products was stopped in 2009.

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. In the past 10 years (2001-2010) 740 salmonellosis cases were recorded to the FVO by cantonal veterinarians ranging between 56 and 93 cases per year. Almost half of them occurred in livestock (mainly cows), one quarter in reptiles, 18% in

dogs/cats and 8% in birds.

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 programme 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 programme was expanded 2007 to other serovars and species (TSV, Article 255-261) according to the regulation 2160/2003 of the European community. In 2009 the state control programme was extended to broiler flocks. Up to date breeding flocks, laying hens, broilers and turkeys and depending on which species the serovars S. Enteritidis, S. Typhimurium, S. Hadar, S. Virchow and/or S. Infantis are covered in this control programme. Since 2007 no more than 3 cases per year in poultry were reported.

The baseline studies 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.
In the slaughter pigs survey, 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.

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

Salmonellosis in humans is the second most frequent zoonosis in Switzerland. The reporting rate for salmonellosis in humans further decreased from 16.7 (2009) to 15.1 reports per 100,000 inhabitants in 2010. 356 (30%) of the 1179 reported cases were caused by S. Enteritidis, 222 (19%) by S. Typhimurium and 136 (11%) by S. 4,12:i:-. The highest reporting rate concerned little children below 5 years old. Most cases occur in summer.

Regarding salmonellosis in animals 73 cases were reported to the FVO by cantonal veterinarians in 2010 (22 in cattle, 22 in dogs and cats, 17 in reptiles, 3 in sheep, 2 in wild birds, 2 in singing birds and one each in horses, pigs, poultry, monkeys and other domestic birds. In veterinary diagnostic laboratories 6956 tests for salmonellosis were carried out in the context of clinical investigations, mainly in cattle (40%), dogs (19%), cats (14%), pigs (8%) and birds (7%) (see table).

Looking at the salmonella infections in poultry 3 cases were reported 2010 which all concerned flocks under the Salmonella control programme (2 cases in laying hens and one in broilers).

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

Despite the steady decline in human cases, salmonellosis is still the second most common zoonosis in Switzerland. Since many years most cases in humans are caused by S. Enteritidis and S. Typhimurium. Particular importance is therefore attached to stepping up and expanding the national control programme aimed at achieving a low prevalence in Swiss farm animal populations. Salmonellae are very rarely found in breeding and laying hens. The longstanding control programme is showing its effect here. In broiler chickens, the first two years of control showed the presence of different Salmonella serotypes, with the first detection of one infection with S. Enteritids in 2010.
It remains unclear to what extent pigs and cattle play a part as reservoirs for infection in humans.
By comparison with other countries, Switzerland has relatively few cases of salmonellosis. This is due, amongst other things, to the control programme of the last few years.

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 realise adequate control programmes. Control measures were implemented in breeding flocks according to Commission Regulation (EC) No. 1003/2005, in laying hen flocks according to Commission Regulation (EC) No. 1168/2006, in broilers according to Commission Regulation (EC) No. 646/2007 and in turkeys according to Commission Regulation (EC) No. 584/2008.

Additional information

1. Bonalli, M., Stephan, R., Käppeli, U., Cernela, N., Adank, L., Hächler, H. Salmonella enterica serotype Kentucky associated with human infections in Switzerland: genotype and resistance trends 2004-2009. International Food Research, in press.
2. 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.
3. In a border control inspection program risk-based random samples are taken. In 2010, these included 21 fish samples from Vietnam of which none were Salmonella positive.
4. Further information can be found on the FVO website www.bvet.admin.ch.

2.1.2 Salmonellosis in humans

Table Salmonella in humans - Species/serotype distribution

Species/serotype Distribution	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.	Unknown status
Salmonella	1179	15.14	0	0	0	0	0
S. Enteritidis	356	4.57					
S. Typhimurium	222	2.85					
Salmonella spp., unspecified	601	7.72					

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	7	5	2	11	4	7	37	23	14
1 to 4 years	44	24	20	55	30	25	186	100	86
5 to 14 years	54	33	21	32	17	15	154	86	68
15 to 24 years	59	21	38	24	13	11	167	71	95
25 to 44 years	74	41	33	38	17	21	228	116	112
45 to 64 years	72	39	31	31	20	11	236	132	102
65 years and older	45	24	21	31	11	20	166	86	80
Age unknown	1	0	0	0	0	0	5	3	1
Total :	356	187	166	222	112	110	1179	617	558

Footnote:

As there were some cases where the gender was unknown, the numbers of females and males may not add up with the column "all".

Table Salmonella in humans - Seasonal distribution

Seasonal Distribution Months	S. Enteritidis Cases	S. Typhimurium Cases	Salmonella spp. Cases
January	10	15	65
February	13	12	54
March	14	14	65
April	26	14	75
May	18	23	92
June	30	17	104
July	31	14	99
August	76	30	192
September	44	31	146
October	55	12	125
November	27	13	88
December	12	27	74
Total :	356	222	1179

2.1.3 Salmonella in foodstuffs

A. Salmonella spp. in broiler meat and products thereof

Preventive measures in place

The Hygiene Ordinance lays down limits for Salmonella in various foods. If these limits are exceeded, the cantonal laboratories are required to report this to the FOPH. The foods affected are confiscated and destroyed. Depending on the situation the products may be recalled and a warning is issued to the population.

Results of the investigation

The industry takes responsibility for the monitoring for 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 3284 tests were done (including 90% single samples) of which 2,4% proved positive for Salmonella spp. (7x S. Enteritidis, 6x S. Typhimurium, 5x S. Mbandaka, 1x S. Chester, 1x S. Paratyphi B und 59x Salmonella spp. not identified).

B. Salmonella spp. in turkey meat and products thereof

Preventive measures in place

The Hygiene Ordinance lays down limits for Salmonella in various foods. If these limits are exceeded, the cantonal laboratories are required to report this to the FOPH. The foods affected are confiscated and destroyed. Depending on the situation the products may be recalled and a warning is issued to the population.

Results of the investigation

The industry takes responsibility for the monitoring for 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. 470 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). Two fresh turkey samples and one mechanically separated turkey meat sample were Salmonella positive (3x Salmonella spp. not identified).

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. Chester	S. Mbandaka	S. Paratyphi B
Meat from broilers (Gallus gallus) - fresh - at processing plant - Surveillance - HACCP and own checks [1)]	poultry industry	Single	10g/25g	310	6	0	0	5	0	1	0
Meat from broilers (Gallus gallus) - fresh - at slaughterhouse - Surveillance - HACCP and own checks [2)]	poultry industry	Single	10g/25g	1053	32	1	1	27	0	3	0
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at processing plant - Surveillance - HACCP and own checks [3)]	poultry industry	Single	10g/25g	1081	25	0	0	24	0	0	1
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant - Surveillance - HACCP and own checks	poultry industry	Single	25g	392	1	0	0	1	0	0	0
Meat from broilers (Gallus gallus) - mechanically separated meat (MSM) - Surveillance - HACCP and own checks	poultry industry	Single	10g	287	11	6	3	0	1	1	0
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at processing plant - Surveillance - HACCP and own checks [4)]	poultry industry	Single	10g/25g	161	4	0	2	2	0	0	0
Meat from turkey - fresh - at processing plant - Surveillance - HACCP and own checks [5)]	poultry industry	Single	10g/25g	101	0	0	0	0	0	0	0
Meat from turkey - fresh - at slaughterhouse - Surveillance - HACCP and own checks [6)]	poultry industry	Single	10g/25g	189	2	0	0	2	0	0	0
Meat from turkey - meat products - raw but intended to be eaten cooked - at processing plant - Surveillance - HACCP and own checks [7)]	poultry industry	Single	10g/25g	39	0	0	0	0	0	0	0

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. Chester	S. Mbandaka	S. Paratyphi B
Meat from turkey - mechanically separated meat (MSM) - Surveillance - HACCP and own checks [8)]	poultry industry	Single	10g/25g	6	1	0	0	1	0	0	0
Meat from turkey - minced meat - intended to be eaten cooked - at processing plant - Surveillance - HACCP and own checks [9)]	poultry industry	Single	10g/25g	135	0	0	0	0	0	0	0

Comments:

[1)] 95x25g; 215x10g

[2)] 264 samples were pools of three (25g); 751x10g; 38x25g

[3)] 261x25g; 820x10g

[4)] 2x25g;159x10g

[5)] 95x25g; 6x10g

[6)] 18x25g; 171x10g

[7)] 33x10g; 6x25g

[8)] 5x10g; 1x25g

[9)] 6x25g; 129x10g

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Fish - raw - Monitoring - official sampling [1)]	FVO	Single	25g	21	0			

Comments:

[1)] Data originate from the border control insepction programme (see footnote). All 21 samples were Pangasius filets and originated from Vietnam.

Footnote:

The data mentioned in the table above are data from a border control inspection programme run by the FVO where risk-based random samples are taken from commodities imported from third countries. As costs for flying these commodities in are high, there are not many samples which can be taken.

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. Since 1 January 2007, the control programme covers breeding holdings with more than 250 places. The samples of poultry breeding flocks that were obtained from one-day chicks, in the rearing or the production phase, contained materials such as shell residues, meconium, empty chick eggs, dead chicks, basket lining or environmental samples (cumulative samples of faeces, drag swabs, boot swabs, dust). They are taken six times under official supervision: three times during the rearing phase (at ages 1–3 days, 4–5 weeks, 15 –20 weeks, and two weeks before being moved to the laying house) as well as three times during the laying phase (beginning, middle and end). Salmonella serotypes S. Enteritidis, S. Typhimurium, S. Hadar, S. Infantis and S. Virchow are subject to state control measures.

Measures in case of the positive findings or single cases

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

If Salmonellae are detected in the environment, there is a suspicion of Salmonella infection. In the event of a suspected infection, the official veterinarian samples further test material as soon as possible (20 killed animals or fallen stock per flock) and submits the meat and organs to bacteriological testing for Salmonella. If testing reveals Salmonella serotypes whose control is of significance to public health, a Salmonella infection covered in the control programme does exist.
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. In breeding flocks the animals are killed and the eggs are no longer allowed to be used for fertilisation purposes. The quarantine conditions are lifted when all animals have been killed and the premises cleaned, disinfected and the freedom from Salmonella of the premises checked by official sampling after disinfection by means of bacteriological testing.

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 programme none of the tested breeding flocks were positive for salmonella.

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

Further information can be found on the FVO website www.bvet.admin.ch.

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 programme covers broiler flocks on farms with at least 5000 places. In broiler flocks, the samples are taken from drag swabs or boot swabs shortly before slaughter. The flocks are tested three weeks at the earliest before slaughter. An official sample is taken from a flock on 10% of farms; in all other flocks testing is commissioned by the animal owner. Salmonella serotypes S. Enteritidis and S. Typhimurium are subject to state control measures.

Measures in case of the positive findings or single cases

Broiler flocks: Before slaughter at farm

If Salmonellae are detected in the environment, there is a suspicion of Salmonella infection. In the event of a suspected infection, the official veterinarian samples further test material as soon as possible (20 killed animals or fallen stock per flock) and submits the meat and organs to bacteriological testing for Salmonella. If testing reveals Salmonella serotypes whose control is of significance to public health, a Salmonella infection covered in the control programme does exist.
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 infected flocks must be slaughtered or culled. In broiler and laying flocks the fresh meat and eggs either have to be disposed of or subjected to treatment in order to destroy the Salmonella before being marketed as food. The quarantine conditions are lifted when all animals have been killed and the premises cleaned, disinfected and the freedom from Salmonella of the premises checked by official sampling after disinfection by means of bacteriological testing.

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, 10 flocks were tested positive for Salmonella. Since most of the determined serovars were not covered by the target, there was one Salmonella Enteritidis infection in broiler flocks relevant for reporting in the context of the control program.

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 applying the afore-mentioned control measures.

Additional information

Further information can be found on the FVO website www.bvet.admin.ch.

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 programme covers all flocks of laying hens on farms with at least 1000 places. Samples from laying hens may contain eggs, blood or environmental samples and are taken during the rearing and production phase: twice under official supervision (aged 15 –20 weeks, and two weeks before being moved to the laying house, as well as nine weeks at the earliest before slaughter). Salmonella serotypes S. Enteritidis and S. Typhimurium are subject to state control measures.

Measures in case of the positive findings or single cases

Laying hens flocks

If Salmonellae are detected in the environment, there is a suspicion of Salmonella infection. In the event of a suspected infection, the official veterinarian samples further test material as soon as possible (20 killed animals or fallen stock per flock) and submits the meat and organs to bacteriological testing for Salmonella. If testing reveals Salmonella serotypes whose control is of significance to public health, a Salmonella infection covered in the control programme does exist.
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 infected flocks must be slaughtered or culled. In broiler and laying flocks the fresh meat and eggs either have to be disposed of or subjected to treatment in order to destroy the Salmonella before being marketed as food. The quarantine conditions are lifted when all animals have been killed and the premises cleaned, disinfected and the freedom from Salmonella of the premises checked by official sampling after disinfection by means of bacteriological testing.

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 2010 two of the tested flocks of laying hens in the control programme were Salmonella positive.

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 S. Typhimurium in small scale flocks of laying hens were notified. In general, not more than 3 cases of Salmonella infection in laying hens per year are reported.

Additional information

Further information can be found on the FVO website www.bvet.admin.ch.

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	S. 1,4,[5],12:i:-
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - Control and eradication programmes - official and industry sampling	56	cantons	Flock	33	0						
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - at farm - Control and eradication programmes - industry sampling	56	cantons	Flock	18	0						
Gallus gallus (fowl) - breeding flocks for broiler production line - at farm - Control and eradication programmes - official sampling	56	cantons	Flock	28	0						
Gallus gallus (fowl) - breeding flocks for broiler production line - day-old chicks - at farm - Control and eradication programmes - official sampling	56	cantons	Flock	21	0						
Gallus gallus (fowl) - breeding flocks for broiler production line - during rearing period - at farm - Control and eradication programmes - official sampling	56	cantons	Flock	19	0						
Gallus gallus (fowl) - breeding flocks for egg production line - adult - at farm - Control and eradication programmes - industry sampling	113	cantons	Flock	26	0						
Gallus gallus (fowl) - breeding flocks for egg production line - adult - at farm - Control and eradication programmes - official and industry sampling	113	cantons	Flock	42	0						
Gallus gallus (fowl) - breeding flocks for egg production line - adult - at farm - Control and eradication programmes - official sampling	113	cantons	Flock	16	0						

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	S. 1,4,[5],12:i:-
Gallus gallus (fowl) - breeding flocks for egg production line - day-old chicks - at farm - Control and eradication programmes - official sampling	113	cantons	Flock	9	0						
Gallus gallus (fowl) - breeding flocks for egg production line - during rearing period - at farm - Control and eradication programmes - official sampling	113	cantons	Flock	63	0						

	Salmonella spp., unspecified
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - Control and eradication programmes - official and industry sampling	
Gallus gallus (fowl) - breeding flocks for broiler production line - adult - at farm - Control and eradication programmes - industry sampling	
Gallus gallus (fowl) - breeding flocks for broiler production line - at farm - Control and eradication programmes - official sampling	
Gallus gallus (fowl) - breeding flocks for broiler production line - day-old chicks - at farm - Control and eradication programmes - official sampling	

Table Salmonella in breeding flocks of Gallus gallus

	Salmonella spp., unspecified
Gallus gallus (fowl) - breeding flocks for broiler production line - during rearing period - at farm - Control and eradication programmes - official sampling	
Gallus gallus (fowl) - breeding flocks for egg production line - adult - at farm - Control and eradication programmes - industry sampling	
Gallus gallus (fowl) - breeding flocks for egg production line - adult - at farm - Control and eradication programmes - official and industry sampling	
Gallus gallus (fowl) - breeding flocks for egg production line - adult - at farm - Control and eradication programmes - official sampling	
Gallus gallus (fowl) - breeding flocks for egg production line - day-old chicks - at farm - Control and eradication programmes - official sampling	
Gallus gallus (fowl) - breeding flocks for egg production line - during rearing period - at farm - Control and eradication programmes - official sampling	

Footnote:

Data from the cantons are incomplete. Measures to improve data quality are ongoing.

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	S. 1,4,[5],12:i:-	Salmonella spp., unspecified
Alpacas - Clinical investigations [1)]	FVO	Animal	19	0				0
Birds - Clinical investigations [2)]	FVO	Animal	463	78				78
Buffalos - Clinical investigations [3)]	FVO	Animal	1	0				0
Camels - Clinical investigations [4)]	FVO	Animal	3	0				0
Cats - Clinical investigations [5)]	FVO	Animal	944	36				36
Cattle (bovine animals) - Clinical investigations [6)]	FVO	Animal	2796	555				555
Deer - farmed - Clinical investigations [7)]	FVO	Animal	4	0				0
Dogs - Clinical investigations [8)]	FVO	Animal	1332	28				28
Fur animals - farmed - Clinical investigations [9)]	FVO	Animal	4	0				0
Goats - Clinical investigations [10)]	FVO	Animal	59	0				0
Other animals - Clinical investigations [11)]	FVO	Animal	373	94				94
Pigs - Clinical investigations [12)]	FVO	Animal	565	20				20
Rabbits - farmed - Clinical investigations [13)]	FVO	Animal	20	0				0
Sheep - Clinical investigations [14)]	FVO	Animal	92	20				20
Solipeds, domestic - Clinical investigations [15)]	FVO	Animal	262	6				6
Wild animals - Clinical investigations (vertebrates) [16)]	FVO	Animal	19	0				0

Comments:

Table Salmonella in other animals

Comments:

[1)] ILD, see footnote

[2)] ILD, see footnote

[3)] ILD, see footnote

[4)] ILD, see footnote

[5)] ILD, see footnote

[6)] ILD, see footnote

[7)] ILD, see footnote

[8)] ILD, see footnote

[9)] ILD, see footnote

[10)] ILD, see footnote

[11)] ILD, see footnote

[12)] ILD, see footnote

[13)] ILD, see footnote

[14)] ILD, see footnote

[15)] ILD, see footnote

[16)] ILD, see footnote

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

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	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. 4,12:i:-	S. Indiana
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling	757	cantons	Flock	642	1	1					
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry	757	cantons	Flock	319	0						
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - suspect sampling	757	cantons	Flock	11	0						
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling [1)]	937	cantons	Flock	368	10	1				1	1
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - industry sampling	937	cantons	Flock	311	7						
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official sampling	937	cantons	Flock	53	0						
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official sampling - suspect sampling	937	cantons	Flock	4	3	1				1	1
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling	757	cantons	Flock	365	1	1					
Gallus gallus (fowl) - laying hens - during rearing period - at farm - Control and eradication programmes - official sampling	757	cantons	Flock	191	0						

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	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	S. 4,12:i:-	S. Indiana
Turkeys - meat production flocks - before slaughter - at farm - Control and eradication programmes - industry sampling	73	cantons	Flock	58	0						
Turkeys - meat production flocks - before slaughter - at farm - Control and eradication programmes - official sampling	73	cantons	Flock	2	0						
Turkeys - meat production flocks - before slaughter - at farm - Control and eradication programmes - official sampling - suspect sampling	73	cantons	Flock	2	2						2

	S. Jerusalem	S. Mbandaka	S. Yoruba
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 - suspect sampling			
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling [1)]	3	3	1

Table Salmonella in other poultry

	S. Jerusalem	S. Mbandaka	S. Yoruba
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - industry sampling	3	3	1
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official sampling			
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official sampling - suspect sampling			
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling			
Gallus gallus (fowl) - laying hens - during rearing period - at farm - Control and eradication programmes - official sampling			
Turkeys - meat production flocks - before slaughter - at farm - Control and eradication programmes - industry sampling			
Turkeys - meat production flocks - before slaughter - at farm - Control and eradication programmes - official sampling			
Turkeys - meat production flocks - before slaughter - at farm - Control and eradication programmes - official sampling - suspect sampling			

Comments:

[1)] Flocks which are tested officially are not tested again by the industry. Therefore this column is simply the sum of industry and official sampling.

Table Salmonella in other poultry

Footnote:

Data from the cantons are incomplete. Data from the flock owners are a challenge to obtain and measures to improve data quality are ongoing.

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 [1)]	ALP	Single	25g	138	0			
Compound feedingstuffs for pigs - final product	ALP	Single	25g	43	0			
Compound feedingstuffs for poultry (non specified) - final product	ALP	Single	25g	61	0			
Compound feedingstuffs for fish - final product	ALP	Single	25g	3	0			
Compound feedingstuffs for horses - final product	ALP	Single	25g	1	0			
Compound feedingstuffs for sheep - final product [2)]	ALP	Single	25g	2	0			

Comments:

[1)] 4x milk replacer for calves

[2)] 4x milk replacer for lambs

Footnote:

ALP = Institute Agroscope Liebefeld Posieux, official feed inspection service. Analyses on Salmonella in feed were performed following EN ISO 6579:2002(2).

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 land animal origin - dairy products [1)]	ALP	Single	25g	1	0			
Feed material of marine animal origin - fish meal	ALP	Single	25g	4	0			

Comments:

[1)] 1x milk pouder

Footnote:

ALP = Institute Agroscope Liebefeld Posieux, official feed inspection service. Analyses on Salmonella in feed were performed following EN ISO 6579:2002(2).

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	25g	1	0			
Feed material of cereal grain origin - maize - derived	ALP	Single	25g	11	0			
Feed material of cereal grain origin - other cereal grain derived [1)]	ALP	Single	25g	4	0			
Feed material of cereal grain origin - wheat derived	ALP	Single	25g	1	0			
Feed material of oil seed or fruit origin - linseed derived	ALP	Single	25g	1	0			
Feed material of oil seed or fruit origin - soya (bean) derived	ALP	Single	25g	46	0			
Other feed material - legume seeds and similar products [2)]	ALP	Single	25g	1	0			
Other feed material - other plants [3)]	ALP	Single	25g	5	0			

Comments:

[1)] 1x rice pouder and 3 x broken rice

[2)] herbs

[3)] 1x potato flower, 2x yeast, 2x brewer grains

Footnote:

ALP = Institute Agroscope Liebefeld Posieux, official feed inspection service. Analyses on Salmonella in feed were performed following EN ISO 6579:2002(2).

2.1.6 Antimicrobial resistance in Salmonella isolates

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Frequency of the sampling

Samples were collected from clinical or subclinical material.

Type of specimen taken

Clinical samples

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, tetracycline

Cut-off values used in testing

Wherever possible the epidemiological cut-off values according to EUCAST were used.

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

41 Salmonella spp. isolates from cattle were available for susceptibility testing. 31 S. Typhimurium (4 of them S. 4,12:i.-), 3 S. Enteritidis, 2. S. Aboni, 1 S. Eboko, 1 S. Rissen, 1 S. Paratyphi (formerly Java) and 1 S. 40:z:4,z33:-). High prevalences of resistance to ampicillin, chloramphenicol, streptomycin, sulfamethoxazol, tetracycline and trimethoprim were found in S. Typhimurium isolates from cattle (26 - 48%). No resistance was found in the 3 S. Enteritidis isolates.

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

Resistance was most frequently observed against antimicrobials that have been used in food animals for many years. Resistances against newer antimicrobials more critical for human health (fluoroquinolones, cephalosporines) were not found.

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

Salmonella prevalence in healthy animals in Switzerland is very low, therefore Salmonella isolates from clinical material are used for Monitoring.

Additional information

See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

The following amendments were made:

Date of Modification	Row name	Old value	New value
2012-06-11	Additional information	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010 Isolate based data on antimicrobial resistance in Salmonella were submitted to EFSA as xml - file, therefore they are not included in this report. They will be published by EFSA in a communitiy summary report on antimicrobial resistance in zoonotic and indicator bacteria.	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

B. Antimicrobial resistance in Salmonella in pigs

Sampling strategy used in monitoring

Frequency of the sampling

Samples were collected from clinical or subclinical material.

Type of specimen taken

Clinical samples

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, tetracycline

Cut-off values used in testing

Wherever possible the epidemiological cut-off values according to EUCAST were used.

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

6 Salmonella spp. isolates from pigs were available for susceptibility testing.(2 S. Typhimurium, 2 S. Infantis, 2. S. Ohio). The 2 S. Typhimurium isolates showed resistance to to ampicillin, chloramphenicol, florfenicol, streptomycin, sulfamethoxazol and tetracycline. No resistance was found in the other Salmonella isolates.

Additional information

See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

The following amendments were made:

Date of Modification	Row name	Old value	New value
2012-06-11	Additional information	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010 Isolate based data on antimicrobial resistance in Salmonella were submitted to EFSA as xml - file, therefore they are not included in this report. They will be published by EFSA in a communitiy summary report on antimicrobial resistance in zoonotic and indicator bacteria.	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

C. Antimicrobial resistance of Salmonella spp. in Animals Birds - unspecified - Clinical investigations

Sampling strategy used in monitoring

Frequency of the sampling

Samples were collected from clinical or subclinical material.

Type of specimen taken

Clinical samples

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, tetracycline

Cut-off values used in testing

Wherever possible the epidemiological cut-off values according to EUCAST were used.

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

33 Salmonella spp. isolates from birds were available for susceptibility testing. 8 S. Typhimurium (2 of them S. 4,12:i.-), 7 S. Enteritidis, 7. S. Indiana, 6 S. Napoli, 3 S. Mbandaka, 1 S. 61:k:1,5,7 and 1 S. enterica subsp. enterica. High prevalences of resistance to ampicillin, streptomycin, sulfamethoxazol, tetracycline and trimethoprim were found in Salmonella spp. isolates from birds (24 - 30%).

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

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.

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

Salmonella prevalence in healthy animals in Switzerland is very low, therefore Salmonella isolates from clinical material are used for Monitoring.

Additional information

See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

The following amendments were made:

Date of Modification	Row name	Old value	New value
2012-06-11	Additional information	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010 Isolate based data on antimicrobial resistance in Salmonella were submitted to EFSA as xml - file, therefore they are not included in this report. They will be published by EFSA in a communitiy summary report on antimicrobial resistance in zoonotic and indicator bacteria.	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

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

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

S. Typhimurium	Cattle (bovine animals) - unspecified - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	27	9																				17		1
Amphenicols - Florfenicol	16	27	9																			12		6		
Tetracyclines - Tetracycline	8	27	11																	13		2		1		
Fluoroquinolones - Ciprofloxacin	0.06	27	0			7		19		1																
Quinolones - Nalidixic acid	16	27	0																			27				
Trimethoprim	2	27	8													17		2								
Aminoglycosides - Streptomycin	16	27	9																					14		4
Aminoglycosides - Gentamicin	2	27	0											18		9										
Aminoglycosides - Kanamycin	8	27	0																			24		3		
Penicillins - Ampicillin	8	27	11															4		12						
Cephalosporins - Cefotaxim	0.5	27	0							10		16		1												
Cephalosporins - Ceftazidim	2	27	0											20		7										
Sulphonamides - Sulfamethoxazol	256	27	11																							

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

S. Typhimurium	Cattle (bovine animals) - unspecified - Clinical investigations (Salmonella 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol					9													2	64
Amphenicols - Florfenicol		6		3														2	64
Tetracyclines - Tetracycline		8		1	2													1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim			8															0.5	32
Aminoglycosides - Streptomycin				7		2												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin			11															0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Sulphonamides - Sulfamethoxazol		2		11		3							11					8	1024

Table Antimicrobial susceptibility testing of S. Enteritidis in Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Clinical investigations - quantitative data [Dilution method]

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

S. Enteritidis	Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Polymyxins - Colistin	2	3	0																	3						

S. Enteritidis	Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Polymyxins - Colistin																		2	4

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

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

S. Enteritidis	Birds - unspecified - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	7	0																					7		
Amphenicols - Florfenicol	16	7	0																			2		5		
Tetracyclines - Tetracycline	8	7	1															1		4		1				
Fluoroquinolones - Ciprofloxacin	0.06	7	0			2		5																		
Quinolones - Nalidixic acid	16	7	0																			7				
Trimethoprim	2	7	1													5		1								
Aminoglycosides - Streptomycin	16	7	1																	4		2				
Aminoglycosides - Gentamicin	2	7	0											7												
Aminoglycosides - Kanamycin	8	7	0																			7				
Penicillins - Ampicillin	8	7	1															1		5						
Cephalosporins - Cefotaxim	0.5	7	0							2		3		2												
Cephalosporins - Ceftazidim	2	7	0											5		2										
Sulphonamides - Sulfamethoxazol	256	7	1																							

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

S. Enteritidis	Birds - unspecified - Clinical investigations (Salmonella 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim			1															0.5	32
Aminoglycosides - Streptomycin						1												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin			1															0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Sulphonamides - Sulfamethoxazol		1		3		2							1					8	1024

Table Antimicrobial susceptibility testing of S. 4,12:-:- in Cattle (bovine animals) - unspecified - Clinical investigations - quantitative data [Dilution method]

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

S. 4,12:-:-	Cattle (bovine animals) - unspecified - Clinical investigations (Salmonella 2010)																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory																										
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	4	0																					3		1
Amphenicols - Florfenicol	16	4	0																			1		3		
Tetracyclines - Tetracycline	8	4	4																							
Fluoroquinolones - Ciprofloxacin	0.06	4	0					4																		
Quinolones - Nalidixic acid	16	4	0																			2		2		
Trimethoprim	2	4	0													3		1								
Aminoglycosides - Streptomycin	16	4	4																							
Aminoglycosides - Gentamicin	2	4	0											2		1		1								
Aminoglycosides - Kanamycin	8	4	0																			4				
Penicillins - Ampicillin	8	4	4																							
Cephalosporins - Cefotaxim	0.5	4	0									4														
Cephalosporins - Ceftazidim	2	4	0											3		1										
Sulphonamides - Sulfamethoxazol	256	4	4																							

Table Antimicrobial susceptibility testing of S. 4,12:-:- in Cattle (bovine animals) - unspecified - Clinical investigations - quantitative data [Dilution method]

S. 4,12:-:-	Cattle (bovine animals) - unspecified - Clinical investigations (Salmonella 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline					4													1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin						1	3											2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin			4															0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Sulphonamides - Sulfamethoxazol													4					8	1024

Table Antimicrobial susceptibility testing of S. Indiana in Birds - unspecified - Clinical investigations - quantitative data [Dilution method]

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

S. Indiana	Birds - unspecified - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	7	0																				7		
Amphenicols - Florfenicol	16	7	0																			7				
Tetracyclines - Tetracycline	8	7	7																							
Fluoroquinolones - Ciprofloxacin	0.06	7	0			6		1																		
Quinolones - Nalidixic acid	16	7	0																			7				
Trimethoprim	2	7	7																							
Aminoglycosides - Streptomycin	16	7	7																							
Aminoglycosides - Gentamicin	2	7	0											6		1										
Aminoglycosides - Kanamycin	8	7	0																			7				
Penicillins - Ampicillin	8	7	7																							
Cephalosporins - Cefotaxim	0.5	7	0							7																
Cephalosporins - Ceftazidim	2	7	0											7												
Sulphonamides - Sulfamethoxazol	256	7	7																							

Table Antimicrobial susceptibility testing of S. Indiana in Birds - unspecified - Clinical investigations - quantitative data [Dilution method]

S. Indiana	Birds - unspecified - Clinical investigations (Salmonella 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline					7													1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim			7															0.5	32
Aminoglycosides - Streptomycin							7											2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin			7															0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Sulphonamides - Sulfamethoxazol													7					8	1024

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

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

S. Typhimurium	Pigs - unspecified - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	2	2																						
Amphenicols - Florfenicol	16	2	2																						
Tetracyclines - Tetracycline	8	2	2																						
Fluoroquinolones - Ciprofloxacin	0.06	2	0			1		1																	
Quinolones - Nalidixic acid	16	2	0																			2			
Trimethoprim	2	2	0													1		1							
Aminoglycosides - Streptomycin	16	2	2																						
Aminoglycosides - Gentamicin	2	2	0											2											
Aminoglycosides - Kanamycin	8	2	0																			2			
Penicillins - Ampicillin	8	2	2																						
Cephalosporins - Cefotaxim	0.5	2	0							2															
Cephalosporins - Ceftazidim	2	2	0											2											
Sulphonamides - Sulfamethoxazol	256	2	2																						

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

S. Typhimurium	Pigs - unspecified - Clinical investigations (Salmonella 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol					2													2	64
Amphenicols - Florfenicol		2																2	64
Tetracyclines - Tetracycline		2																1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin				2														2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin			2															0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Sulphonamides - Sulfamethoxazol													2					8	1024

Table Antimicrobial susceptibility testing of S. 4,12:-:- in Birds - unspecified - Clinical investigations - quantitative data [Dilution method]

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

S. 4,12:-:-	Birds - unspecified - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	2	0																				1		1
Amphenicols - Florfenicol	16	2	0																			1		1		
Tetracyclines - Tetracycline	8	2	2																							
Fluoroquinolones - Ciprofloxacin	0.06	2	0					2																		
Quinolones - Nalidixic acid	16	2	0																			2				
Trimethoprim	2	2	0													2										
Aminoglycosides - Streptomycin	16	2	2																							
Aminoglycosides - Gentamicin	2	2	0											1		1										
Aminoglycosides - Kanamycin	8	2	0																			2				
Penicillins - Ampicillin	8	2	1															1								
Cephalosporins - Cefotaxim	0.5	2	0							2																
Cephalosporins - Ceftazidim	2	2	0											1		1										
Sulphonamides - Sulfamethoxazol	256	2	2																							

Table Antimicrobial susceptibility testing of S. 4,12:-:- in Birds - unspecified - Clinical investigations - quantitative data [Dilution method]

S. 4,12:-:-	Birds - unspecified - Clinical investigations (Salmonella 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline					2													1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin							2											2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin			1															0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Sulphonamides - Sulfamethoxazol													2					8	1024

Table Antimicrobial susceptibility testing of S. 4,12:-:- in Birds - at slaughterhouse - animal sample - faeces - Clinical investigations - quantitative data [Dilution method]

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

S. 4,12:-:-	Birds - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Polymyxins - Colistin	2	2	0																	2						

S. 4,12:-:-	Birds - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Typhimurium in Birds - at slaughterhouse - animal sample - faeces - Clinical investigations - quantitative data [Dilution method]

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

S. Typhimurium	Birds - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Polymyxins - Colistin	2	6	1																	5		1				

S. Typhimurium	Birds - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Polymyxins - Colistin																		2	4

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

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

S. Enteritidis	Cattle (bovine animals) - unspecified - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	3	0																				3		
Amphenicols - Florfenicol	16	3	0																			2		1		
Tetracyclines - Tetracycline	8	3	0																	3						
Fluoroquinolones - Ciprofloxacin	0.06	3	0			1		2																		
Quinolones - Nalidixic acid	16	3	0																			3				
Trimethoprim	2	3	0													3										
Aminoglycosides - Streptomycin	16	3	0																	3						
Aminoglycosides - Gentamicin	2	3	0											3												
Aminoglycosides - Kanamycin	8	3	0																			3				
Penicillins - Ampicillin	8	3	0																	3						
Cephalosporins - Cefotaxim	0.5	3	0							2		1														
Cephalosporins - Ceftazidim	2	3	0											3												
Sulphonamides - Sulfamethoxazol	256	3	0																							

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

S. Enteritidis	Cattle (bovine animals) - unspecified - Clinical investigations (Salmonella 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Sulphonamides - Sulfamethoxazol		2		1														8	1024

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

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

S. Typhimurium	Birds - unspecified - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	6	0																			2		4		
Amphenicols - Florfenicol	16	6	0																			5		1		
Tetracyclines - Tetracycline	8	6	0																	5		1				
Fluoroquinolones - Ciprofloxacin	0.06	6	0					6																		
Quinolones - Nalidixic acid	16	6	0																			6				
Trimethoprim	2	6	0													5		1								
Aminoglycosides - Streptomycin	16	6	0																					5		1
Aminoglycosides - Gentamicin	2	6	0											5		1										
Aminoglycosides - Kanamycin	8	6	0																			6				
Penicillins - Ampicillin	8	6	0															3		3						
Cephalosporins - Cefotaxim	0.5	6	0							2		4														
Cephalosporins - Ceftazidim	2	6	0											4		2										
Sulphonamides - Sulfamethoxazol	256	6	0																							

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

S. Typhimurium	Birds - unspecified - Clinical investigations (Salmonella 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Sulphonamides - Sulfamethoxazol		1		3		2												8	1024

Table Antimicrobial susceptibility testing of S. Enteritidis in Birds - at slaughterhouse - animal sample - faeces - Clinical investigations - quantitative data [Dilution method]

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

S. Enteritidis	Birds - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Polymyxins - Colistin	2	7	1																	6			1			

S. Enteritidis	Birds - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Indiana in Birds - at slaughterhouse - animal sample - faeces - Clinical investigations - quantitative data [Dilution method]

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

S. Indiana	Birds - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Polymyxins - Colistin	2	7	0																	7						

S. Indiana	Birds - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Typhimurium in Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Clinical investigations - quantitative data [Dilution method]

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

S. Typhimurium	Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Polymyxins - Colistin	2	27	0																	27						

S. Typhimurium	Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. 4,12:-:- in Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Clinical investigations - quantitative data [Dilution method]

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

S. 4,12:-:-	Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Polymyxins - Colistin	2	4	0																	4						

S. 4,12:-:-	Cattle (bovine animals) - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Typhimurium in Pigs - at slaughterhouse - animal sample - faeces - Clinical investigations - quantitative data [Dilution method]

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

S. Typhimurium	Pigs - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Polymyxins - Colistin	2	2	0																	2						

S. Typhimurium	Pigs - at slaughterhouse - animal sample - faeces - Clinical investigations (Salmonella 2010)																	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Polymyxins - Colistin																		2	4

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	
Sulphonamides	Sulphonamides		256	
Aminoglycosides	Streptomycin		32	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.5	
Penicillins	Ampicillin		4	

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

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	
Sulphonamides	Sulphonamides		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 1995 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. From 2005 until 2009 campylobacteriosis cases rose again to up to 100,1 reports per 100,000 inhabitants. 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.
In the last 10 years (2001-2010) 83 campylobacteriosis cases were reported of which 90% occurred in pets (dogs and cats) and 10% in livestock (cattle and sheep). In pets, next to C. jejuni, often C. upsaliensis are found.

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 monitoring programme on antimicrobial 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 showed a prevalence of 46.8% positive broiler flocks in the period May 2008 to April 2009 (60% from May 2008 to December 2008) and a prevalence of Campylobacter in broiler carcasses of 70.6% (cumulated qualitative and quantitative approach). The Campylobacter prevalence in broiler herds for the entire 2009 (from January to December) came to 44%.

The situation in cattle was investigated in the antibiotic resistance monitoring program in 2006 and 2008. Between February and April faecal samples were collected from 100 cattle just before slaughter at the biggest cattle slaughter house in Switzerland. The share of positive samples was 14% in 2006 and 10% in 2008. Thus, a slight decrease could be shown. 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 2010 human campylobacteriosis cases decreased significantly the first time since 2005 from above 100 reports to 84.8 reports per 100’000 inhabitants. Like in other years about 50% of the cases were caused by C. jejuni, 4% by C. coli and in 36% either by C. jejuni or C. coli (no further differentiation was done). Other species such as C. fetus (17 cases), C. lari (2 cases) and C. upsaliensis (2 cases) were detected very rarely and in 8,5% the causing species remained unknown.

In animals, 8 cases (5 in dogs, 2 in cats and 1 in cattle) of campylobacteriosis were reported to the FVO by cantonal veterinarians in 2010. The reporting rate was similar to previous years. Furthermore, in veterinary diagnostic laboratories 2609 tests for campylobacteriosis were carried out in the context of clinical investigations, mainly in dogs and cats.

Campylobacter is one of the main bacteria in the antimicrobial resistance monitoring programme. A random sample of broilers, pigs and calves was investigated at slaughter using cloacal and faecal swabs. The samples are taken evenly distributed throughout the year, in order to exclude seasonal effects. From 2009 to 2010 the Campylobacter prevalence in broiler herds decreased from 44% to 33%, with 112 isolates of C. jejuni and 20 isolates of C. coli identified in 400 sampled broiler flocks in 2010. The Campylobacter prevalence in pigs remained stable. In 300 sampled pigs the Campylobacter prevalence was found to be 65%. 194 C. coli strains and one C. jejuni strain were isolated. The prevalence in calves was 15% with 25 C. jejuni and 12 C. coli isolated from 245 samples. Compared with the Campylobacter prevalence of 40.4% found in a survey in 2006, a marked decrease could be observed.

A cross-sectional study in broiler meat at retail was conducted from April 2009 to April 2010. Since the last comparable study conducted in 2007, the prevalence of Campylobacter in poultry meat slightly decreased from 43.7% to 38.4%. Again it could be shown that frozen products and products without skin have a smaller risk to be contaminated with Campylobacter than fresh products and products with skin.

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). Like in the years before, in 2010 incidences were highest in infants aged 0-4 years and in young adults aged 15-24 years. Typically, infections above average occur in summer (July/August) and to a lesser extend at the beginning of the year (December/January). It is assumed 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, whereas cattle and pets seem to be less important.

Recent actions taken to control the zoonoses

In 2009 Switzerland formed 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 knowledge gaps and initialisation of applied research projects are the main tasks of the Campylobacter-platform. The focus lies 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. Further information can be found on the FVO website www.bvet.admin.ch.

2.2.2 Campylobacteriosis in humans

Table Campylobacter in humans - Species/serotype distribution

Species/serotype Distribution	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.	Unknown status
Campylobacter	6604	85.05	0	0	0	0	0
C. coli	279	3.58					
C. jejuni	3306	42.46					
C. upsaliensis	2	0.03					
Campylobacter spp., unspecified	2997	38.72					
C. hyointestinalis	1	0.01					
C. fetus	17	0.22					
C. lari	2	0.03					

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	4	3	1	52	21	31	53	29	21
1 to 4 years	12	5	7	131	68	61	157	100	57
5 to 14 years	15	9	4	229	134	93	226	143	82
15 to 24 years	42	18	24	592	294	294	489	244	243
25 to 44 years	72	28	42	991	511	477	911	460	447
45 to 64 years	74	43	30	732	417	314	691	401	284
65 years and older	59	30	29	549	303	243	479	256	220
Age unknown	1	0	1	30	14	12	13	5	6
Total :	279	136	138	3306	1762	1525	3019	1638	1360

Footnote:

As there were some cases where the gender was unknown, the numbers of females and males may not add up with the column "all".

Table Campylobacter in humans - Seasonal distribution

Seasonal Distribution / Months	C. coli	C. jejuni	C. upsaliensis	Campylobacter spp., unspecified
	Cases	Cases	Cases	Cases
January	26	256		231
February	10	137		134
March	14	146		162
April	10	145		115
May	19	182		185
June	23	325		324
July	38	433	2	391
August	36	472		442
September	32	312		272
October	15	278		276
November	24	267		227
December	32	353		258
Total :	279	3306	2	3017

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 1373 tests were done (including single as well as pooled samples) in broiler meat and products thereof of which 412 (30%) proved positive for Campylobacter spp. (108x C. jejuni, 5x C. coli and 299x unspecified). No imported meat samples were included.

B. Thermophilic Campylobacter spp., unspecified in Food Meat from turkey

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 135 tests were done (including single as well as pooled samples) in turkey meat and products thereof of which 31 (23%) proved positive for Campylobacter spp. (11x C. jejuni and 20x unspecified). No imported meat samples were included.

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 processing plant - Surveillance - HACCP and own checks [1)]	poultry industry	Single	10g/25g	594	264	5	90	0	0	169
Meat from broilers (Gallus gallus) - fresh - at slaughterhouse - Surveillance - HACCP and own checks [2)]	poultry industry	Batch	10g	173	104	0	10	0	0	94
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at processing plant - Surveillance - HACCP and own checks [3)]	poultry industry	Single	10g/25g	206	38	0	7	0	0	31
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant - Surveillance - HACCP and own checks	poultry industry	Single	25g	392	1	0	1	0	0	0
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at processing plant - Surveillance - HACCP and own checks [4)]	poultry industry	Single	10g/25g	8	5	0	0	0	0	5
Meat from turkey - fresh - at processing plant - Surveillance - HACCP and own checks	poultry industry	Single	10g	99	26	0	6	0	0	20
Meat from turkey - fresh - at slaughterhouse - Surveillance - HACCP and own checks	poultry industry	Single	10g	18	3	0	3	0	0	0
Meat from turkey - meat preparation - intended to be eaten cooked - at processing plant - Surveillance - HACCP and own checks	poultry industry	Single	10g	14	2	0	2	0	0	0
Meat from turkey - minced meat - intended to be eaten cooked - at processing plant - Surveillance - HACCP and own checks	poultry industry	Single	10g	4	0	0	0	0	0	0

Table Campylobacter in poultry meat

Comments:

[1)] 284x10g; 310x25g

[2)] 33 were single samples (of which 10 were 25g)

[3)] 167x10g;39x25g

[4)] 6x10g;2x25g

2.2.4 Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Sampling strategy

A random sample of 400 broiler herds is investigated at slaughter using cloacal swabs (5 swabs pooled per herd). The samples are taken evenly distributed throughout the year, in order to exclude seasonal effects.
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. 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.

Frequency of the sampling

At slaughter

8 samples per week

Type of specimen taken

At slaughter

cloacal swabs

Methods of sampling (description of sampling techniques)

At slaughter

In total 5 cloacal swabs (one each from 5 different broilers) per slaughter batch were taken. The samples were taken 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.

Case definition

At slaughter

Herds positive tested for C. jejuni or C. coli.

Diagnostic/analytical methods used

At slaughter

Bacteriological method: At the laboratory, cloacal swabs were pooled and direct culture was carried out on a selective medium suitable for Campylobacter (m CCDA). Identification of Campylobacter was carried out according to ISO 10272-1: 2006 (interpretation of gram staining, oxidase-katalase-tests and hippurat- and indoxylacetate-hydrolysis).

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 are allowed.

Measures in case of the positive findings or single cases

No measures are taken.

Notification system in place

Campylobacteriosis (but not an infection with Campylobacter) in animals is notifiable (TSV, Art.5).

Results of the investigation

In 2010, 33% of the 400 sampled broiler flocks were positive for Campylobacter, 112 isolates of C. jejuni and 20 C. coli were identified.

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

The prevalence of Campylobacter in broiler flocks markedly decreased from 44% in 2009 to 33% in 2010.

Additional information

Further information can be found on the OVF website www.bvet.admin.ch.

B. Campylobacter in Animals Cattle (bovine animals) - calves (under 1 year) - for slaughter - at slaughterhouse - Monitoring - official sampling - objective sampling (random sample)

Monitoring system

Sampling strategy

A random sample of 245 calves is investigated at slaughter using faecal swabs. The samples are taken evenly distributed throughout the year, so seasonal effects may be excluded. The slaughter plants included in the surveillance programme account for >80% of the total production of calves in Switzerland. The number of samples for each plant has been determined in proportion to the number of calves 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.

Frequency of the sampling

5 samples per week

Type of specimen taken

Other: faecal swabs

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.

Case definition

Samples positive tested for C. jejuni or C. coli.

Diagnostic/analytical methods used

At the laboratory, samples were cultured within 72h after sampling with direct cultivation on selective culture media (m CCDA). Identification of Campylobacter was carried out according to ISO 10272-1: 2006 (interpretation of gram staining, oxidase-katalase-tests and hippurat- and indoxylacetate-hydrolysis).

Vaccination policy

No vaccination available.

Measures in case of the positive findings or single cases

No measures are taken.

Notification system in place

Campylobacteriosis (but not an infection with Campylobacter) in animals is notifiable (TSV, Art.5).

Results of the investigation

In 245 sampled calves the prevalence of Campylobacter was 15%, 12 C. coli and 25 C. jejuni strains were isolated.

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

The Campylobacter prevalence is rather low in Swiss calves and therefore the impact of veal as a source for human infection should be rather small, too.

Additional information

Further information can be found on the FVO website www.bvet.admin.ch.

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

Monitoring system

Sampling strategy

A random sample of 300 pigs is investigated at slaughter using faecal swabs. The samples are taken evenly distributed throughout the year, in order to exclude seasonal effects.
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. 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.

Frequency of the sampling

6 samples per week.

Type of specimen taken

At slaughter: faecal swabs

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.

Case definition

Samples positive tested for C. jejuni or C. coli.

Diagnostic/analytical methods used

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

Vaccination policy

No vaccination available.

Other preventive measures than vaccination in place

--

Measures in case of the positive findings or single cases

No measures are taken.

Notification system in place

Campylobacteriosis (but not an infection with Campylobacter) in animals is notifiable (TSV, Art.5).

Results of the investigation

In 300 sampled pigs the prevalence of Campylobacter was 65%, 194 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 surface of swine carcass due to drying process, this finding is not very meaningful for public health.

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

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Additional information

Further information can be found on the FVO website www.bvet.admin.ch.

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
Birds - Clinical investigations [1)]	FVO	Animal	62	0					0
Camels - Clinical investigations [2)]	FVO	Animal	1	0					0
Cats - Clinical investigations [3)]	FVO	Animal	885	1					1
Cattle (bovine animals) - Clinical investigations [4)]	FVO	Animal	159	8					8
Cattle (bovine animals) - calves (under 1 year) - for slaughter - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling - objective sampling [5)]	FVO	Animal	245	37	12	25	0	0	0
Dogs - Clinical investigations [6)]	FVO	Animal	1290	5					5
Fur animals - farmed - Clinical investigations [7)]	FVO	Animal	4	0					0
Gallus gallus (fowl) - at slaughterhouse - Monitoring - official sampling - objective sampling [8)]	FVO	Flock	400	132	20	112	0	0	0
Goats - Clinical investigations [9)]	FVO	Animal	10	0					0
Other animals - Clinical investigations [10)]	FVO	Animal	74	0					0
Pigs - Clinical investigations [11)]	FVO	Animal	11	0					0
Pigs - fattening pigs - at slaughterhouse - animal sample - mucosal swab (rectum-anal) - Monitoring - official sampling - objective sampling [12)]	FVO	Animal	300	195	194	1	0	0	0
Rabbits - Clinical investigations [13)]	FVO	Animal	15	0					0
Sheep - Clinical investigations [14)]	FVO	Animal	4	0					0

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
Solipeds, domestic - Clinical investigations [15)]	FVO	Animal	93	0					0
Wild animals - Clinical investigations [16)]	FVO	Animal	1	0					0

Comments:

[1)] ILD, see footnote

[2)] ILD, see footnote

[3)] ILD, see footnote

[4)] ILD, see footnote

[5)] antimicorbial resistance monitoring

[6)] ILD, see footnote

[7)] ILD, see footnote

[8)] antimicorbial resistance monitoring

[9)] ILD, see footnote

[10)] ILD, see footnote

[11)] ILD, see footnote

[12)] antimicorbial resistance monitoring

[13)] ILD, see footnote

[14)] ILD, see footnote

[15)] ILD, see footnote

Table Campylobacter in animals

Comments:

[16)] ILD, see footnote

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

2.2.5 Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in cattle

Sampling strategy used in monitoring

Frequency of the sampling

A random sample of 245 calves was investigated at slaughter using faecal swabs. The samples were taken evenly distributed throughout the year, in order to exclude seasonal effects.
The slaughter plants included in the surveillance programme account for >80% of the total production of calves in Switzerland. The number of samples for each plant has been determined in proportion to the number of calves 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.
Frequency: 5 samples per week.

Type of specimen taken

Faecal swabs

Methods of sampling (description of sampling techniques)

at slaughter: 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

Case definition: Samples positive tested for C. jejuni or C. coli.

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

At the laboratory, samples were cultured within 72h after sampling with direct cultivation on selective culture media (m CCDA). Identification of Campylobacter was carried out according to ISO 10272-1: 2006 (interpretation of gram staining, oxidase-katalase-tests and hippurat- and indoxylacetate-hydrolysis).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

chloramphenicol, ciprofloxacin, erythromycin, gentamicin, nalidixic acid, streptomycin, tetracycline

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).

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

The control program/strategies in place

--

Recent actions taken to control the zoonoses

--

Suggestions to the Community for the actions to be taken

--

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

24 C. jejuni and 12 C. coli isolates from calves (< 6 months old) were subjected to susceptibility testing. High levels of resistance were found against ciprofloxacin (33% for C. jejuni / 42% for C. coli), nalidixic acid (33% for C. jejuni / 42% for C. coli) and tetracycline (33% for C. jejuni and C. coli). The highest proportions of resistant isolates were found in C. coli against streptomycin (75%).
17 % of the C. coli and 50% of the C. jejuni isolates were fully sensitive to all tested antimicrobials, no isolate showed resistance against more than four antimicrobials.

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

Prevalence of resistance is extremely high for streptomycin in C. coli. It is very high for (fluoro-)quinolones and tetracycline in C. coli and C. jejuni. The occurrence of resistance seemes to stay stable since 2006, but the number of isolates is too small to make reliable conculsions.

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

Consumption of veal amounted to 3.2 kg per person in the year 2010. This corresponds to 6% of the total meat consumption. Even though resistance levels for certain antimicrobials are high in Campylobacter from calves, Campylobacter prevalence is low and substantially decreases during the meat processing, therefore veal seems to play a lesser role as a source of resistant campylobacter for humans.

Additional information

See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

The following amendments were made:

Date of Modification	Row name	Old value	New value
2012-06-11	Additional information	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010 Isolate based data on antimicrobial resistance in Campylobacter were submitted to EFSA as xml - file, therefore they are not included in this report. They will be published by EFSA in a communitiy summary report on antimicrobial resistance in zoonotic and indicator bacteria.	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

B. 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 300 faecal 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. The number of samples taken should provide at least 170 isolates for the susceptibility testing.
Frequency: 6 samples per week.

Type of specimen taken

Faecal samples.

Methods of sampling (description of sampling techniques)

At slaughter: 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, tetracycline

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).

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.

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

192 C. coli isolates from fattening pigs were subjected to susceptibility testing.
The highest proportions of resistant isolates were found against streptomycin (78%). High levels of

resistance were also found against ciprofloxacin (38%), nalidixic acid (38%) and tetracycline (31%).
14 % the C. coli isolates were fully sensitive to all tested antimicrobials, 1.6% 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. After a decreasing trend over the last 4 years the level of resistance slightly increased in 2010 for these two antimicrobials. The prevalence of resistance for ciprofloxacin slightly increased over the last years. The occurrence of resistances to 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 25.3 kg per person in the year 2010. This corresponds to 45% 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.
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: www.swissmedic.ch **>** Marktüberwachung **>** Tierarzneimittel **>** Antibiotikavertriebsstatistik **>** ARCH-Vet 2010

The following amendments were made:

Date of Modification	Row name	Old value	New value
2012-06-11	Additional information	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010 Isolate based data on antimicrobial resistance in Campylobacter were submitted to EFSA as xml - file, therefore they are not included in this report. They will be published by EFSA in a communitiy summary report on antimicrobial resistance in zoonotic and indicator bacteria.	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

C. 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 from 398 slaughter batches cloacal swabs (5 from each batch) 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 broilers slaughtered per year. Each sample represents one herd. The number of samples taken should provide at least 170 isolates for the susceptibility testing. Frequency: 8 samples per week.

Type of specimen taken

Cloacal swabs

Methods of sampling (description of sampling techniques)

In total 5 cloacal swabs (from 5 different broilers) per slaughter batch were collected 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 pooling and analysis.

Procedures for the selection of isolates for antimicrobial testing

From each sampled slaughter batch 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, tetracycline

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).

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.

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

107 C. jejuni and 19 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.
64.5 % of the C. jejuni isolates and 42 % 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. Prevalence of resistance is constantly low for gentamicin in C. jejuni and C. coli and for erythromycin in C. jejuni. The prevalence of resistance to erythromycin in C. coli increased in the last three years to over 10%. The prevalence of resistance to ciprofloxacin increased from about 15% in 2006 to over 30% in C. jejuni and over 40% in C. coli.

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

Consumption of poultry meat was 11 kg per person in 2010 which corresponds to 20.5% of total meat consumption. About 49 % 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. 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: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

The following amendments were made:

Date of Modification	Row name	Old value	New value
2012-06-11	Additional information	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010 Isolate based data on antimicrobial resistance in Campylobacter were submitted to EFSA as xml - file, therefore they are not included in this report. They will be published by EFSA in a communitiy summary report on antimicrobial resistance in zoonotic and indicator bacteria.	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

Table Antimicrobial susceptibility testing of C. jejuni in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

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

C. jejuni	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	24	0																	16		7		1		
Tetracyclines - Tetracycline	2	24	8											14		1		1								
Fluoroquinolones - Ciprofloxacin	1	24	8									13		2		1							8			
Quinolones - Nalidixic acid	16	24	8																	7		5		4		
Aminoglycosides - Streptomycin	2	24	1															23								
Aminoglycosides - Gentamicin	1	24	0									16		8												
Macrolides - Erythromycin	4	24	0													12		8		2		2				

C. jejuni	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline	8																	0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid					8													2	64
Aminoglycosides - Streptomycin	1																	1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. jejuni in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

C. jejuni	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin																		0.5	32

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

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

C. coli	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	19	0																	2		10		7		
Tetracyclines - Tetracycline	2	19	7											8		2		2						1		1
Fluoroquinolones - Ciprofloxacin	1	19	9							1		5		4									9			
Quinolones - Nalidixic acid	32	19	9																			7		3		
Aminoglycosides - Streptomycin	4	19	8															10		1						2
Aminoglycosides - Gentamicin	2	19	0									2		14		3										
Macrolides - Erythromycin	16	19	2													3		2		7		5				

C. coli	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline	5																	0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid					9													2	64
Aminoglycosides - Streptomycin	6																	1	16
Aminoglycosides - Gentamicin																		0.12	16

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

C. coli	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin			2															0.5	32

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

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

C. jejuni	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	107	0																	55		44		7		1
Tetracyclines - Tetracycline	2	107	18											75		12		1		1		1		1		2
Fluoroquinolones - Ciprofloxacin	1	107	31							11		57		8								1	30			
Quinolones - Nalidixic acid	16	107	32																	30		39		6		
Aminoglycosides - Streptomycin	2	107	5															101		1		1				2
Aminoglycosides - Gentamicin	1	107	0									62		44		1										
Macrolides - Erythromycin	4	107	1													47		44		13		2				

C. jejuni	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline	14																	0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid		1		2	29													2	64
Aminoglycosides - Streptomycin	2																	1	16
Aminoglycosides - Gentamicin																		0.12	16

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

C. jejuni	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin			1															0.5	32

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

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

C. coli	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Pigs 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	192	1																	24		109		58		
Tetracyclines - Tetracycline	2	192	59											69		49		10		5		5		4		11
Fluoroquinolones - Ciprofloxacin	1	192	73							51		56		12								12	61			
Quinolones - Nalidixic acid	32	192	73																	8		75		34		2
Aminoglycosides - Streptomycin	4	192	151															35		5		1		3		35
Aminoglycosides - Gentamicin	2	192	1									51		104		36										
Macrolides - Erythromycin	16	192	14													32		55		74		16		1		

C. coli	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Pigs 2010)																	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol			1															2	32
Tetracyclines - Tetracycline	39																	0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid				9	64													2	64
Aminoglycosides - Streptomycin	113																	1	16
Aminoglycosides - Gentamicin	1																	0.12	16

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

C. coli	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Pigs 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin			14															0.5	32

Table Antimicrobial susceptibility testing of C. coli in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

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

C. coli	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	12	0																	2		2		8		
Tetracyclines - Tetracycline	2	12	4											3		2		1		2		1				2
Fluoroquinolones - Ciprofloxacin	1	12	5							1		4		2								1	4			
Quinolones - Nalidixic acid	32	12	5																			1		6		
Aminoglycosides - Streptomycin	4	12	9															2		1						2
Aminoglycosides - Gentamicin	2	12	0									3		6		3										
Macrolides - Erythromycin	16	12	1													2				2		7				

C. coli	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline	1																	0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid					5													2	64
Aminoglycosides - Streptomycin	7																	1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. coli in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

C. coli	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin			1															0.5	32

Table Cut-off values used for antimicrobial susceptibility testing of C. coli 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		2	
	Streptomycin		4	
Macrolides	Erythromycin		16	

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Food

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		2	
	Streptomycin		4	
Macrolides	Erythromycin		16	

Table Cut-off values used for antimicrobial susceptibility testing of C. jejuni 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	

Table Cut-off values used for antimicrobial susceptibility testing of C. jejuni in Food

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 children less than one year old and also people aged over 60.

Cheese production is officially monitored for Listeria monocytogenes in cheese-making facilities from all over Switzerland every year as part of a national testing programme by official food control. From 2002 onwards several hundred samples of semi-hard and soft-cheese from either raw or pasteurized cow’s, sheep’s and goat’s milk were tested every year for Listeria. Only a few samples were positive each year.
In 2007 a Listeria Monitoring Programme (LMP) was set up by the research institute of Agroscope Liebefeld-Posieux (ALP) with which contaminations in the dairy industry, can be rapidly identified. Products are tested for Listeria at ALP as part of quality assurance programmes. By taking part in the LMP, customers provide important evidence to ensure compliance with legal requirements (CH law and EU hygiene regulations).
Furthermore, ALP provides a Listeria Advisory Team. 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 years 1996 until 2008 showed that consultations by the ALP Listeria Advisory Team had a sustainable impact: in 85% of cases, the measures taken proved successful over the subsequent years of operation.

Listeriosis in animals is notifiable (TSV, Article 5), i.e. the suspicion or occurrence of such a disease must be reported to the cantonal veterinarian. From 1991 until 1995 never more than 3 cases of listeriosis were reported. Most cases occurred in the time period 1999 until 2004, with reported cases ranging between 27 to 34 per year. Since 2005, no more than 21 cases per year were reported. In the past 10 years (2001 until 2010) 218 listeriosis cases were reported to the FVO by cantonal veterinarians. 94% of these cases

affected ruminants (cattle, sheep and goats).

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

In 2010, 67 human cases were reported to the Federal Office of Public Health. In comparison to the years before reported cases increased (41 and 44 in 2009 and 2008, respectively). The reporting rate rose thus to 0,9 per 100’000 inhabitants. However, no cluster were identified. In general, mainly people aged over 65 years are affected. Different than in the several years before cases in newborns occurred in 2010.

Results of the a Listeria Monitoring Programme (LMP) of the recent years indicate that the situation is stable on a low level with roughly 1% Listeria monocytogenes positive samples.

In animals, the number of reported listeriosis cases to the FVO by cantonal veterinarians in 2010 was at the same level as 2009 and thus still lower than the years before. All 11 cases affected ruminants (7 in cattle, 2 in sheep and 2 in goats).
In veterinary diagnostic laboratories 23 tests for listeriosis were carried out in the context of clinical investigations in 2010, mainly in ruminants.

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

Listeria are repeatedly leading to disease in humans. Even if the number of cases is relatively small, the high mortality, especially in older people, makes it very significant.
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.
In animals, the reported listeriosis cases have remained stable at a low level over the last years.

Additional information

1. In a border control inspection program risk-based random samples are taken. In 2010, these included 21 fish samples from Vietnam of which 5 were Listeria spp. positive (2x serovar 1/2a and 3x serovar 4b; up to 270 cfu/g were detected).
2. Further information can be found on the FVO website www.bvet.admin.ch.

2.3.2 Listeriosis in humans

Table Listeria in humans - Species/serotype distribution

Species/serotype Distribution	Cases	Cases Inc.
Listeria	67	.86
Listeria spp., unspecified	2	0.03
L. monocytogenes - L. monocytogenes serovar 3a	1	0.01
L. monocytogenes - L. monocytogenes serovar 4b	26	0.33
L. monocytogenes - L. monocytogenes serovar 1/2b	4	0.05
L. monocytogenes - L. monocytogenes serovar 1/2a	34	0.44

Table Listeria in humans - Age distribution

Age distribution	L. monocytogenes			Listeria spp., unspecified		
	All	M	F	All	M	F
<1 year	4	3	1			
25 to 44 years	5		5			
45 to 64 years	15	11	4			
65 years and older	42	26	16			
Age unknown	1	1				
Total :	67	41	26	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

At manufacturer: 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

Once a year

Type of specimen taken

At the production plant

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)

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

In 2010, in the context of the national monitoring program, a total of 496 semi-hard and 126 soft-cheese samples from cow's and goat's milk as well as 36 cream cheese from goat's milk were tested for Listeria monocytogenes at the end of production. In none of the samples was the limit for Listeria exceeded.

Additional information

In the framework of the Listeria Monitoring Programme (LMP) from the research institute of Agroscope Liebefeld-Posieux (ALP), a total of 4'394 samples were tested for Listeria in 2010. 42 samples (1%) - namely 1 milkpouder, 3 hard cheese, 8 semi-hard cheese, 8 cream cheese, 1 brine, 2 smear water samples and 19 environmental samples - proved positive for Listeria monocytogenes. All cheese samples showed contamination of the cheese surface. None of the body of the cheese contained L. monocytogenes.

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L. monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Cheeses made from cows' milk - hard - made from pasteurised milk - at processing plant - Monitoring - official sampling	FVO	Single	25g	57	0	57	0			
Cheeses made from cows' milk - hard - made from raw or low heat-treated milk - at processing plant - Monitoring - official sampling	FVO	Single	25g	393	0	393	0			
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at processing plant - Monitoring - official sampling	FVO	Single	25g	38	0	38	0			
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at processing plant - Monitoring - official sampling	FVO	Single	25g	70	0	70	0			
Cheeses made from goats' milk - hard - made from raw or low heat-treated milk - at processing plant - Monitoring - official sampling	FVO	Single	25g	46	0	46	0			
Cheeses made from goats' milk - soft and semi-soft - made from pasteurised milk - at processing plant - Monitoring - official sampling [1)]	FVO	Single	25g	28	0	28	0			
Cheeses made from goats' milk - soft and semi-soft - made from raw or low heat-treated milk - at processing plant - Monitoring - official sampling [2)]	FVO	Single	25g	26	0	26	0			

Comments:

[1)] 25x cream cheese

[2)] 11x cream cheese

Table Listeria monocytogenes in milk and dairy products

Footnote:

All data mentioned in this table originate from the national monitoring programme for listeria in dairy products.

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L. monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g
Fish - raw [1)]	FVO	Single		21	5			21		5

Comments:

[1)] Data originate from the border control inspection programme (see footnote). All 21 samples were Pangasius filets and were imported from Vietnam. From the 5 Listeria positive samples (with up to 270 cfu/g) 2 were serovar 1/2a and 3 were serovar 4b. The detection method used was ISO Norm 11290-2.

Footnote:

The data mentioned in the table above are data from a border control inspection programme run by the FVO where risk-based random samples are taken from commodities imported from third countries. As costs for flying these commodities in are high, there are not many samples which can be taken.

As the enumation method was used resulting in cfu/g, no sample weight was given by the laboratory.

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
Birds - Clinical investigations [1)]	FVO	Animal	2	2		2
Cattle (bovine animals) - Clinical investigations [2)]	FVO	Animal	9	1		1
Goats - Clinical investigations [3)]	FVO	Animal	3	1		1
Other animals - Clinical investigations [4)]	FVO	Animal	3	0		0
Sheep - Clinical investigations [5)]	FVO	Animal	5	5		5
Solipeds, domestic - Clinical investigations [6)]	FVO	Animal	1	0		0

Comments:

[1)] ILD, see footnote

[2)] ILD, see footnote

[3)] ILD, see footnote

[4)] ILD, see footnote

[5)] ILD, see footnote

[6)] ILD, see footnote

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

Table Listeria in animals

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

Laboratories report the detection of EHEC and physicians report EHEC diseases within one week to the cantonal health authorities and 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). 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.

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 2010, confirmed cases of STEC slightly declined further compared to the previous years: the number of reports dropped from 67 in 2008 to 42 in 2009 to 31 in 2010. The reporting rate thus went from 0.9 cases per 100000 inhabitants in 2008 to 0.5 in 2009 and to 0.4 in 2010. Die highest reporting rate of 3.9 cases per 100000 inhabitants affected alike previous years babies and infants aged up to 4 years old. Five of the 6 reported HUS occurred in this age group. Only for 5 of the 31 cases the serotype is known: 2x O157, 2x O103 and 1x O145.

In a study conducted 2010 (Käppeli et al., 2011) 97 human non-O157 VTEC isolates - collected from patients from 2000 to 2009 - were further characterized. In total, 40 different serotypes were found, of which serotypes O26:H11/H-; O103:H2; O121:H19; O145:H28/H- dominated. O26:H11/H- was the one which was most frequently associated with HUS. The high genetic diversity indicates that the non-O157 STEC infections in Switzerland are often sporadic and not major outbreaks.

As most of the laboratories do not routinely test for VTEC, it is very likely that the impact of VTEC is underestimated. In view of the low infectious dose of STEC (<100 microorganisms) an infection via contaminated food or water is easily possible.

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

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. Käppeli, U., Hächler, H., Giezendanner, N., Beutin, L., Stephan. R. (2011). Shiga toxin-producing Escherichia coli non-O157 strains associated with human infections in Switzerland: 2000-2009. Emerging Infectious Diseases 17, 180-185.
6. Further information can be found on the FVO website www.bvet.admin.ch.

2.4.2 E. coli infections in humans

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

Species/serotype Distribution	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
Escherichia coli, pathogenic	41	.4	0	0	0	0
HUS	6	0.08				
- lab. confirmed cases	6					
- clinical cases	25	0.32				
- laboratory confirmed	4					

Table Escherichia coli, pathogenic in humans - Age distribution

Age distribution	Verotoxigenic E. coli (VTEC)			Verotoxigenic E. coli (VTEC) - VTEC O157:H7			Verotoxigenic E. coli (VTEC) - VTEC non-O157		
	All	M	F	All	M	F	All	F	M
<1 year	1	0	1						
1 to 4 years	4	4	0						
5 to 14 years	1	0	1						
Total :	6	4	2	0	0	0	0	0	0

Footnote:

The numbers given relate only to the 6 HUS cases.

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 (bovine tuberculosis) has been constantly lower than 2% since many years. Bovine tuberculosis cases are reported each year on a low scale (between 4 and 8 cases per year in the years 2005 to 2010).
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. Between 1960 and 1980, the entire bovine population was tested every other year in an active surveillance programme. Since 1980, monitoring has been conducted only in the form of passive surveillance at the slaughterhouse. The 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. Since then, isolated cases of bovine tuberculosis have been found (most recently in 1998), which were partly due to reactivation of Mycobacterium bovis infections in humans with subsequent infection of bovine animals. Freedom from disease has been proven in 1997 conducting a survey in a randomized sample of about 10% of farms (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.
No cases of TB were found in captive wild animals that were tested in 1998 (Wyss et al. 2000).
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).
In the last two decades, no more than two cases per year in animals were reported to the FVO by cantonal veterinarians. In the last 10 years 8 tuberculosis cases in animals were reported, of which none occurred in cattle, but in cats (2), parrots (2) and one each in chicken, monkey, dogs and horses.

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

In 2010, the Federal Office of Public Health received reports of 549 cases of tuberculosis. In 377 cases it was specified which Mycobacterium was the exact cause: 360x M. tuberculosis, 6x M. bovis, 3x M. africanum and 2x M. caprae (provisional figures). Whereas the age of the bovine TB patients in 2009 ranged from 17 to 83 years, this range was narrower in 2010 (from 43 to 82 years).

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 aforementioned foods originating of Switzerland.

In Austria (Tyrolia and Vorarlberg) M. capraae 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 factors are wild animals living close to the Austrian or German border and the international trade with animals.
In 2010, again no cases of tuberculosis in cattle were reported to the FVO by the cantonal veterinarians in 2010. The one case reported in 2010 occurred in a horse.
In veterinary diagnostic laboratories 20 animals (6 cattle,7 pigs, 1 sheep and 6 other animals) were tested for Mycobacterium bovis and/or Mycobacterium tuberculosis in the context of clinical investigations by antigen assay.

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

There is no risk of an TB infection by contact to infected bovines within Switzerland or through food containing Mycobacteria (like raw meat or milk) from Swiss products.

Recent actions taken to control the zoonoses

In 2010, the monitoring of about 1000 cattle in Canton St. Gallen and the Principality of Liechtenstein was conducted using the tuberculin skin test. This study is focused in particular on the monitoring of farms whose cattle had spent the last year’s Alpine pasturing season on Alpine pastures in Austria. As part of a transnational study (together with Austria, Northern Italy and Southern Germany) it is planned to study the prevalence in the wild animal population (especially in red deer and wild pigs) in the Alpine region close to the border (collaboration with the Vetsuisse Faculty in Bern and Zurich). This study is ongoing and results are not yet available. The results will allow a more accurate estimation if the current TB-free status in Switzerland is jeopardised.

Additional information

1. Wyss D., Giacometti M., Nicolet J., Burnens A., Pfyffer GE., Audige L., (2000). Farm and slaughter survey of bovine tuberculosis in captive deer in Switzerland. Vet. Rec. 147,713 -717.
2. Further information can be found on the FVO website www.bvet.admin.ch.

2.5.2 Tuberculosis, mycobacterial diseases in humans

Table Mycobacterium in humans - Species/serotype distribution

Species/serotype Distribution	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
Mycobacterium	471	6.06	0	0	0	0
M. bovis	6	0.08				
M. tuberculosis	359	4.61				
M. avium complex	95	1.22				
M. africanum	9	0.12				
M. caprae	2	0.03				

Table Mycobacterium in humans - Age distribution

Age distribution	M. bovis			Mycobacterium spp., unspecified		
	All	M	F	All	M	F
<1 year				3	0	3
1 to 4 years				5	4	1
5 to 14 years				7	4	3
15 to 24 years				74	45	28
25 to 44 years	1	1		205	97	107
45 to 64 years	1		1	88	53	35
65 years and older	4	1	3	83	41	42
Total :	6	2	4	465	244	219

Footnote:

In two cases the gender was not known, thus the sum of females and males do not add up with the column "all".

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

Up to date there are no observations that would challenge the freedom of Swiss cattle from tuberculosis. Especially the results of the monitoring of cattle which were on Alpine pastures in Austria and of red deer and wild pigs in the Alpine region close to the Swiss border in 2010 will be important for a more accurate evaluation.

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) - Clinical investigations [1)]	FVO	Animal	5	0			
Other animals - Clinical investigations [2)]	FVO	Animal	6	0			
Pigs - Clinical investigations [3)]	FVO	Animal	6	0			
Sheep - Clinical investigations [4)]	FVO	Animal	1	0			

Comments:

[1)] ILD, see footnote

[2)] ILD, see footnote

[3)] ILD, see footnote

[4)] ILD, see footnote

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

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

If present, the row "Total -1" refers to analogous data of the previous year.

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	41871	1600563	41871	100	0	0	no routine test	0	0	3	0
Total : [1)]	41871	1600563	41871	100	0	0	N.A.	0	0	3	0

Comments:

[1)] N.A.

Footnote:

Freedom from disease has been proven in 1997 conducting a survey in a randomized sample of 4874 farms. 111‘394 cattle were tuberculin tested. All farms were negative.

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 doctor and laboratory reports). The number of detections of Brucella spp. in humans have been rare for many years. The literature shows that in contrast to Biovar 1 and Biovar 3, B. suis Biovar 2 is very rarely notified in humans (probably as Biovar 2 is known to be less virulent to humans than Biovar 1 and 3).

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. 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 4’874 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.
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 three cases were found to be Brucellla suis Biovar 2. 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. It is known that B. suis Biovar 2 is prevalent in wild boars (Leuenberger et al., 2007). In a recent study, Wu (2011) found that 28.8% (95% CI 23.0%-34.0%) of the tested wild boars were Brucella suis Biovar 2 positive and 35.8% (95% CI 30.0%-42.0%) had antibodies against B. suis. These findings were significantly higher than in previous studies indicating a spread of B. suis Biovar 2 in Swiss wild boars. However, comparison of the isolates found in pigs in 2009 with those found in wild boars using the MLVA (Multi locus variable number of tandem repeats) typing method showed no relation amongst these (Abril 2011). The cases in 2009 thus are unlikely to have come from wild boar contacts.

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 2010 5 brucellosis cases were reported in humans of which 1 had been identified as Brucella melitensis. The other four Brucella were not differentiated.

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 2010 a total of 697 sheep farms (9'430 blood samples) and 527 goat farms (3'814 blood samples) were tested negative for Brucella melitensis. Furthermore, no cases of brucellosis in sheep and goat were reported by the cantonal veterinarians. At insemination stations, 744 bulls were tested on B. abortus in 2010. In addition, in diagnostic laboratories in total 1491animals were tested in the context of clinical investigations or abortions in 2010 including mainly cattle (92%).

A dissertation by Wu (2011) found that mainly outdoor pigs which are outside the whole day, close to the forest (<50m) and with low fences (<60cm) had the highest risk of contact with wild boars. A questionnaire revealed that 31% of the gamekeeper and 25% of outdoor pig holders observed at least 1 interaction between wild boars and pigs in the past 20 years. 5% of holdings reported hybrides.
As wild boars live mainly in the Jura and holdings which keep pigs outdoors are located mainly in the middle part of Switzerland, contacts are most likely to occur at the border of these two regions.

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 conducted in 2010 to evaluate risk factors for the infection of pigs which are reared outdoor (results see above).

Additional information

1. Leuenberger R, Boujon P, Thür B, Miserez R, Garin-Bastuji B, Rüfenacht J, Stärk KD (2007) Prevalence of classical swine fever, Aujeszky's disease and brucellosis in a population of wild boar in Switzerland, Vet Rec; 160(11):362-8.
2. Further information can be found on the FVO website www.bvet.admin.ch.
2. Hinić V., Brodard I., Thomann A., Cvetnić Z., Makaya P.V., Frey J., Abril C. (2008) Novel identification and differentiation of Brucella melitensis, B. abortus, B. suis, B. ovis, B. canis, and B. neotomae suitable for both conventional and real-time PCR systems; J Microbiol Methods Oct 75(2):375-8
3. Hinić V, Brodard I, Thomann A, Holub M, Miserez R, Abril C. (2009) IS711-based real-time PCR assay as a tool for detection of Brucella spp. in wild boars and comparison with bacterial isolation and serology; BMC Veterinary Research. Jul 14;5:22
4. Hinić V., Brodard I., Petridou E., Filiousis G., Contos V., Frey J., Abril C. (2009); Brucellosis in a dog caused by Brucella melitensis Rev 1,Vet Microbiol, Sept 26
5. Abril C, Thomann A, Brodard I, Wu N, Ryser-Degiorgis MP, Frey J, Overesch G. (2011) A novel isolation method of Brucella species and molecular tracking of Brucella suis biovar 2 in domestic and wild animals, Vet Microbiol. 2011 Mar 5
6. Wu, N Abril, C., Hinic, V., Brodard, I., Thür, B., Fattebert, J., Hüssy, D., Ryser-Degiorgis, M.P. 82011). Free-ranging wild boar may represent a threat to disease freedom in domestic pigs in Switzerland. J Wildl Dis, in revision
7. Wu, N., Abril, C., Thomann, A., Grosclaude, E., Doherr, M.G., Boujon, P., Ryser-Degiorgis, M.P. (2011). Contacts between wild boar and outdoor pigs in Switzerland: risk factors and assessment of pathogen spill -over. Vet Rec, in revision

8. Further information can be found on the OVF website www.bvet.admin.ch.

2.6.2 Brucellosis in humans

Table Brucella in humans - Species/serotype distribution

Species/serotype Distribution	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
Brucella	5	.06	0	0	0	0
B. melitensis	1	0.01				
B. suis	0	0				
Brucella spp., unspecified	4	0.05				

Table Brucella in humans - Age distribution

Age distribution	B. abortus			B. melitensis			Brucella spp., unspecified		
	All	M	F	All	M	F	All	M	F
15 to 24 years							1	1	
25 to 44 years							1		1
45 to 64 years				1	1		1	1	
65 years and older							1	1	
Total :	0	0	0	1	1	0	4	3	1

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 were tested. Tests were perfotmed in blood samples from 31042 animals and in 18952 pooled bulk milk samples. 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

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.

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. 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.

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 (TSV, Art. 150 - Art. 157).

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

Actions to be taken in suspicious farms are ban of all animal traffic and the investigation of the whole herd. 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. 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.

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 (TSV, Art. 190 - Art. 195).

Results of the investigation

In 2010 a randomized sample of 697 farms with sheep and 527 farms with goats were included in the survey. 9’430 samples from sheep and 3’814 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 [1)]	FVO	Animal	2	0				0
Buffalos - Clinical investigations [2)]	FVO	Animal	1	0				0
Cattle (bovine animals) - Clinical investigations [3)]	FVO	Animal	1369	0				0
Dogs - Clinical investigations [4)]	FVO	Animal	1	0				0
Goats - Clinical investigations [5)]	FVO	Animal	26	0				0
Other animals - Clinical investigations [6)]	FVO	Animal	3	0				0
Pigs - Clinical investigations [7)]	FVO	Animal	18	0				0
Sheep - Clinical investigations [8)]	FVO	Animal	57	0				0
Solipeds, domestic - Clinical investigations [9)]	FVO	Animal	8	0				0
Wild animals - Clinical investigations (vertebrates) [10)]	FVO	Animal	6	0				0

Comments:

[1)] ILD, see footnote

[2)] ILD, see footnote

[3)] ILD, see footnote

[4)] ILD, see footnote

[5)] ILD, see footnote

[6)] ILD, see footnote

Table Brucellosis in other animals

Comments:

[7)] ILD, see footnote

[8)] ILD, see footnote

[9)] ILD, see footnote

[10)] ILD, see footnote

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

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

If present, the row "Total -1" refers to analogous data of the previous year.

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 [1)]	15624	505032	15624	100	0	0	1224	13244	0	0	0	0	0	0
Total : [2)]	15624	505032	15624	100	0	0	1224	13244	0	0	0	0	0	0

Comments:

[1)] In 2010 a randomized sample of 697 farms with sheep and 527 farms with goats were included in the survey. 9’430 samples from sheep and 3’814 samples from goats were tested using serological test. There were no positive findings in these samples.

[2)] N.A.

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

If present, the row "Total -1" refers to analogous data of the previous year.

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 [1)]	41871	1600563	41871	100	0	0	0	0	0	0	0	0	1370	0	0	3577	0	4	0	5	0
Total : [2)]	41871	1600563	41871	100	0	0	0	0	0	0	0	0	1370	0	0	3577	0	4	0	5	0

Comments:

[1)] Freedom from disease has been proven in 1997 conducting a survey in a randomized sample of 4874 farms. 139‘655 cows were tested using serological test were tested. Tests were perfotmed in blood samples from 31042 animals and in 18952 pooled bulk milk samples. There were no positive findings in these samples.

[2)] N.A.

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 notifiable. Thus, no data on the occurence of human yersiniosis are available. In animals, yersiniosis is notifiable (TSV, Article 5 and Article 291) and cantonal veterinarians 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. In the past ten years (2001-2010) never more than 3 cases per year were reported, in the last 5 years even never more than 1. 25% of the 16 yersiniosis cases reported during 2001-2010 affected monkeys, 50% were unknown species and one case each occurred in cattle, sheep, rabbits and alpacas.

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

One case in animals was reported in alpacas in 2010. The number of reported cases in the recent years has been constantly at a very low level.
In veterinary diagnostic laboratories 2391 tests for yersiniosis were carried out in the context of clinical investigations in 2010, mainly in dogs and cats (81%), cattle (6%), horses (4%) and birds (3%). Except for 4 dogs all laboratory results were negative (see table Yersinia in animals).

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.

Recent actions taken to control the zoonoses

As the last Yersinia prevalence study in slaughter pigs was conducted some years ago, Switzerland will carry out a survey in 2012 to be able to evaluate the current situation.

Additional information

Further information can be found on the FVO website www.bvet.admin.ch.

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 [1)]	FVO	Animal	2	0			0			
Birds - Clinical investigations [2)]	FVO	Animal	72	0			0			
Camels - Clinical investigations [3)]	FVO	Animal	1	0			0			
Cats - Clinical investigations [4)]	FVO	Animal	809	0			0			
Cattle (bovine animals) - Clinical investigations [5)]	FVO	Animal	134	0			0			
Dogs - Clinical investigations [6)]	FVO	Animal	1132	4			4			
Fur animals - farmed - Clinical investigations [7)]	FVO	Animal	5	0			0			
Goats - Clinical investigations [8)]	FVO	Animal	10	0			0			
Other animals - Clinical investigations [9)]	FVO	Animal	86	0			0			
Pigs - Clinical investigations [10)]	FVO	Animal	13	0			0			
Rabbits - farmed - Clinical investigations [11)]	FVO	Animal	21	0			0			
Sheep - Clinical investigations [12)]	FVO	Animal	3	0			0			
Solipeds, domestic - Clinical investigations [13)]	FVO	Animal	102	0			0			
Wild animals - Clinical investigations (Wild animals (vertebrates)) [14)]	FVO	Animal	1	0			0			

Comments:

Table Yersinia in animals

Comments:

[1)] LD, see footnote

[2)] LD, see footnote

[3)] LD, see footnote

[4)] LD, see footnote

[5)] LD, see footnote

[6)] LD, see footnote

[7)] LD, see footnote

[8)] LD, see footnote

[9)] ILD, see footnote

[10)] LD, see footnote

[11)] LD, see footnote

[12)] LD, see footnote

[13)] LD, see footnote

[14)] LD, see footnote

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

For Yersinia diagnostic only direct detection of the bacteria was used. All 4 positives thus resulted from direct detection of the bacteria.

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 of the pigs slaughtered in abattoirs increased steadily, all with negative results: 34% in 2005, 44% in 2006, about 90% in 2007, 2008 and 2009. In 2010 more than 90% of all slaughtered pigs were tested.
In the last 10 years reported cases in animals to the FVO by the cantonal veterinarians ranged between 0 and 3 cases per year and always concerned carnivorous wildlife, never domestic animals. All infections were caused by Trichinella britovi. The 13 cases reported to the FVO by cantonal veterinarians in these past 10 years concerned lynx (10), foxes (2) 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 2010, the Federal Office of Public Health received one report of human trichinellosis. It is assumed that this patient acquired the infection abroad.
In animals, 3 cases of Trichinella infections in lynxes (2) and foxes (1) were reported to the FVO by the cantonal veterinarians.

In 2010 93% of all slaughtered pigs were tested for Trichinella with a negative result. 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).
Also 2845 slaughter horses (93% of all slaughtered horses) were tested for Trichinella with negative results.

Regarding the wildlife, further 2353 wild animals, mainly wild boars, were tested in veterinary diagnostic laboratories in 2010. 4 wild animals (3 lynx, 1 fox) were T. britovi positive.

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

As all infections in wildlife in the past were T. britovi, Switzerland is considered free of Trichinella spiralis. The estimated risk of Trichinella transmission from wildlife to the slaughter pig population is negligible.

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
5. Further information can be found on the FVO website www.bvet.admin.ch.

2.8.2 Trichinellosis in humans

Table Trichinella in humans - Species/serotype distribution

Species/serotype Distribution	Cases	Cases Inc.	Autochthon cases	Autochthon Inc.	Imported cases	Imported Inc.
Trichinella	1	.01	0	0	0	0
Trichinella spp., unspecified	1	0.01				

Table Trichinella in humans - Age distribution

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

In 2010 2845 horses (93% of all slaughtered horses) were tested for Trichinella with negative results.

Notification system in place

Trichinellosis in animals is notifiable (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.

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 2010, about 2.66 Mio slaughter pigs (93% of the total slaughter population) were tested and no Trichinella larvae were found.
In addition, 2353 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

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella	T. spiralis	Trichinella spp., unspecified	T. britovi
Pigs [1)]	FVO	Animal	2660000	0			
Solipeds, domestic - horses [2)]	FVO	Animal	2845	0			
Wild boars - wild [3)]	FVO	Animal	2448	0			
Wild animals - Clinical investigations [4)]	FVO	Animal	12	4	0	0	4

Comments:

[1)] FLEKO, see footnote

[2)] FLEKO

[3)] ILD/FLEKO

[4)] ILD, see footnote. The 12 animals were 10 lynx, 1 fox and 1 wulf. 3 lynx and the 1 fox were T. britovi positive.

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

FLEKO = Fleischkontrollstatistik (meat inspection statistics) is a database where meat insepctors have to report their results from the meat inspection at slaughter house.

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

Echinococcus granulosus, the causative agent of Zystic Echinococcosis has nearly been extincted in Switzerland, sporadically imported cases are diagnosed in humans or animals (dogs or cattle or sheep, probably infected from imported infected dogs).

Alveolar echinococcosis (AE) is caused by the “dangerous” fox tapeworm Echinococcus multilocularis. An infection results in disease with severe consequences for the person concerned. Human cases of Echinococcosis were notifiable to FOPH until 1998. Although it is no longer notifiable, data are available. Exact figures on the incidence of AE 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. From 2006-2010 the average incidence was 0.25 cases in 100’000 per year adding up to approximately 20 (each year 10 – 29 cases) newly diagnosed cases annually. Average age at time of diagnosis in all studies ranged from 52 to 55 years without any significant difference. The age specific incidence yields a significant increase with every 20 years of life except for persons aged > 80 years. The proportion of female cases increased significantly to 55% in the years 1984-2010 compared to earlier years (46%). 55% of all AE cases in Switzerland from 1984-2010 have been diagnosed in patients living in urban areas, although the incidence in rural areas is still significantly higher (0.26 per 100’000 per year from 1984-2010, and 0.12 in urban areas, respectively; p< 0.001). Incidences increased mainly in 6 major agglomeration areas (defined based on criteria such as population size, number of places of employment and proportion of the workforce working in core cities, core areas of an agglomeration, edificial interconnection or bordering of cities): around Constanz, Zurich, Bern, Basel, Lausanne and Geneva.

In animals, echinococcosis is notifibale (TSV, Article 5 and Article 291). Since 1996 reported cases per year rank between 0 and 9 cases. In the past ten years (2001 to 2010) 44 echinococcosis cases were reported to the FVO by cantonal veterinarians. 52% occurred in dogs, 20% in foxes, 12% in monkeys and the remaining 16% in pigs, wild animals and other species.
In the years 2007 and 2008, the Institute of Parasitology of the University of Zurich tested mice and feacal fox samples in the region of Zurich. About 17% of the mice (100 mice from 634 in 2007 resp. 66 from 393 in 2008) were positive for E. multilocularis. In the fox faecal samples the number of positive samples declined from 26% in 2007 to 19% in 2008 (361/1376 in 2007 resp. 202/1044 in 2008). However fox faecal samples from regions without deworming bait containing praziquantel remained at the level of the previous year (63/254 (25%) samples were positive).
In a dog survey in 2009 in Switzerland the prevalence of E. multilocularis (determined by egg isolation and species specific PCR) was found to be 0% (0.0/0.0-2.5) in 118 randomly collected pet dogs, but 2.4% (0.5 -6.9%) in 124 farm dogs with free access to the surrounding fields. In this study eggs were also isolated from hair samples of all dogs. No taeniid-eggs were found on the surface of pet dogs, but in 2 cases (1.6%) taeniid-eggs were isolated from farm dogs. Species identification in these two cases was not achieved by PCR.

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

Generally speaking, an infection of humans with Echinococcus multilocularis, the causative agent in AE, is rare – albeit the increased risk of infection since 2001. Following the steep increase in 2001, the incidence of human AE-cases currently appears to stabilize on this higher level. In contrast to existing perceptions, the majority of cases in Switzerland are diagnosed in urban areas. Also, most areas with increasing incidences can be allocated to areas of core cities and the corresponding agglomeration. Age appears to be an important factor in the development of clinically relevant AE.
The increased risk is thought to be caused by the encroachment of foxes to the urban areas as a consequence of an increased fox population by a factor of 2.6 after having eradicated fox rabies from 1984 to 2000 (mean numbers of foxes shot or found dead: 19’500 from 1977-1987 and 51’500 from 1997-2007).

In animals, up to date never more than 10 cases per year were reported and in 2010 it were 9 cases. Affected were again mainly dogs (50%) and foxes (25%). The other cases were one each in pigs, monkeys and wild animals. The situation for animals seems unchanged since many years.
In 2010, in veterinary diagnostic laboratories 68 tests for echinococcosis were carried out in the context of clinical investigations mainly in wild animals (60%) and dogs (26%), which also contribute most to the positive findings, see table “Echinococcosis in animals”.

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.

Recent actions taken to control the zoonoses

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 extended parts of the surrounding of the city. The baits contain the anthelminthic praziquantel for the deworming of the foxes. The method has been proved to be effective, thus areas with bait distribution showed a significant decrease of the E. multilocularis egg contamination. 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. 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
3. 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

4. Guidelines for deworming of dogs and cats are published for Switzerland in www.ESCCAP.ch
5. Further information can be found on FVO website www.bvet.admin.ch

2.9.2 Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling unit	Region	Units tested	Total units positive for Echinococcus	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cats - Clinical investigations [1)]	FVO	Animal		2	1	0	1	0
Cattle (bovine animals) - Clinical investigations [2)]	FVO	Animal		1	0	0	0	0
Dogs - Clinical investigations [3)]	FVO	Animal		18	6	0	6	0
Other animals - Clinical investigations [4)]	FVO	Animal		3	1	0	1	0
Pigs - Clinical investigations [5)]	FVO	Animal		3	1	0	1	0
Wild animals - Clinical investigations [6)]	FVO	Animal		41	9	0	9	0

Comments:

[1)] ILD, see footnote

[2)] ILD, see footnote

[3)] ILD, see footnote

[4)] ILD, see footnote

[5)] ILD, see footnote

[6)] ILD, see footnote

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

Table Echinococcus in animals

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 notifiable. Thus, no data on the frequency of human toxoplasmosis are available. It is known, that some sporadic human cases do occur.

In animals, toxoplasmosis is notifiable (TSV, Article 5 and Article 291). 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. In the past ten years (2001-2010) in total 18 cases were reported to the FVO by cantonal veterinarians. Never more than 4 cases per year were recorded. 50% of these cases occurred in livestock (mainly goats and sheep), 25% in cats and the remaining 25% in other species.

In 2000, Toxoplasma-DNA in meat-producing animals was present in meat samples in 1% of the assessed cows, 0% of young cattle, 2% of young bulls, 1% of calves, 0% of pigs and 4% of sheep samples. Toxoplasma antibodies could be detected in 32% of cows and young cattle, 21% in young bulls, 4% in calves and 53% in sheep; in the breeding pigs 27% and in the fattening pigs 1% (Wyss et al., 2000).
In 2009, again 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, 2.2% of porcine samples, 2.0% of sheep samples and 0.7% of wild boar samples (Berger-Schoch et al., 2011).
Toxoplasma antibodies could be detected in 13% in calves (6/47), 37% in cattle (48/129), 62% in bulls (62/100) and 53% in cows (69/130). In the fattening pigs it was 14% (7/50), in the free-range pigs 13% (13/100), in the sows 36% (43/120) and in the wild boars 6.7% (10/150). Seroprevalence in the lambs was 33% (33/100) and in the ewes 81% (121/150). The seroprevalence rose significantly with the increasing age of the animals tested, while the housing conditions (conventional fattening pigs versus free-range pigs) appeared to have no influence on the results of serological testing (Berger-Schoch et al., in press).
In comparison of the two studies (which is justifiable as the same standardised P-30 ELISA was used and various other studies from abroad have shown that both substrates (serum and meat juice) are directly comparable) the T. gondii seroprevalence in all species rose over the past 10 years. With the switch from the conventional PCR to the real-time system, PCR has become more sensitive, so that the increase in the T. gondii prevalence in meat samples apparent in most species (except sheep) needs to be taken with caution. In addition, the difference in prevalence was only significant in calves.
As another source of human infection, faeces of 252 cats was investigated in the same study. Oocytes of T. gondii were found in 0.4% of the samples (Berger-Schoch et al. 2011).
Genotyping of the isolates of the survey from 2009 indicated that all 3 genotypes occur in Switzerland (Berger-Schoch et al., 2011).

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

Humans become infected by the oral route, either through the uptake of infectious oocysts from the environment or by means of tissue cysts from raw or insufficiently cooked meat.
The seroprevalence figures in the new study, which were very high in some cases, show that infections with Toxoplasma gondii in meat-producing animals are widespread in Switzerland and infection with T. gondii was more frequently than was the case 10 years ago. The increasing age of the animals was

identified as a risk factor for Toxoplasma infection.

The low rate of infection in wild boars can most likely be explained by the fact that wild pigs normally live extensively in areas with low cat density.
The oocyst excretion rate of 0.4 % found in cats may appear low. But when one considers that a sick cat may excrete large quantities of oocysts for up to 20 days, and these can survive for a year under favourable conditions (i.e. not too cold, hot or dry) the environmental contamination with T. gondii must not be underestimated.

In 2010, the reported cases in animals by cantonal veterinarians to the FVO were in the range of the past 10 years. One of the cases was in cats, whereas the other three cases were rather untypical cases and affected wildlife animals, singing birds and a kangaroo.

In veterinary diagnostic laboratories 471 tests for toxoplasmosis were carried out in the context of clinical investigations in 2010, mainly in cats (95%). 8 animals were tested positive for toxoplasmosis (1 cat, 1 bird, 1 goat, 2 wild animals and 3 “other animal”, see table Toxoplasma in animals).

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.
There is a risk of exposure in Switzerland both from the consumption of meat and from cats as contaminators of the environment. The risk appears to have increased rather than decreased in the past ten years. Therefore recommendations from the FOPH that pregnant women should disclaim on raw or insufficient cooked meat and that caution is generally called for when faced with cat faeces (and thus potentially contaminated surroundings) could be confirmed.

Recent actions taken to control the zoonoses

A national survey on Toxoplasma gondii was conducted in 2009 in order to update the data obtained 10 years ago (results are described in the text above and in the publications mentioned below).

Additional information

1. Berger-Schoch A.E., Bernet D. et al., in press, Toxoplasma gondii in Switzerland: A serosurvey based on meat juice analysis of slaughter pigs, wild boar, sheep and cattle. Zoonoses and Public Health
2. Berger-Schoch A.E., Herrmann D.C. et al., (2011) Molecular prevalence and genotypes of Toxoplasma gondii in feline faeces (oocysts) and meat from sheep, cattle and pigs in Switzerland. Veterinary Parasitology, 177 : 290–297.
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. Further information can be found on the FVO website www.bvet.admin.ch.

2.10.2 Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii
Birds - Clinical investigations [1)]	FVO	Animal	1	1	1
Cats - Clinical investigations [2)]	FVO	Animal	447	1	1
Cattle (bovine animals) - Clinical investigations [3)]	FVO	Animal	1	0	0
Dogs - Clinical investigations [4)]	FVO	Animal	2	0	0
Goats - Clinical investigations [5)]	FVO	Animal	5	1	1
Other animals - Clinical investigations [6)]	FVO	Animal	5	3	3
Pigs - Clinical investigations [7)]	FVO	Animal	1	0	0
Sheep - Clinical investigations [8)]	FVO	Animal	4	0	0
Solipeds, domestic - Clinical investigations [9)]	FVO	Animal	1	0	0
Wild animals - Clinical investigations [10)]	FVO	Animal	4	2	2

Comments:

[1)] ILD, see footnote

[2)] ILD, see footnote

[3)] ILD, see footnote

[4)] ILD, see footnote

Table Toxoplasma in animals

Comments:

[5)] ILD, see footnote

[6)] ILD, see footnote

[7)] ILD, see footnote

[8)] ILD, see footnote

[9)] ILD, see footnote

[10)] ILD, see footnote

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

For Toxoplasma diagnostic histopathology, immunhistochemistry, PCR as well as the detection of the oocyst in case of final hosts were used. From the 8 positive animals, 6 were PCR positive, one immunohistochemistry positive and the cat oocyst positive.

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.

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. Overall, between 1978 and 1998 a total of 2.8 million baits containing a modified live virus were distributed. 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.

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. According to the definitions of the OIE and WHO (no cases for at least two years) the territory of Switzerland is considered to be 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 with a viral sequence closely related to North African strains from dogs, it does not indicate a focus of rabies infection in Switzerland but an illegal import.
(Re-)Import conditions for cats, dogs and ferrets were implemented in 2003 and adapted in 2004 according to the EU regulation 998/2003/EC.

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

Switzerland and most of the neighboring countries were free from European fox rabies in 2010. The fox rabies situation in northeastern Italy, where two foxes were diagnosed positive in October 2008, spread further in 2009 and 2010 to the north of Italy close to the Swiss border (68 cases occurred in 2009 and 149 up to April in 2010). Switzerland therefore prepared itself to react quickly with an oral immunization campaign for foxes in Switzerland close to the Italian border. A vaccination campaign in June/July, August/September and November/December 2010 in Italy improved the situation. Thus, so far the oral immunization campaign for foxes in Switzerland was not put into action.

In 2010, human samples (salivary, liquor or brain) from 3 clinically suspicious patients were tested for rabies virus as a differential diagnosis with negative results. Furthermore, 644 human sera were analysed if the level of protecting antibodies is sufficient: 419 sera were a control after a rabies vaccination, 201

sera a control of postexposure treatments, 6 sera from clinical suspects and 18 sera without a mentioned reason.
The national reference laboratory for rabies (the Swiss Rabies Center) investigated 87 animal samples in the year 2010, all of which proved negative for the presence of Lyssavirus in the brain. The samples came mostly from foxes (43%), bats (17%) and pets (dogs and cats; 26%).
Furthermore, in a total of 2307 serum samples from dogs and cats that accompanied their owners on trips an adequate protection against rabies infection was determined by detection of neutralising antibodies.

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

The import conditions implemented in 2003 reduce the risk of imported rabies cases in domestic animals to a very low level. However, illegal imports as well as bat rabies remain a certain risk to Switzerland.

Recent actions taken to control the zoonoses

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. Animals with suspect symptoms origination from countries where urban rabies exists are tested for rabies.
In addition, Switzerland is prepared with an oral immunization campaign at the moment to react quickly if 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. Further information can be found on the FVO website www.bvet.admin.ch.

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

Table Rabies in animals

	Source of information	Sampling unit	Region	Units tested	Total units positive for Lyssavirus (rabies)	Lyssavirus, unspecified	Classical rabies virus (genotype 1)	European Bat Lyssavirus - unspecified
Bats - wild	SRC (Swiss Rabies Centre)	Animal	Schweiz/Suisse/Svizzera	15	0			
Cats	SRC (Swiss Rabies Centre)	Animal	Schweiz/Suisse/Svizzera	8	0			
Cattle (bovine animals)	SRC (Swiss Rabies Centre)	Animal	Schweiz/Suisse/Svizzera	2	0			
Dogs	SRC (Swiss Rabies Centre)	Animal	Schweiz/Suisse/Svizzera	15	0			
Foxes - wild	SRC (Swiss Rabies Centre)	Animal	Schweiz/Suisse/Svizzera	37	0			
Marten - wild	SRC (Swiss Rabies Centre)	Animal	Schweiz/Suisse/Svizzera	4	0			
Lynx - wild	SRC (Swiss Rabies Centre)	Animal	Schweiz/Suisse/Svizzera	1	0			
Mice - wild [1)]	SRC (Swiss Rabies Centre)	Animal	Schweiz/Suisse/Svizzera	1	0			
Polecats - wild	SRC (Swiss Rabies Centre)	Animal	Schweiz/Suisse/Svizzera	1	0			
Rats - wild [2)]	SRC (Swiss Rabies Cente)	Animal	Schweiz/Suisse/Svizzera	2	0			
Squirrels - wild	SRC (Swiss Rabies Cente)	Animal	Schweiz/Suisse/Svizzera	1	0			

Table Rabies in animals

Comments:

[1] 1x bank vole

[2] 2x Norway rats

2.12 STAPHYLOCOCCUS INFECTION

2.12.1 General evaluation of the national situation

2.12.2 Staphylococcus in animals

A. Staphylococcus in Animals

Monitoring system

Sampling strategy

A random sample of 392 fattening pigs, 240 calves and 398 broiler herds were investigated at slaughter using nasal swabs and cloacal swabs, respectively.
The slaughter plants included in the monitoring program accounted for over 85% of the total production of pigs, over 80% of the total production of calves and over 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. The samples were taken by the competent authority in the framework of the antimicrobial resistance monitoring,

Frequency of the sampling

The samples were taken evenly distributed over the year, in order to exclude seasonal effects.

Type of specimen taken

Other: Nasal swabs in pigs and calves; cloacal swabs in broilers

Methods of sampling (description of sampling techniques)

Samples were taken using transport swabs (Oxoid Ltd, Basingstoke, England) from the nares (pigs and calves) or from the cloacae (broilers) just after stunning by officials of the Swiss abattoir authorities and were transported immediately after sampling to the laboratory without cooling. Cloacal swabs from 5 broilers of one slaughter batch were collected separately and pooled at the laboratory.

Case definition

MRSA positive sample

Diagnostic/analytical methods used

Swabs were transferred into tubes containing 10 ml Mueller Hinton Broth supplemented with 6.5% NaCl and incubated aerobically at 37°C for 24h under agitation. One ml from this pre-enrichment was inoculated into 9 ml tryptone soy broth containing 3.5 mg/L cefoxitin and 75 mg/L aztreonam and incubated further aerobically at 37°C for 24h. One loop-full was then spread onto MRSA selective agar plates (BBL TM CHROMagar TM MRSA; Becton Dickinson, Franklin Lakes, NJ), which were incubated at 37°C for 24h. Pink to mauve-colored colonies were regarded as suspicious and five presumptive colonies were cultivated onto tryptone soy agar plates containing 5% sheep blood (TSA-SB) (Oxoid Ltd, Basingstoke, England) at 37°C for 24h. S. aureus was identified using Vitek 2 with GP cards (BioMérieux, Mary l'Etoile, France) following manufacturer recommendations. The Penicillin-binding protein (PBP2a) was detected with the Oxoid Penicillin Binding Protein (PBP2a) latex agglutination test, (Oxoid Ltd., Basingstoke, England) in accordance with the supplier’s instructions.

Vaccination policy

No vaccination available

Other preventive measures than vaccination in place

No

Control program/mechanisms

The control program/strategies in place

None

Recent actions taken to control the zoonoses

None

Suggestions to the Community for the actions to be taken

-

Measures in case of the positive findings or single cases

None

Notification system in place

No

Results of the investigation

No MRSA were found in broilers. In calves MRSA prevalence was 2.1 % (95%CI 0.7 - 4.8). All 5 MRSA isolates from calves belonged to the genotype ST389-t011-V. MRSA prevalence in fattening pigs was 5.9% (95%CI 3.8 - 9.7). 17 isolates belonged to the genotye ST398-t034-V, 5 to the genotype ST49-t208-V and one to the genotype ST389-6011-V. Isolates belonging to the most commonly detected genotype ST398-t034-V shared an identical resistance profile, except one that was susceptible to streptomycin. They showed resistance to ß-lactams specified by mec(A) and bla(Z), tetracycline [tet(K), tet(M)], macrolide-lincosamide-streptogramin B (MLSB) antibiotics [erm(A)], spectinomycin [ant(9)-Ia], trimethoprim [dfr(G)], and tiamulin.

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

In 2009, the prevalence of MRSA in Swiss slaughter pigs was 2.2% (95%CI 1.0-4.2) with 8 of 405 pig nasal samples being positive. It increased significantly to 5.9% in 2010 with 23 of 392 nasal swabs containing MRSA. Compared to the situation in other european countries, the MRSA prevalence in Swiss livestock is still low.

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

The increased MRSA prevalence in fattening pigs is giving cause for a certain concern. The monitoring of the situation will be continued. People in close contact with animals have been shown to have a higher risk of carrying MRSA. In a study carried out in 2009 no MRSA were found on food of animal origin in Switzerland.

Additional information

See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

Table Staphylococcus in Animals

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Staphylococcus	Total units positive for S. aureus, methicillin resistant (MRSA)	S. aureus, methicillin resistant (MRSA) - spa-type t011	S. aureus, methicillin resistant (MRSA) - spa-type t108	S. aureus, methicillin resistant (MRSA) - spa-type t034	S. aureus, methicillin resistant (MRSA) - MRSA, unspecified
Cattle (bovine animals) [1)]	ZOBA	Animal		240	5	5	5			
Pigs [2)]	ZOBA	Animal		392	23	23	1		17	5
Gallus gallus (fowl) [3)]	ZOBA	Herd		398	0	0				

Comments:

[1)] Nasal swabs from calves < 6mo

[2)] Nasal swabs from fattening pigs

[3)] Cloacal swabs from broilers (5 pooled swaps per herd)

Footnote:

5 MRSA Isolates from pigs belonged to spa-type t208

2.12.3 Antimicrobial resistance in Staphylococcus isolates

Table Antimicrobial susceptibility testing of S. aureus, methicillin resistant (MRSA) - MRSA, unspecified in Cattle (bovine animals) - calves (under 1 year) - at slaughterhouse - animal sample - Monitoring - official sampling - objective sampling (Nasal swaps) - quantitative data [Dilution method]

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

MRSA, unspecified	Cattle (bovine animals) - calves (under 1 year) - at slaughterhouse - animal sample - Monitoring - official sampling - objective sampling (Nasal swaps)																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	5																								
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	5	0											1	4									4	64
Tetracyclines - Tetracycline	1	5	5													5								0.5	16
Fluoroquinolones - Ciprofloxacin	1	5	0						2	2	1													0.25	8
Trimethoprim	2	5	0									5												2	32
Aminoglycosides - Streptomycin	16	5	0										2	2	1									4	32
Aminoglycosides - Gentamicin	2	5	0								5													1	16
Aminoglycosides - Kanamycin	8	5	0										5											4	64
Antimycobacterial drugs - Rifampicin	0.032	5	0		5																			0.015	0.25
Cephalosporins - Cefoxitin	4	5	5											1	4									0.5	16
Fusidanes - Fusidic acid	0.5	5	0							5														0.5	4
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	2	5	0								4	1												1	16
Lincosamides - Clindamycin	0.25	5	5											5										0.125	4
Macrolides - Erythromycin	1	5	5												5									0.25	8
Oxazolidines - Linezolid	4	5	0								2	1	2											1	8
Penicillins - Penicillin	0.125	5	5									1	4											0.125	2

Table Antimicrobial susceptibility testing of S. aureus, methicillin resistant (MRSA) - MRSA, unspecified in Cattle (bovine animals) - calves (under 1 year) - at slaughterhouse - animal sample - Monitoring - official sampling - objective sampling (Nasal swaps) - quantitative data [Dilution method]

MRSA, unspecified	Cattle (bovine animals) - calves (under 1 year) - at slaughterhouse - animal sample - Monitoring - official sampling - objective sampling (Nasal swaps)																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	5																								
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
Pleuromutilins - Tiamulin	2	5	0							3	2													0.5	4
Streptogramins - Quinupristin/Dalfopristin	1	5	1							1	3	1												0.5	4
Sulphonamides - Sulfamethoxazol	128	5	1														3	1	1					64	512

Table Antimicrobial susceptibility testing of S. aureus, methicillin resistant (MRSA) - MRSA, unspecified in Pigs - fattening pigs - unspecified - at slaughterhouse - animal sample - Monitoring - official sampling - objective sampling (Nasal swaps) - quantitative data [Dilution method]

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

MRSA, unspecified	Pigs - fattening pigs - unspecified - at slaughterhouse - animal sample - Monitoring - official sampling - objective sampling (Nasal swaps)																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	23																								
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	23	0										3	19	1									4	64
Tetracyclines - Tetracycline	1	23	23													23								0.5	16
Fluoroquinolones - Ciprofloxacin	1	23	0						6	15	2													0.25	8
Trimethoprim	2	23	17								6						17							2	32
Aminoglycosides - Streptomycin	16	23	17										3	3			17							4	32
Aminoglycosides - Gentamicin	2	23	0								22	1												1	16
Aminoglycosides - Kanamycin	8	23	0										23											4	64
Antimycobacterial drugs - Rifampicin	0.032	23	0		23																			0.015	0.25
Cephalosporins - Cefoxitin	4	23	23											11	8	4								0.5	16
Fusidanes - Fusidic acid	0.5	23	0							23														0.5	4
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	2	23	0								23													1	16
Lincosamides - Clindamycin	0.25	23	21						2	3				18										0.125	4
Macrolides - Erythromycin	1	23	19							3	1				19									0.25	8
Oxazolidines - Linezolid	4	23	0								1	22												1	8
Penicillins - Penicillin	0.125	23	23										23											012	2
Pleuromutilins - Tiamulin	2	23	22								1			22										0.5	4
Streptogramins - Quinupristin/Dalfopristin	1	23	18							1	4	13	5											0.5	4

Table Antimicrobial susceptibility testing of S. aureus, methicillin resistant (MRSA) - MRSA, unspecified in Pigs - fattening pigs - unspecified - at slaughterhouse - animal sample - Monitoring - official sampling - objective sampling (Nasal swaps) - quantitative data [Dilution method]

MRSA, unspecified	Pigs - fattening pigs - unspecified - at slaughterhouse - animal sample - Monitoring - official sampling - objective sampling (Nasal swaps)																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	23																								
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
Sulphonamides - Sulfamethoxazol	128	23	3														18	2	1	2				64	512

Table Cut-off values for antibiotic resistance testing of Staphylococcus 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	
Tetracyclines	Tetracycline	EUCAST	1	
Fluoroquinolones	Ciprofloxacin	EUCAST	1	
Trimethoprim	Trimethoprim	EUCAST	2	
Sulphonamides	Sulfamethoxazol	EUCAST	128	
Aminoglycosides	Streptomycin	EUAST	16	
	Gentamicin	EUCAST	2	
	Kanamycin	EUCAST	8	
Cephalosporins	Cefoxitin	EUCAST	4	
Penicillins	Penicillin	EUCAST	0.125	
Lincosamides	Clindamycin	EUCAST	0.25	
Macrolides	Erythromycin	EUCAST	1	
Fusidanes	Fusidic acid	EUCAST	0.5	

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

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Oxazolidines	Linezolid	EUCAST	4	
Streptogramins	Quinupristin/Dalfopristin	EUCAST	1	
Antimycobacterial drugs	Rifampicin	EUCAST	0.032	
Pleuromutilins	Tiamulin	EUCAST	2	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin	EUCAST	2	

Footnote:

For chloramphenicol, ciprofloxacin, sulfamethoxazol, kanamycin, streptomycin, linezolid, quinupristin/dalfopristin and tiamulin cut-off values for Staph. aureus were used, because no EUCAST cut-off values for MRSA are defined

2.13 Q-FEVER

2.13.1 General evaluation of the national situation

A. Coxiella burnetii (Q-fever) general evaluation

History of the disease and/or infection in the country

Since Q fever (pathogen: Coxiella burnetii) in humans is not a notifiable disease, there are no current data on the frequency of this disease in humans.

Coxiellosis in animals is notifiable. In March 2009 it was re-categorised from a diseases to be controlled into a disease to be monitored (TSV, Article 5). Coxiella burnetii plays a certain role as a causative pathogen for abortions in biungulate animals. Abortions in cattle after three months of pregnancy have to be reported to a veterinarian (TSV, Articles 217-221). 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.
Especially at the beginning of the 1990s numbers per year were high with about 100 reported cases a year. Until the mid 1990s 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 up to 2010. In the past ten years 540 coxiellosis cases were reported to the FVO by cantonal veterinarians, of which 80% occurred in cattle, 13% in goats and 7% in sheep.

The total number of C. burnetii-related abortions reported every year is low; in cattle 30–60 cases are recorded every year, while in sheep and goats only isolated cases are reported. This situation is also reflected in data on seroprevalence of the pathogen, which has been found in studies from the Swiss reference laboratory to be about 30% in cattle and about 1–3% in sheep and goats.

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

In 2010, 74 cases of coxiellosis in ruminants (69 in cattle, 2 in goats and 3 in sheep) were reported to the FVO by cantonal veterinarians, which is in the range of the past 5 years.
In veterinary diagnostic laboratories 2546 tests for Coxiella spp. were carried out in the context of clinical investigations, mainly in ruminants (96%) and mainly subsequently after abortions.

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

The role of Coxiella burnetii as abortion cause among ruminants 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.

Additional information

1. 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.
2. Further information can be found on the FVO website www.bvet.admin.ch.

2.13.2 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 [1)]	FVO	Animal	2	0		0
Buffalos - Clinical investigations [2)]	FVO	Animal	1	0		0
Cats - Clinical investigations [3)]	FVO	Animal	1	0		0
Cattle (bovine animals) - Clinical investigations [4)]	FVO	Animal	2293	87		87
Goats - Clinical investigations [5)]	FVO	Animal	84	1		1
Pigs - Clinical investigations [6)]	FVO	Animal	6	3		3
Sheep - Clinical investigations [7)]	FVO	Animal	150	3		3
Solipeds, domestic - Clinical investigations [8)]	FVO	Animal	5	0		0
Wild animals - Clinical investigations [9)]	FVO	Animal	4	0		0

Comments:

[1)] ILD, see footnote

[2)] ILD, see footnote

[3)] ILD, see footnote

[4)] ILD, see footnote

[5)] ILD, see footnote

Table Coxiella burnetii (Q fever) in animals

Comments:

[6)] ILD, see footnote

[7)] ILD, see footnote

[8)] ILD, see footnote

[9)] ILD, see footnote

Footnote:

All data categorised as “clinical investigation” are summaries of data from the ILD (Informationssystem Labordiagnostik = information system of laboratory data). Summaries are done at the FVO. ILD is run by the FVO and all labs, which are approved for the diagnosis of certain diseases have to report their results in this system. Only tests on antigen detection are selected for the zoonoses reporting in the context of "clinical investigation".

For Coxiella burnetii diagnostic direct detection of the bacteria and PCR were used. From the 91 positive animals, 23 were PCR positive and the remaining 68 cases resulted from direct detection 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 201 samples from fattening pigs, 204 samples from calves and 200 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 calve 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

Faecal samples from pigs and cattle, cloacal samples from broilers.

Methods of sampling (description of sampling techniques)

Faecal samples from calves and pigs and 5 cloacal samples from different broilers per slaughter batch were taken at the slaughter line using a swab in standard transportation medium (Transport Swabs, Oxoid TS0001A, AMIES W/O CH). Immediately after collection, the samples were brought to the laboratory for analysis. Cloacal swabs from one slaughter batch were pooled at the laboratory.

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, tetracycline

Cut-off values used in testing

Wherever possible the epidemiological cut-off values according to EUCAST were used.

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

183 isolates from broilers, 179 isolates from pigs and 184 isolates from calves were subjected to susceptibility testing. Resistance is common in E. coli from all three animal species. 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 (35% for both).
Two strains from broilers were found to be ESBL producing strains.

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: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

The following amendments were made:

Date of Modification	Row name	Old value	New value
2012-06-11	Additional information	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010 Isolate based data on antimicrobial resistance in non pathogenic E. coli were submitted to EFSA as xml - file, therefore they are not included in this report. They will be published by EFSA in a communitiy summary report on antimicrobial resistance in zoonotic and indicator bacteria	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

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

Escherichia coli, non-pathogenic	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	184	32																	2		36		107		7
Amphenicols - Florfenicol	16	184	1																	2		59		109		13
Tetracyclines - Tetracycline	8	184	94															7		62		17		4		
Fluoroquinolones - Ciprofloxacin	0.03	184	8			139		37		2		1		2											3	
Quinolones - Nalidixic acid	16	184	6																			175		3		
Trimethoprim	2	184	38													109		33		4						
Aminoglycosides - Streptomycin	16	184	86																	1		61		29		7
Aminoglycosides - Gentamicin	2	184	10											59		99		15		1				1		4
Aminoglycosides - Kanamycin	8	184	39																			139		6		1
Penicillins - Ampicillin	8	184	72															5		28		73		6		
Cephalosporins - Cefotaxim	0.25	184	2							167		14		1		1				1						
Cephalosporins - Ceftazidim	0.5	184	2											175		7		1				1				
Polymyxins - Colistin	2	184	3																	181		2	1			
Sulphonamides - Sulfamethoxazol	256	184	102																					19		16

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

Escherichia coli, non-pathogenic	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol		4		3	25													2	64
Amphenicols - Florfenicol		1																2	64
Tetracyclines - Tetracycline		4		27	63													1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid					6													4	64
Trimethoprim			38															0.5	32
Aminoglycosides - Streptomycin		19		18		15	34											2	128
Aminoglycosides - Gentamicin		3	2															0.25	32
Aminoglycosides - Kanamycin							38											4	128
Penicillins - Ampicillin			72															0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4
Sulphonamides - Sulfamethoxazol		29		12		5		1		2		4	96					8	1024

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

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

Escherichia coli, non-pathogenic	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	183	5																	1		65		104		8
Amphenicols - Florfenicol	16	183	0																	4		88		86		5
Tetracyclines - Tetracycline	8	183	55															17		71		37		3		1
Fluoroquinolones - Ciprofloxacin	0.03	183	64			93		26		2		13		35		9		2							3	
Quinolones - Nalidixic acid	16	183	63																			119		1		
Trimethoprim	2	183	28													123		25		7		1				
Aminoglycosides - Streptomycin	16	183	30																	2		94		52		5
Aminoglycosides - Gentamicin	2	183	3											45		115		19		1				1		2
Aminoglycosides - Kanamycin	8	183	4																			175		4		
Penicillins - Ampicillin	8	183	34													2		20		68		57		2		
Cephalosporins - Cefotaxim	0.25	183	2							154		27											2			
Cephalosporins - Ceftazidim	0.5	183	2											174		7		2								
Polymyxins - Colistin	2	183	0																	183						
Sulphonamides - Sulfamethoxazol	256	183	57																					40		29

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

Escherichia coli, non-pathogenic	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol				1	4													2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline		5		12	37													1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid		3		14	46													4	64
Trimethoprim			27															0.5	32
Aminoglycosides - Streptomycin		8		10		5	7											2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin							4											4	128
Penicillins - Ampicillin			34															0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4
Sulphonamides - Sulfamethoxazol		31		20		5		1				2	55					8	1024

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

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

Escherichia coli, non-pathogenic	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Pigs 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	179	9																	2		43		116		9
Amphenicols - Florfenicol	16	179	0																	3		61		105		10
Tetracyclines - Tetracycline	8	179	53															10		85		25		6		1
Fluoroquinolones - Ciprofloxacin	0.03	179	6			139		34		1		1		1											3	
Quinolones - Nalidixic acid	16	179	5																			170		3		1
Trimethoprim	2	179	48													100		29		2		1				1
Aminoglycosides - Streptomycin	16	179	80																	6		47		37		9
Aminoglycosides - Gentamicin	2	179	4											51		107		17				1				1
Aminoglycosides - Kanamycin	8	179	5																			165		9		1
Penicillins - Ampicillin	8	179	35													1		4		65		71		3		
Cephalosporins - Cefotaxim	0.25	179	0							169		9		1												
Cephalosporins - Ceftazidim	0.5	179	0											172		7										
Polymyxins - Colistin	2	179	1																	178			1			
Sulphonamides - Sulfamethoxazol	256	179	77																					35		32

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

Escherichia coli, non-pathogenic	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Pigs 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol		5			4													2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline		2		17	33													1	64
Fluoroquinolones - Ciprofloxacin																		0.016	8
Quinolones - Nalidixic acid				1	4													4	64
Trimethoprim			46															0.5	32
Aminoglycosides - Streptomycin		18		21		26	15											2	128
Aminoglycosides - Gentamicin		1	1															0.25	32
Aminoglycosides - Kanamycin							4											4	128
Penicillins - Ampicillin			35															0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4
Sulphonamides - Sulfamethoxazol		20		11		4				2		3	72					8	1024

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic 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		0.03	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulphonamides	Sulphonamides		256	
Aminoglycosides	Streptomycin		16	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.25	
Penicillins	Ampicillin		8	

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

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		0.03	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulphonamides	Sulphonamides		256	
Aminoglycosides	Streptomycin		16	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.25	
Penicillins	Ampicillin		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 381 samples from fattening pigs, 249 samples from calves and 219 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 calve 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

Faecal samples from pigs and cattle, cloacal samples from broilers.

Methods of sampling (description of sampling techniques)

Faecal samples from calves and pigs and 5 cloacal samples from different broilers per slaughter batch were taken at the slaughter line using a swab in standard transportation medium (Transport Swabs, Oxoid TS0001A, AMIES W/O CH). Immediately after collection, the samples were brought to the laboratory for analysis. Cloacal swabs from one slaughter batch were pooled at the laboratory.

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.

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

165 Enterococcus faecalis and 20 Enterococcus faecium isolates from broilers, 105 Enterococcus faecalis and 33 Enterococcus faecium from pigs, as well as 103 Enterococcus faecalis and 31 Enterococcus faecium isolates from calves were subjected to susceptibility testing.
Resistance were commonly found in Enterococci from all three animal species.
Very high to extremely high levels of resistance to bacitracin and neomycin were observed in E. faecalis and E. feacium from all three animal species. Very high to extremely high levels of resistance were also found to tetracycline in E. faecalis and to quinupristin/dalfopristin in E. faecium. High levels of resistance were found to erythromycin in E. faecalis and E. faecium from broilers, pigs and calves. None of the isolates was resistant against vancomycin.

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: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

The following amendments were made:

Date of Modification	Row name	Old value	New value
2012-06-11	Additional information	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010 Isolate based data on antimicrobial resistance in non-pathogenic Enterococci were submitted to EFSA as xml - file, therefore they are not included in this report. They will be published by EFSA in a communitiy summary report on antimicrobial resistance in zoonotic and indicator bacteria.	See: www.swissmedic.ch > Marktüberwachung > Tierarzneimittel > Antibiotikavertriebsstatistik > ARCH-Vet 2010

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

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

E. faecium	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	32	20	0																			2		17		1
Amphenicols - Florfenicol	8	20	1																	6		13				1
Tetracyclines - Tetracycline	4	20	6															13		1				1		
Fluoroquinolones - Ciprofloxacin	4	20	0													1		6		7		6				
Aminoglycosides - Streptomycin	128	20	0																							
Aminoglycosides - Gentamicin	512	20	0																							
Aminoglycosides - Neomycin	16	20	11																					2		7
Penicillins - Ampicillin	4	20	3																	15		2		3		
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	20	16																					3		1
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	20	0															18		2						
Ionophores - Salinomycin	8	20	0															5				4		11		
Macrolides - Erythromycin	4	20	6													4		9		1				1		
Nitroimidazoles and Nitrofurans - Nitrofurantoin	256	20	0																							
Oxazolidines - Linezolid	4	20	0															1		13		6				
Penicillins - Amoxicillin / Clavulanic acid	4	20	0																	18		2				
Streptogramins - Quinupristin/Dalfopristin	1	20	13													1		6		9		2		1		1

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

E. faecium	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	32
Tetracyclines - Tetracycline		2	3															1	32
Fluoroquinolones - Ciprofloxacin																		0.5	32
Aminoglycosides - Streptomycin						20												128	2048
Aminoglycosides - Gentamicin						20												128	2048
Aminoglycosides - Neomycin		8		3														8	128
Penicillins - Ampicillin																		2	128
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin				3		5		2	6									8	256
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin																		1	32
Ionophores - Salinomycin																		1	32
Macrolides - Erythromycin	5																	0.5	16
Nitroimidazoles and Nitrofurans - Nitrofurantoin		8		9		2		1										32	256
Oxazolidines - Linezolid																		0.5	32
Penicillins - Amoxicillin / Clavulanic acid																		2	64
Streptogramins - Quinupristin/Dalfopristin																		0.5	32

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

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

E. faecium	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Pigs 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	32	33	0																			2		27		3
Amphenicols - Florfenicol	8	33	1																	5		26		1		1
Tetracyclines - Tetracycline	4	33	8															24		1						
Fluoroquinolones - Ciprofloxacin	4	33	0													9		16		5		3				
Aminoglycosides - Streptomycin	128	33	4																							
Aminoglycosides - Gentamicin	512	33	2																							
Aminoglycosides - Neomycin	16	33	13																					9		11
Penicillins - Ampicillin	4	33	4																	26		3		3		
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	33	27																					2		2
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	33	0															28		4		1				
Ionophores - Salinomycin	8	33	0															20		12		1				
Macrolides - Erythromycin	4	33	6													6		3		14		4		2		
Nitroimidazoles and Nitrofurans - Nitrofurantoin	256	33	0																							
Oxazolidines - Linezolid	4	33	2																	15		16		2		
Penicillins - Amoxicillin / Clavulanic acid	4	33	1																	28		4				
Streptogramins - Quinupristin/Dalfopristin	1	33	23													2		8		4		16		2		1

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

E. faecium	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Pigs 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol		1																2	64
Amphenicols - Florfenicol																		2	32
Tetracyclines - Tetracycline		1	7															1	32
Fluoroquinolones - Ciprofloxacin																		0.5	32
Aminoglycosides - Streptomycin						29		1						1	2			128	2048
Aminoglycosides - Gentamicin						30		1							2			128	2048
Aminoglycosides - Neomycin		8		3			2											8	128
Penicillins - Ampicillin						1												2	128
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin		2		3		8		15	1									8	256
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin																		1	32
Ionophores - Salinomycin																		1	32
Macrolides - Erythromycin	4																	0.5	16
Nitroimidazoles and Nitrofurans - Nitrofurantoin		5		24		3		1										32	256
Oxazolidines - Linezolid																		0.5	32
Penicillins - Amoxicillin / Clavulanic acid				1														2	64
Streptogramins - Quinupristin/Dalfopristin																		0.5	32

Table Antimicrobial susceptibility testing of E. faecalis in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

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

E. faecalis	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	32	103	25																	1		7		62		4
Amphenicols - Florfenicol	8	103	0																	34		66		3		
Tetracyclines - Tetracycline	4	103	65															38						1		1
Fluoroquinolones - Ciprofloxacin	4	103	0													47		54		2						
Aminoglycosides - Streptomycin	512	103	43																							
Aminoglycosides - Gentamicin	512	103	9																							
Aminoglycosides - Neomycin	16	103	93																					3		7
Penicillins - Ampicillin	4	103	0																	103						
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	103	80																					3		2
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	103	0															55		45		3				
Ionophores - Salinomycin	8	103	0															99		4						
Macrolides - Erythromycin	4	103	38													40		12		10		3				
Nitroimidazoles and Nitrofurans - Nitrofurantoin	32	103	9																							
Oxazolidines - Linezolid	4	103	0													1		13		83		6				
Penicillins - Amoxicillin / Clavulanic acid	4	103	0																	101		2				

Table Antimicrobial susceptibility testing of E. faecalis in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

E. faecalis	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol		4		24	1													2	64
Amphenicols - Florfenicol																		2	32
Tetracyclines - Tetracycline		3	60															1	32
Fluoroquinolones - Ciprofloxacin																		0.5	32
Aminoglycosides - Streptomycin						57		3				1		3	39			128	2048
Aminoglycosides - Gentamicin						91		3						2	7			128	2048
Aminoglycosides - Neomycin		23		22		7	41											8	128
Penicillins - Ampicillin																		2	128
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin		18		48		12		3	17									8	256
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin																		1	32
Ionophores - Salinomycin																		1	32
Macrolides - Erythromycin	38																	0.5	16
Nitroimidazoles and Nitrofurans - Nitrofurantoin		94		8					1									32	256
Oxazolidines - Linezolid																		0.5	32
Penicillins - Amoxicillin / Clavulanic acid																		2	64

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

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

E. faecalis	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	32	165	0																			19		138		7
Amphenicols - Florfenicol	8	165	2																	65		95		3		1
Tetracyclines - Tetracycline	4	165	126															38		1				1		
Fluoroquinolones - Ciprofloxacin	4	165	1													63		98		2		1		1		
Aminoglycosides - Streptomycin	512	165	6																							
Aminoglycosides - Gentamicin	512	165	0																							
Aminoglycosides - Neomycin	16	165	148																					4		13
Penicillins - Ampicillin	4	165	0																	162		3				
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	165	142																					2		1
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	165	0															97		64		4				
Ionophores - Salinomycin	8	165	0															155		6		2		2		
Macrolides - Erythromycin	4	165	49													74		27		15				2		5
Nitroimidazoles and Nitrofurans - Nitrofurantoin	32	165	5																							
Oxazolidines - Linezolid	4	165	0													1		28		134		2				
Penicillins - Amoxicillin / Clavulanic acid	4	165	0																	160		5				

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

E. faecalis	Gallus gallus (fowl) - broilers - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Broilers 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol		1																2	64
Amphenicols - Florfenicol		1																2	32
Tetracyclines - Tetracycline		13	112															1	32
Fluoroquinolones - Ciprofloxacin																		0.5	32
Aminoglycosides - Streptomycin						157		2							6			128	2048
Aminoglycosides - Gentamicin						163		2										128	2048
Aminoglycosides - Neomycin		69		56		15	8											8	128
Penicillins - Ampicillin																		2	128
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin		20		46		36		13	47									8	256
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin																		1	32
Ionophores - Salinomycin																		1	32
Macrolides - Erythromycin	42																	0.5	16
Nitroimidazoles and Nitrofurans - Nitrofurantoin		160		3		2												32	256
Oxazolidines - Linezolid																		0.5	32
Penicillins - Amoxicillin / Clavulanic acid																		2	64

Table Antimicrobial susceptibility testing of E. faecium in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

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

E. faecium	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory																										
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	32	31	2																			1		26		2
Amphenicols - Florfenicol	8	31	1																	8		19		3		
Tetracyclines - Tetracycline	4	31	5															26								
Fluoroquinolones - Ciprofloxacin	4	31	0													5		19		4		3				
Aminoglycosides - Streptomycin	128	31	6																							
Aminoglycosides - Gentamicin	512	31	1																							
Aminoglycosides - Neomycin	16	31	20																					5		6
Penicillins - Ampicillin	4	31	0																	31						
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	31	31																							
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	31	0															26		4		1				
Ionophores - Salinomycin	8	31	0															19		12						
Macrolides - Erythromycin	4	31	8															6		8		9		1		2
Nitroimidazoles and Nitrofurans - Nitrofurantoin	256	31	0																							
Oxazolidines - Linezolid	4	31	0															1		27		3				
Penicillins - Amoxicillin / Clavulanic acid	4	31	0																	31						
Streptogramins - Quinupristin/Dalfopristin	1	31	25													2		4		15		6		1		3

Table Antimicrobial susceptibility testing of E. faecium in Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling - quantitative data [Dilution method]

E. faecium	Cattle (bovine animals) - meat production animals - calves (under 1 year) - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Cattle 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol				2														2	64
Amphenicols - Florfenicol		1																2	32
Tetracyclines - Tetracycline			5															1	32
Fluoroquinolones - Ciprofloxacin																		0.5	32
Aminoglycosides - Streptomycin						25				1					5			128	2048
Aminoglycosides - Gentamicin						30									1			128	2048
Aminoglycosides - Neomycin		15		1		1	3											8	128
Penicillins - Ampicillin																		2	128
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin				5		18		4	4									8	256
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin																		1	32
Ionophores - Salinomycin																		1	32
Macrolides - Erythromycin	5																	0.5	16
Nitroimidazoles and Nitrofurans - Nitrofurantoin		3		13		14		1										32	256
Oxazolidines - Linezolid																		0.5	32
Penicillins - Amoxicillin / Clavulanic acid																		2	64
Streptogramins - Quinupristin/Dalfopristin																		0.5	32

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

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

E. faecalis	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Pigs 2010)																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	32	105	8																			7		74		12
Amphenicols - Florfenicol	8	105	2																	29		72		2		1
Tetracyclines - Tetracycline	4	105	56															49								
Fluoroquinolones - Ciprofloxacin	4	105	1													20		73		10		1				
Aminoglycosides - Streptomycin	512	105	35																							
Aminoglycosides - Gentamicin	512	105	4																							
Aminoglycosides - Neomycin	16	105	89																					8		8
Penicillins - Ampicillin	4	105	0																	102		3				
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin	32	105	93																							2
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	4	105	0															39		59		7				
Ionophores - Salinomycin	8	105	0															90		15						
Macrolides - Erythromycin	4	105	25													41		18		21						
Nitroimidazoles and Nitrofurans - Nitrofurantoin	32	105	3																							
Oxazolidines - Linezolid	4	105	0															4		96		5				
Penicillins - Amoxicillin / Clavulanic acid	4	105	0																	103		2				

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

E. faecalis	Pigs - fattening pigs - at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling (AMR Monitoring Pigs 2010)																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory																			
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol		4		4	4													2	64
Amphenicols - Florfenicol		1																2	32
Tetracyclines - Tetracycline		4	52															1	32
Fluoroquinolones - Ciprofloxacin		1																0.5	32
Aminoglycosides - Streptomycin						64		5		1		3			32			128	2048
Aminoglycosides - Gentamicin						96		3		2		2			2			128	2048
Aminoglycosides - Neomycin		20		46		9	14											8	128
Penicillins - Ampicillin																		2	128
Glycopeptides (Cyclic peptides, Polypeptides) - Bacitracin		10		44		32		10	7									8	256
Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin																		1	32
Ionophores - Salinomycin																		1	32
Macrolides - Erythromycin	25																	0.5	16
Nitroimidazoles and Nitrofurans - Nitrofurantoin		102		3														32	256
Oxazolidines - Linezolid																		0.5	32
Penicillins - Amoxicillin / Clavulanic acid																		2	64

Table Cut-off values for antibiotic resistance of E. faecalis in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		512	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		32	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

Table Cut-off values for antibiotic resistance of E. faecalis in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		512	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		32	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

Table Cut-off values for antibiotic resistance of E. faecium in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		128	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

Table Cut-off values for antibiotic resistance of E. faecium in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		128	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

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, the FOPH is supported by the National Centre for Enteropathogenic Bacteria (NENT). This reference laboratory disposes 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:

The outbreaks were categorised according to the revised Manual for reporting of food-borne outbreaks.

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.

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 and SET. 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. Such legal measures are now in preparation.

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

	Number of outbreaks	Human cases	Hospitalized	Deaths	Strong evidence Number of Outbreaks	Total number of outbreaks
Salmonella - S. Typhimurium	0	unknown	unknown	unknown	0	0
Salmonella - S. Enteritidis	0	unknown	unknown	unknown	0	0
Salmonella - Other serovars	0	unknown	unknown	unknown	1	1
Campylobacter	1	3	0	0	0	1
Listeria - Listeria monocytogenes	0	unknown	unknown	unknown	0	0
Listeria - Other Listeria	0	unknown	unknown	unknown	0	0
Yersinia	0	unknown	unknown	unknown	0	0
Escherichia coli, pathogenic -	0	unknown	unknown	unknown	0	0
Bacillus - B. cereus	0	unknown	unknown	unknown	0	0
Bacillus - Other Bacillus	0	unknown	unknown	unknown	0	0
Staphylococcal enterotoxins	0	unknown	unknown	unknown	3	3
Clostridium - Cl. botulinum	0	unknown	unknown	unknown	0	0
Clostridium - Cl. perfringens	0	unknown	unknown	unknown	0	0
Clostridium - Other Clostridia	0	unknown	unknown	unknown	0	0
Other Bacterial agents - Brucella	0	unknown	unknown	unknown	0	0

	Number of outbreaks	Human cases	Hospitalized	Deaths	Strong evidence Number of Outbreaks	Total number of outbreaks
Other Bacterial agents - Shigella	0	unknown	unknown	unknown	0	0
Other Bacterial agents - Other Bacterial	0	unknown	unknown	unknown	0	0
Parasites - Trichinella	0	unknown	unknown	unknown	0	0
Parasites - Giardia	0	unknown	unknown	unknown	0	0
Parasites - Cryptosporidium	0	unknown	unknown	unknown	0	0
Parasites - Anisakis	0	unknown	unknown	unknown	0	0
Parasites - Other Parasites	0	unknown	unknown	unknown	0	0
Viruses - Norovirus	2	25	0	1	0	2
Viruses - Hepatitis viruses	0	unknown	unknown	unknown	0	0
Viruses - Other Viruses	0	unknown	unknown	unknown	0	0
Other agents - Histamine	0	unknown	unknown	unknown	2	2
Other agents - Marine biotoxins	0	unknown	unknown	unknown	0	0
Other agents - Other Agents	0	unknown	unknown	unknown	0	0
Unknown agent	2	26	1	0	0	2

Table Foodborne Outbreaks: detailed data for Other agents

Please use CTRL for multiple selection fields

Histamine

	Value
FBO Code	5
Number of outbreaks	1
Number of human cases	2
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Fish and fish products
More food vehicle information	Tuna fish on pizza
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	
Additional information	

Histamine

	Value
FBO Code	6
Number of outbreaks	1
Number of human cases	2
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Fish and fish products
More food vehicle information	Tuna fish sandwich
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Restaurant/Café/Pub/Bar/Hotel/Catering service
Origin of food vehicle	Unknown
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Salmonella

Please use CTRL for multiple selection fields

Other serovars

	Value
FBO Code	1
Number of outbreaks	1
Number of human cases	8
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Cheese
More food vehicle information	raw soft cheese from goat milk
Nature of evidence	Analytical epidemiological evidence
Outbreak type	General
Setting	Household / domestic kitchen
Place of origin of problem	Processing plant
Origin of food vehicle	Intra EU trade
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	Salmonella Newport

Table Foodborne Outbreaks: detailed data for Staphylococcal enterotoxins

Please use CTRL for multiple selection fields

Enterotoxin, unspecified

	Value
FBO Code	2
Number of outbreaks	1
Number of human cases	27
Number of hospitalisations	27
Number of deaths	0
Food vehicle	Mixed or buffet meals
More food vehicle information	Potato salad
Nature of evidence	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans
Outbreak type	General
Setting	Camp, picnic
Place of origin of problem	Camp, picnic
Origin of food vehicle	Domestic market
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	
Additional information	

Enterotoxin, unspecified

	Value
FBO Code	3
Number of outbreaks	1
Number of human cases	11
Number of hospitalisations	11
Number of deaths	0
Food vehicle	Cheese
More food vehicle information	Semi-hard mountain cheese
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Household / domestic kitchen
Place of origin of problem	Processing plant
Origin of food vehicle	Domestic market
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	

Enterotoxin, unspecified

	Value
FBO Code	4
Number of outbreaks	1
Number of human cases	2
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Cheese
More food vehicle information	Semi-hard mountain cheese
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Household / domestic kitchen
Place of origin of problem	Processing plant
Origin of food vehicle	Domestic market
Contributory factors	Unprocessed contaminated ingredient
Mixed Outbreaks (Other Agent)	
Additional information	