European Food Safety Authority

ZOONOSES MONITORING

Switzerland

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

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

IN 2014

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 2014.

The information covers the occurrence of these diseases and agents in animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and indicator 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 Union 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 European Union 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 European Union Summary Reports on zoonoses and antimicrobial resistance that are 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

1.1.1 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 (FSVO) and monthly agricultural statistics (Swiss Farmers Federation).

Dates the figures relate to and the content of the figures

Number of animals held in farms in Switzerland in 2014 (data status June 2015). Number of animals slaughtered in the year 2014.

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

In general, the number of animal holdings is decreasing slightly year by year. From 2013 to 2014 the numbers reduced by 3.1% in pigs, 2.1% in sheep, 1.7% in cattle and 1.5% in goats. Exception is the poultry industry: the number of holdings with laying hens increased by 2.7% and the one with broilers by 2.5%. Over 90% of poultry meat is produced by 4 major meat producing companies. The number 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.

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

Average size of the farms in 2014: 41 cattle, 202 pigs, 46 sheep, 15 goats, 219 laying hens and 6278 broilers.

Additional information

Day-old chicks and hatching eggs are imported on a large scale to Switzerland. In the broiler sector there far more fertilized eggs than day-old chicks are imported, increasing trend. Whereas the number of imported fertilized eggs of the broiler type rose from 32.3 in 2013 to 36.1 million in 2014 (12%), the number of imported day-old chicks of the broiler type declined from 14230 to 10149. However, the total number of imported day-old chicks stayed more or less the same, as more day-old chicks of the eggline were imported (20020 in 2014 instead of 14280 in 2013). Exporting countries were mainly Germany, the Netherlands and France.

2 DISEASE STATUS

2.1 TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.1.1 General evaluation of the national situation

2.1.1.1 Mycobacterium - general evaluation

History of the disease and/or infection in the country

Tuberculosis in humans is notifiable (ordinance of the Federal Department of Home Affairs (FDHA) on medical doctor and laboratory reporting). Human tuberculosis cases due to Mycobacterium (M.) bovis are reported on a low scale (not more than 15 cases per year since 2005), which corresponds to less than 2% of all reported tuberculosis cases. In animals, tuberculosis is notifiable (TSV, Article 3: disease to be eradicated and 158 159). 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). Between 1960 and 1980, the entire bovine population was tested every other year in an active surveillance program. Since 1980, passive surveillance at the slaughterhouse is performed. Isolated cases of bovine tuberculosis have been found (most recently in 1998), which were partly due to reactivation of M. bovis infections in geriatric humans with subsequent transmission of the agent to bovines. In 1997 a survey in a randomized sample of about 10% of farms (4874 farms) was conducted to prove freedom from disease. 111394 cattle were tested using the comparative cervical intradermal test. On 72 farms, tests had to be repeated. All farms were negative. In 1998, lymph nodes from slaughtered captive deer from 124 sampled holdings (from a total of 485 farmed deer holdings) showed no lesions typical of bovine tuberculosis and were tested negative in culture for M. bovis and M. tuberculosis [1]. In a study conducted in 2010, 23 of 582 cattle of the Canton St. Gallen, which had spent the Alpine pasturing season 2009 on Alpine pastures in Austria, reacted with an unclear result in the comparative cervical intradermal test, but were negative after retesting with the comparative cervical intradermal test and/or the Interferon-gamma test. In addition, in 6 of 165 wild boars (4%) bacteria from the MTBC complex were detected, but none of these tested positive for M. bovis or M. caprae. 269 wild red deer were tested negative for tuberculosis [2]. Since 1991 tuberculosis cases in animals were reported extremely rarely (not more than 2 cases per year). Only in 2013 more cases (in total 10) were reported due to two outbreaks in cattle (one due to M. bovis, the other due to M. caprae). These cases were the first in cattle since 1998. Next to the recent bovine cases other reports in the last 10 years (2005 to 2014) affected cats (3x), parrots, dogs, horses and lamas (each 1x).

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

In 2014, 418 diagnostically confirmed human cases of tuberculosis and 59 non-laboratory confirmed cases were reported. 338 of the laboratory confirmed cases were caused by M. tuberculosis, 2 by M. bovis, 6 by M. africanum and 1 by M. caprae. 71 strains were M. tuberculosis-complex positive, but could not be identified further. The two M. bovis cases were young women (17 and 15) with migration background. 2014, two tuberculosis cases were reported in animals, one in cattle (M. caprae) and one in cats (M. microti). The one case in cattle was reported in January 2014 and still belonged to the M. caprae outbreak in the eastern part of Switzerland in 2013/2014. The origin of infection was deer in Austria. All infected animals were kept during summer on Alpine pastures in Austria in regions where M. caprae is endemic. In cattle, the last case before this recent outbreak occurred 1998. In veterinary diagnostic laboratories 347 tests were carried out in 2014, mainly in cattle (76%) and deer (14%).

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

Human tuberculosis cases due to M. bovis were reported on a low scale and corresponded to less than 2% of all reported tuberculosis cases since more than 10 years. 2013 it were below 0.5%. Swiss livestock is recognized free of bovine tuberculosis. The outbreaks in 2013 showed that isolated TB cases do exist. The risk of a TB infection by contact with infected bovines or by consumption of food products containing mycobacteria (like raw milk, which is however mostly pasteurised) within Switzerland is negligible. Raw milk is not ready for consumption and needs to be heat treated (minimum 70C) before consumption. Products from pasteurised milk are no risk as bacteria are inactivated through the heat treatment. Infections over contact (aerogen transmission) are more likely to take place as only a few bacteria are needed. Human cases of tuberculosis are anticipated to be mainly attributable to stays abroad or to the consumption of foreign food products. However, natives aged over 65 years could have been infected in their childhood, when the disease in Swiss cattle was more frequent. Risk factors for the incursion of the disease are international trade with animals and summer grazing of Swiss cattle in risk areas such as the border areas with Austria and Germany where contact with infected cattle or wildlife cannot be excluded. The cases in 2013 in eastern Switzerland prove, that summer grazing in Tyrolia and Vorarlberg, Austria, where M. caprae infection in red deer is endemic in certain regions since the 90ties, is a risk for infection for Swiss cattle. Although the source of infection of the first outbreak with M. bovis remains unclear, international trade needs to be looked at closer. According also to the number of cases reported in the EU (ADNS system) tuberculosis cases seem to be increasing in the recent years (like in UK, France, Italy, Spain and Portugal). Infected wild animals are a potential reservoir and were found in all these countries (wild boar, deer, badgers), especially in areas with high wildlife densities.

Recent actions taken to control the zoonoses

As detecting suspect cases during meat inspection in slaughterhouses is a challenge in a country with a very low prevalence disease awareness at slaughterhouses was started to be strengthened. In 2013, after the detection of the first case in cattle since 1998, a new project was lanced in Switzerland to improve the disease awareness at the meat inspection in slaughterhouses, called LyMON. A manual with pictures on how bovine TB looks like was distributed to all meat inspectors at the slaughterhouse. In addition, submission of lymphatic tissue with unspecific alterations for analysis was enhanced. 2014 lymphatic tissue with unspecific alterations of 265 cattle were analysed using ZiehI-Neelsen staining and a genus-specific mycobacterial PCR, of which 126 were taken in the framework of this new project LyMON. All samples were negative for bacteria of the M. tuberculosis-complex. In 2010 a study investigated cattle which were kept on Alpine pastures in Austria 2009 as well as red deer and wild boar in the Alpine region in 2010. All animals were tested negative.

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] Schning, J. 2012: Untersuchungen zum Vorkommen der Rindertuberkulose bei Wildtieren und zum Risiko der Entwicklung eines Reservoirs bei Wildungulaten in der Schweiz und im Frstentum Liechtenstein. Inauguraldissertation der Vetsuisse Fakultt der Universitt Bern, 2012._ [3] Further information can be found on the FSVO website www.blv.admin.ch.

2.1.2 Mycobacterium in animals

2.1.2.1 M. bovis in animal - Cattle (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. 111394 cattle 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 (TSV, Art. 3: disease to be eradicated and Art. 158 - Art. 165). Notifications of suspicious cases are 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.

Results of the investigation

Studies in six Swiss abattoirs from 2002 until 2005 showed that in about 0.58% of livestock animals lesions in the muscles caused by T. saginata cysticerci were found. This estimate was constant in these years. The animals most heavily infected were cows. However, the routinely performed standard meat inspection protocol has a low diagnostic sensitivity for the detection of T. saginata cysticerci infections. In an abattoir trial 2008/2009 several additional heart incisions were performed in 1088 slaughtered cattle originating from 832 farms throughout Switzerland. With the EU-approved routine meat inspection, bovine cysticercosis was diagnosed in 1.8% (20/1088) of the slaughtered animals. Additional incisions into the heart muscle revealed a further 29 cases, indicating that the prevalence was at least 4.5%. All infected animals originated from individual farms) [2]. Data of the Fleko (meat inspection statistics) from 2006 until 2014 support that cows are the most affected species: of 269 carcasses with massive lesions 80% were cattle, 15% sheep, 4% pigs and 0.4% goats. On average 30 carcasses (ranging from 13 to 45) with massiv lesions are detected each year. This corresponds to at most 0.004% of the total slaughtered population. 2014, 45 carcasses with massiv lesions were entered in the Fleko (36 cattle (80%), 6 sheep (13%) and 3 pigs (7)). Unfortunately, a precise species diagnosis in the slaughterhouses is not reported. In pigs however, it is known that T. hydatigena is found, because this can be morphologically differentiated from the zoonotic T. suis. Data on cases with few lesions which are frozen are not systematically collected. In a border control inspection program risk-based random samples were taken in 2014. 10 fresh bovine meat samples from third countries (Brazil, Argentina) were tested negative for Cysticercus bovis.

Results of the investigation

At the beginning of 2014 1 further case of tuberculosis in cattle was reported. It still belonged to the M. caprae outbreak in the eastern part of Switzerland in 2013/2014. The origin of infection was deer in Austria. All infected animals were kept during summer on Alpine pastures in Austria in regions where M. caprae is endemic. In cattle, the last outbreak before this recent outbreak occurred 1998.

2.2 BRUCELLOSIS

2.2.1 General evaluation of the national situation

2.2.1.1 Brucella - general evaluation

History of the disease and/or infection in the country

Brucellosis in humans is notifiable (ordinance of the Federal Department of Home Affairs (FDHA) on doctor and laboratory reporting). The number of detections of Brucella (B.) spp. in humans has been rare for many years. Brucellosis in animals is notifiable (TSV, Article 3: disease to be eradicated: bovine brucellosis since 1956, in sheep and goats since 1966; Article 4: disease to be controlled: brucellosis in rams). Government measures are applied to control brucellosis in sheep and goats (B. melitensis, TSV, Articles 190-195), in cattle (B. abortus, TSV, Articles 150-157), in pigs (B. suis as well as B. abortus and B. melitensis, TSV, Articles 207 211) and in rams (B. ovis, TSV, Articles 233-236). Cattle, pigs, sheep and goats must be tested for brucellosis in cases where the causes of abortion are being investigated (TSV, Article 129). Vaccination is prohibited since 1961. Switzerland is officially recognized as free of brucellosis in cattle, sheep and goats by the EU (Bilateral Agreement on Agriculture, Veterinary Annex). Requirements of section 3.2.1.5 of the OIE International Animal Health Code are fulfilled since 1963. B. abortus in bovines was last reported in 1996, B. melitensis in small ruminants in 1985. Freedom from bovine brucellosis was proven the last time in 1997 when a random sample of 139655 cows (in general older than 24 months) from 4874 farms was tested negative using a serological test. Since 1998 the freedom of the sheep and goat population from brucellosis is documented annually with serological testing of randomly selected farms according to EU regulation 91/68/EEC. B. suis in pigs is very rare. However, it is known that B. suis Biovar 2 is prevalent in wild boars [1]. Outdoor pigs which are outside the whole day, close to the forest (<50m) and with low fences (<60cm) have the highest risk of contact with wild boars. From 252 wild boars tested from 2008 until 2010 28.8% (95% CI 23.0%-34.0%) were B. suis Biovar 2 positive by culture and PCR and 35.8% (95% CI 30.0%-42.0%) had antibodies against B. suis [6]. These findings were significantly higher than in previous studies indicating a spread of B. suis Biovar 2 in Swiss 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 hybrids [7]. After a reported case in wild boars in 2001, the first outbreak since many years with B. suis Biovar 2 occurred in domestic pigs in 2009. The primary case was in a farm with Mangalitza pigs, which were reared outdoor and therefore contact to wild boars was very likely. Two secondary farms had contact to the first one via animal traffic. The outbreak isolates constituted a unique cluster by MLVA (Multi locus variable number of tandem repeats) and was distinct from that of isolates obtained from wild boars, suggesting that direct transmission of the pathogen from wild boars to domestic pigs was not responsible for this outbreak [5]. In 2010, B. suis Biovar 2 was again detected in one wild boar. A clinical case of B. ovis in rams was detected in 2010, after 9 years of no reported cases. B. ovis in rams was mainly detected between 1994 and 2001. In this time period 101 cases were reported, ranging from 1 to 34 per year.

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

In 2014 three brucellosis cases in humans were reported (in 2013: 4 cases). B. melitensis was detected two times, the third case remained unspecified. One man and two women aged between 46 and 63 years were affected. In 2014, no cases of brucellosis were reported by the cantonal veterinarians. In the yearly national survey 688 sheep farms (9265 blood samples) and 471 goat farms (3216 blood samples) were tested negative for B. melitensis. In diagnostic laboratories 17 animals other than ovine, caprine or bovine were tested for brucellosis in the context of clinical investigations.

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

Human infections with Brucella spp. through the consumption of Swiss raw milk or dairy products from non-heat-treated milk (for example sheep or goat cheese) is considered to be of negligible risk because its prevalence is close to zero in the Swiss animal population as no new cases in dairy livestock have been found for many years. Cases of brucellosis in humans are anticipated to be attributable to stays abroad or to the consumption of foreign products. B. suis Biovar 2 seem to occur from time to time in wild boars and holdings which keep pigs outdoors. Contacts between wild boars and pigs kept outdoor are most likely to occur at the border of the Jura and the middle part of Switzerland. B. suis Biovar 2 is very rarely notified in humans, probably as it is known to be less virulent to humans than Biovar 1 and 3.

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 2008 -2010 to obtain recent B. suis prevalence data in wild boars and to evaluate risk factors for the infection of pigs which are reared outdoor (results see above).

Additional information

[1] Leuenberger R, Boujon P, Thr B, Miserez R, Garin-Bastuji B, Rfenacht J, Strk 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] Hini V., Brodard I., Thomann A., Cvetni 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] Hini V, Brodard I, Thomann A, Holub M, Miserez R, Abril C. (2009a): 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] Hini V., Brodard I., Petridou E., Filiousis G., Contos V., Frey J., Abril C. (2009b): 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., Thr, B., Fattebert, J., Hssy, D., Ryser-Degiorgis, M.P. (2011): Free-ranging wild boar may represent a threat to disease freedom in domestic pigs in Switzerland. J Wildl Dis._ [7] Wu, N., Abril, C., Thomann, A., Grosclaude, E., Doherr, M.G., Boujon, P., Ryser-Degiorgis, M.P. (2012): Risk factors for contacts between wild boar and outdoor pigs in Switzerland and investigations on potential Brucella suis spill-over. BMC Vet Res._[8] Further information can be found on the FSVO website www.blv.admin.ch.

2.2.2 Brucella in animals

2.2.2.1 B. abortus in animal - Cattle (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. 139655 cows (in general older than 24 months) were tested using serological test. Tests were performed in blood samples from 31042 animals and in 18952 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 the ban of all animal traffic and investigation of the whole herd as well as the placenta of calving cows. In confirmed cases (herds) all diseased cattle have to be killed. All placentas, abortion material and the milk of diseased and suspicious cows have to be disposed of. The barn has to be disinfected. Official meat inspection includes each carcass, its organs and lymphatic tissue on the prevalence of abnormal alterations. Whole carcasses need to be destroyed if lesions typical for brucellosis are confirmed positive by a laboratory test. Without lesions or in case of unclear laboratory results the udder, genitals and the blood need to be destroyed (VHyS, Annex 7).

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.

2.2.2.2 B. melitensis in animal - Goats

Status as officially free of caprine brucellosis during the reporting year

The entire country free

see chapter Brucella melitensis in sheep

Results of the investigation

No cases occurred in the passive surveillance after 1997, when freedom was proven in a nationwide survey.

2.2.2.3 B. melitensis in animal - Sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Switzerland is officially acknowledged as free from ovine and caprine brucellosis. Since 1998 every year a survey in a randomized sample of farms is conducted proving freedom from disease. Free status is recognized by the EU (Bilateral Agreement on Agriculture, Veterinary Annex). EU regulation 91/68/EEC that defines populations of sheep and goat as one epidemiological unit is the basis of the survey, following a risk-based design of repeated surveys for the documentation of freedom from non-highly contagious diseases [1].

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 the whole herd has to be killed immediately. All placentas, abortion material and the milk of diseased and suspicious animals have to be disposed of. The barn has to be disinfected. Official meat inspection is investigating each carcass, its organs and lymphatic tissue on the prevalence of abnormal alterations. Whole carcasses need to be destroyed if lesions typical for brucellosis could be confirmed by a laboratory test. Without lesions or in case of unclear laboratory results the udder, genitals and the blood need to be destroyed (VHyS, Annex 7).

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 2014 a randomized sample of 688 sheep farms (9265 blood samples) and 471 goat farms (3216 blood samples) were tested negative for B. melitensis using serological tests. In addition, no cases of brucellosis in sheep and goats were reported.

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.

Additional information

[1] 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.

3 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.

3.1 SALMONELLOSIS

3.1.1 General evaluation of the national situation

3.1.1.1 Salmonella - general evaluation

History of the disease and/or infection in the country

Salmonellosis in humans is notifiable (ordinance of the Federal Department of Home Affairs (FDHA) on medical doctor and laboratory reporting). In the 80s Salmonellosis in humans was the most reported food borne disease. After reaching a peak in 1992 with 113 reports per 100,000 inhabitants the incidence declined steadily and in 1995 Campylobacteriosis took over to be the most reported food borne disease. Since 2003 the incidence of Salmonellosis was never over 30 reports per 100,000 inhabitants. S. Enteritidis was the most frequently isolated serovar followed by S. Typhimurium. From 1995 until 2006 the infection of chicken with S. Enteritidis was notifiable and a control program for S. Enteritidis 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 and laying hen flocks steadily declined from 38 to 3 infected flocks per year. Since 2007 Salmonella infection in poultry and pigs is notifiable according to the regulation 2160/2003 of the European community. The control program covers the detection of S. Enteritidis and S. Typhimurium, including the monophasic variant S. enterica serovar 4,[5],12:i:- , in breeding flocks with over 250 places, laying hen flocks with over 1000 places, broiler flocks with over 5000 places and turkey flocks with over 500 places. For breeding flocks S. Hadar, S. Virchow and S. Infantis are included additionally. From 2007 until 2013, no more than 5 cases per year in poultry were reported. Most cases covered by the control program occurred in laying hens. In broiler chickens many different Salmonella serotypes were detected, controlled serovars were found one each in 2010 and 2011. The first and only case in breeding flocks (S. Enteritidis) in the control program was found in 2012. Baseline studies were carried out in 2005 2008 resulting in the following prevalence estimates: in laying hens 1.3% (3 of 235 flocks; 2006), in broilers 0.3% (1 of 299 flocks; 2007), in slaughter pigs 2.3% (14 of 615; 2007) and in breeding pigs 13.0% (29 of 223; 2008). In laying hens and broilers all isolates were either S. Enteritidis or S. Typhimurium. In slaughter pigs 60% and in breeding pigs 27% of the detected serovars were S. Enteritidis or S. Typhimurium - proving again the presence of these two serovars in the pig population. The prevalence in slaughter pigs in 2007 was equal as in previous research studies. As breeding pigs have not been addressed before the prevalence obtained 2008 cannot be compared with previous data. Furthermore, Salmonellosis is notifiable in all animals and regularly reported. In the past 10 years (2005-2014) on average 64 salmonellosis cases per year were recorded by cantonal veterinarians (Min: 49, Max: 83). Mainly cows (32%), reptiles (31%), dogs/cats (20%) and sheep (6%) were affected. From 2002 until 2009 cheese production in cheese-making facilities was officially sampled and monitored for Salmonella in a national surveillance program. As since 2004 no Salmonella were detected, the official testing on Salmonella in dairy products was stopped in 2009. In 2007 a study in broiler meat at retail showed that Salmonella prevalence was low (0.4%) in Swiss products compared to 15.3% within imported products. In 2008 a baseline study of Salmonella spp. in neck skin from broiler carcasses resulted in a Salmonella prevalence of 2.6%.

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

In 2014, 1238 cases in humans were reported representing a notification rate of 15.1 cases per 100000 inhabitants (2013: 1266 cases or 15.5/100000). The Salmonella cases have stagnated at this level since 2009. As in previous years the most affected age group were children under 5 years (<1 year: 45/100000, 1 to 4 years: 47/100000). The typical seasonal increase of notifications in summer and autumn occurred also 2014. The most frequently reported serovars remained S. Enteritidis (28%), the monophasic strain 4,12:i:- (16%) and S. Typhimurium (15%). Unusual were 25 cases of S. bovismorbificans. They could be attached to a single outbreak due to the consumption of sprouts in a restaurant in southern Germany. In 2014, 5 cases (S. Enteritidis (5x)) of salmonella infection were detected in the framework of the control program in poultry flocks. One case occurred in laying hens > 1000 places, the 4 others in broilers > 5000 places. The latter occurred all at the same time. The only epidemiological link between all 4 farms was a hatchery in Switzerland. All day-old chicks belonged to the same lot of this hatchery. Tests performed in this hatchery were negative. The concerned hatching eggs were imported from the EU. A transovarial transmission of S. Enteritidis could have been the common source, but no further investigation was performed. Further suspect cases for S. Enteritidis / S. Typhimurium (positive environmental samples not confirmed in animal samples) were as follows: in laying hen flocks > 1000 places: S. Enteritidis (4x), S. Typhimurium (2x); in broiler flocks > 5000 places: S. Enteritidis (1x), S. Typhimurium (1x). Further Serovars which are not covered in the control program were detected in environmental samples as follows: in laying hen flocks > 1000 places: S. Mbandaka (2x), S. Indikan (1x), S. Schwarzengrund (1x); in broiler flocks > 5000 places: S. Albany (4x), S. Schwarzengrund (2x), S. Braenderup (1x), S. Bredeney (1x), S. Chester (1x), S. Idikan (1x), S. Infantis (1x), S. Lexington (1x), S. Tennessee (1x), S. Senftenberg (1x), S. Welikade (1x),[13,23:i:- (monophasic)] (1x); in turkey flock > 500 places S. Indiana (1x), Salmonella unspecified (1x). Outside from the control program, 6 further very small laying hen flocks (70, 59, 45, 20, 6, 3 animals, respectively) were tested positive for Salmonella (3x. S. Typhimurium, 1x S. Enteritidis, 1x S. Indiana, 1x unspecified). 2014, 63 salmonellosis cases in animals were reported. As usual mainly cows (22x), reptiles (17x) and dogs/cats (12x) were affected. This number of reports lies within the range of normal yearly fluctuations. This is also true for cattle. In veterinary diagnostic laboratories 3867 tests for salmonellosis were carried out in the context of clinical investigations, mainly in dogs/cats (46%) and cattle (35%). The positivity rate in cattle animals is usually higher than in other non-farmed animals, as often several animals are infected on a positive farm. Serovars found in cattle are mainly S. Typhimurium and the monophasic variant 4,12:i:-. Due to a change in the laboratory database the lab data from 2014 are no longer 100% comparable to the years before. However, it seems, that 2014 less cattle were examined in the context of clinical investigations and a few cattle more were tested positive. On farm level, the number of salmonella reports remained stable. To examine Swiss cheese made out of raw or low heat-treated milk, 222 samples were examined 2014 for the presence of Salmonella. No Salmonella could be detected.

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

The longstanding S. Enteritidis control program showed its effect in the decline of human cases. However, salmonellosis is still the second most frequent zoonosis in Switzerland with stagnation in numbers of cases since 2009. It remains unclear to what extent pigs and cattle play a role as source of infection for humans. Stepping up and expanding the national control program might be needed in order to further reduce human salmonellosis cases.

Recent actions taken to control the zoonoses

Control measures were implemented in breeding flocks according to Commission Regulation (EC) No. 200/2010, in laying hen flocks according to Commission Regulation (EC) No. 517/2011, in broilers according to Commission Regulation (EC) No. 200/2012 and in turkeys according to Commission Regulation (EC) No. 1190/2012. 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 FSVO. 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 larger cheese manufacturers have a hygiene management system in place that conforms to ISO 9000.

Additional information

[1] The industry takes responsibility for the monitoring of poultry meat production in a system of self-auditing following the HACCP principles. Results of the Salmonella monitoring of the largest poultry producers and abattoirs are available covering more than 92% 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. No imported meat samples were included in the data analysis. In total 3268 tests were done in 2014 (78% single samples and 24% batch-related). 6 (0,2%) of the 3268 samples proved positive for Salmonella spp. (S. Infantis (1x), S. Mbandaka (2x), Agona (1x), Salmonella spp. (2x)). 3 of 6 (50%) positive samples were batch samples._ [3]The FSVO runs a border inspection program in which risked-based random samples are taken from commodities from third countries. As commodities from third countries can only be inspected at the airports and because this mode of importation is quite expensive not many samples can be tested. In 2014, 14 raw fish samples and 2 ready to eat fish products from Vietnam, Malaysia, Japan and Australia, from Vietnam and 29 fresh beef meat samples from Brazil, Argentina, Chile, the United States, Canada, Australia and New Zealand were tested negative for Salmonella. _ [3] In a S. Kentucky study conducted in 2010 (Bonalli et al.) 106 human S. Kentucky strains, isolated from patients between 2004 and 2009, were genotyped using PFGE. There was some evidence of a non-recognised outbreak of S. Kentucky in 2006. Travels to North Africa were a risk factor for S. Kentucky infection [Bonalli, M., Stephan, R., Kppeli, U., Cernela, N., Adank, L., Hchler, H. Salmonella enterica serotype Kentucky associated with human infections in Switzerland: genotype and resistance trends 2004-2009, International Food Research (May 2011)]._ [4] Further information can be found on the FSVO website www.blv.admin.ch.

3.1.2 Salmonella in foodstuffs

3.1.2.1 Salmonella spp. in food - Meat from broilers (Gallus gallus)

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 FSVO. 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

In the framework of the self auditing system of the poultry meat industry 2978 samples of broiler meat were tested for Salmonella in 2014. 6 of 2978 (0.2%) were Salmonella spp. positive (S. Infantis (1x), S. Mbandaka (2x), S. Agona (1x), Salmonella spp. (2x)). Positive samples were neck skin samples (2x), fresh broiler meat with skin (2x), meat preparations (1x) and mechanically separated broiler meat (1x).

3.1.2.2 Salmonella spp. in food - Meat from turkey

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 FSVO. 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

In the framework of the self auditing system of the poultry meat industry 290 samples of turkey meat were tested for Salmonella in 2014. All 290 samples tested negative for Salmonella.

3.1.2.3 Salmonella spp. in food

Monitoring system

Sampling strategy

In an additional study to the listeria monitoring program the prevalence of a certain pathogenic organisms is evaluated to examine Swiss cheese made out of raw or low heat-treated milk. 2014 222 samples of cheese made out of raw or low heat-treated milk were tested for the presence of Salmonella. No Salmonella was detected.

Preventive measures in place

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 FSVO. 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.

Results of the investigation

In 2014, 222 samples of cheese made out of raw or low heat-treated milk were tested negative for the presence of Salmonella.

3.1.3 Salmonella in animals

3.1.3.1 Salmonella spp. in animal

Control program/mechanisms

The control program/strategies in place

There is a passive surveillance in place: animal keepers, livestock inspectors, AI technicians, animal health advisory services, meat inspectors, abattoir personnel, police and customs officers have to report any suspected case of salmonellosis in animals to a veterinarian. If Salmonella are confirmed by a diagnostic laboratory, this must be reported to the cantonal veterinarian. Cases in cows, goats or dairy sheep must be reported to the cantonal health and food safety authorities.

Measures in case of the positive findings or single cases

If biungulates are affected, the sick animals must be isolated and the whole herd and the environment must be tested. Healthy animals from this herd may be slaughtered with a special official permit and subject to appropriate precautions at the abattoir. 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.

Notification system in place

Salmonellosis in animals is notifiabile (TSV, Art. 4: diseases to be controlled) and Article 222-227).

Results of the investigation

2014, 63 salmonellosis cases in animals were reported. As usual mainly cows (22x), reptiles (17x) and dogs/cats (12x) were affected. This number of reports lies within the range of normal yearly fluctuations.. In veterinary diagnostic laboratories 3867 tests for salmonellosis were carried out in the context of clinical investigations, mainly in dogs/cats (46%) and cattle (35%). The positivity rate in cattle is usually higher than in other non-farmed animals, as often several animals are infected on a positive farm. Serovars found in cattle are mainly S. Typhimurium and the monophasic variant 4,12:i:-.

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

The number of salmonellosis reports in animals stayed at the same level as in recent years. Due to a change in the laboratory database the lab data from 2014 are no longer 100% comparable to the years before. However, it seems, that 2014 less animals were examined in the context of clinical investigations. As in 2013, a few cattle more were tested positive. However, on farm level, the number of salmonella reports remained stable.

Additional information

Further information can be found on the FSVO website www.blv.admin.ch.

3.1.3.2 Salmonella spp. in animal - Gallus gallus (fowl) - broilers

Vaccination policy

Broiler flocks

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

Broiler flocks

Since 01.01.2009 control measures in broiler flocks are taken according to the Swiss ordinance of epizootics (TSV, Article 255-261) and Commission Regulation (EC) No. 200/2012. The national control program covers broiler flocks on farms with at least 5000 places. Salmonella serotypes S. Enteritidis and S. Typhimurium including the monophasic variant 4,12:i:- are subject to state control measures.

Measures in case of the positive findings or single cases

Broiler flocks: At slaughter (flock based approach)

If Salmonella serotypes subject to control measures are detected in the environment, there is a suspicion of Salmonella infection. In the event of a suspected infection, the official veterinarian samples 20 killed animals or fallen stock per flock and submits the meat and organs to bacteriological testing for Salmonella. If S. Enteritidis and/or S. Typhimurium including the monophasic variant 4,12:i:- are detected in the animal samples, a case of Salmonella infection is reported. In this case animal movements from this holding are prohibited (TSV, Article 69) in order to prevent spread of disease. 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. Fresh meat has 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 culled or slaughtered and the premises were cleaned, disinfected and freedom from Salmonella of the premises by means of bacteriological testing was proven.

Notification system in place

Salmonella infection in broilers (TSV, Art. 4 (disease to be controlled) and Article 255-261) is notifiable.

Results of the investigation

In 2014, 4 cases of S. Enteritidis were detected in the framework of the control program in in broilers > 5000 places. They all occurred at the same time. The only epidemiological link between all 4 farms was that all day-old chicks belonged to the same lot of a Swiss hatchery. Tests performed in this hatchery were negative. The concerned hatching eggs were imported from the EU. A transovarial transmission of S. Enteritidis could have been the common source of infection. Further 2 suspect cases (1x S. Enteritidis, 1x S. Typhimurium; positive environmental samples not confirmed in animal samples) were reported. Other Serovars not covered in the control program were S. Albany (4x), S. Schwarzengrund (2x), S. Braenderup (1x), S. Bredeney (1x), S. Chester (1x), S. Idikan (1x), S. Infantis (1x), S. Lexington (1x), S. Tennessee (1x), S. Senftenberg (1x), S. Welikade (1x),[13,23:i:- (monophasic)] (1x).

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

The results of the control program show that the Salmonella prevalence in broilers in Switzerland is low. Only one case in 2010 and 2011 as well as the probable one outbreak with 4 cases in 2014 (which might have been imported from the EU) were detected in the framework of the control program since 2007. Switzerland wants to maintain the current situation by applying the aforementioned control measures.

Additional information

Further information can be found on the FSVO website www.blv.admin.ch.

3.1.3.3 Salmonella spp. in animal - Gallus gallus (fowl) - laying hens

Vaccination policy

Laying hens flocks

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

Laying hens flocks

Control measures are taken according to the Swiss ordinance of epizootics (TSV, Article 255-261) and Commission Regulation (EC) No. 517/2011. The control program covers all laying hen flocks on farms with at least 1000 places. S. Enteritidis and S. Typhimurium including the monophasic variant 4,12:i:- are subject to state control measures.

Measures in case of the positive findings or single cases

Laying hens flocks

If Salmonella serotypes subject to control measures are detected in the environment, there is a suspicion of Salmonella infection. In the event of a suspected infection, the official veterinarian samples 20 killed animals or fallen stock per flock and submits the meat and organs to bacteriological testing for Salmonella. If S. Enteritidis and/or S. Typhimurium including the monophasic variant 4,12:i:- are detected in the animal samples, a case of Salmonella infection is reported. In this case animal movements from this holding are prohibited (TSV, Article 69) in order to prevent spread of disease. 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. 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 culled or slaughtered and the premises were cleaned, disinfected and freedom from Salmonella of the premises by means of bacteriological testing was proven.

Notification system in place

Salmonella infection in laying hens (TSV, Art. 4 (disease to be controlled) and Article 255-261) is notifiable.

Results of the investigation

In 2014, 1 case of S. Enteritidis was detected in the framework of the control program in laying hen flocks > 1000 places. Further 6 suspect cases ((S. Enteritidis (4x), S. Typhimurium (2x); positive environmental samples not confirmed in animal samples) were reported. Other Serovars not covered in the control program were S. Mbandaka (2x), S. Indikan (1x) and S. Schwarzengrund (1x). Outside from the control program, 6 further very small laying hen flocks (70, 59, 45, 20, 6, 3 animals, respectively) were tested positive for Salmonella (3x. S. Typhimurium, 1x S. Enteritidis, 1x S. Indiana, 1x unspecified).

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

The prevalence of Salmonella spp. in flocks of laying hens in Switzerland is low. The 1,3% prevalence estimate from the baseline study in 2006 still seems to be valid. The target of max. 2% of S. Enteritids / S. Typhimurium could each year be reached. However, slightly more samples were positive for S. Enteritids / S. Typhimurium as well as other serovars not covered by the target in the environment as the previous year.Also more cases were detected in the smaller flocks not covered by the control program.

Additional information

Further information can be found on the FSVO website www.blv.admin.ch.

3.1.3.4 Salmonella spp. in animal - Gallus gallus (fowl) - breeding flocks, unspecified

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 are taken according to the Swiss ordinance of epizootics (TSV, Article 255-261) and Commission Regulation (EC) No. 200/2010. Since 2007, the control program covers breeding holdings with more than 250 places. Salmonella serotypes S. Enteritidis, S. Typhimurium including the monophasic variant 4,12:i:-, 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 Salmonella serotypes subject to control measures are detected in the environment, there is a suspicion of Salmonella infection. In the event of a suspected infection, the official veterinarian samples 20 killed animals or fallen stock per flock and submits the meat and organs to bacteriological testing for Salmonella. If S. Enteritidis, S. Typhimurium including the monophasic variant 4,12:i:-, S. Hadar, S. Infantis and/or S. Virchow are detected in the animal samples, a case of Salmonella infection is reported. In this case animal movements from this holding are prohibited (Article 69 TSV) in order to prevent spread of disease. 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 breeding purposes. The quarantine conditions are lifted when all animals have been killed and the premises were cleaned, disinfected and freedom from Salmonella of the premises by means of bacteriological testing was proven.

Notification system in place

Salmonella infection in poultry (TSV, Art. 4 (disease to be controlled) and Article 255-261) is notifiable.

Results of the investigation

In 2014 no cases or suspect cases in breeding flocks occurred, neither in the framework of the control program nor in smaller herds.

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

Since 2007 - when the control program started - the first and only Salmonella positive breeding flock was detected in 2012. It is assumed, that this was a rare event and that the Salmonella situation in breeding flocks in Switzerland is very good.

Additional information

Further information can be found on the FSVO website www.blv.admin.ch.

3.1.3.5 Salmonella spp. in Turkeys - breeding flocks and meat production flocks

Vaccination policy

Meat production flocks

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

Meat production flocks

Control measures are taken according to the Swiss ordinance of epizootics (TSV, Article 255-261) and Commission Regulation (EC) No. 1190/2012. The control program covers all flocks of turkeys on farms with at least 500 places. S. Enteritidis and S. Typhimurium including the monophasic variant 4,12:i:- are subject to state control measures.

Measures in case of the positive findings or single cases

If Salmonella serotypes subject to control measures are detected in the environment, there is a suspicion of Salmonella infection. In the event of a suspected infection, the official veterinarian samples 20 killed animals or fallen stock per flock and submits the meat and organs to bacteriological testing for Salmonella. If S. Enteritidis and/or S. Typhimurium including the monophasic variant 4,12:i:- are detected in the animal samples, a case of Salmonella infection is reported. In this case animal movements from this holding are prohibited (TSV, Article 69) in order to prevent spread of disease. 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. Fresh meat has 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 culled or slaughtered and the premises were cleaned, disinfected and freedom from Salmonella of the premises by means of bacteriological testing was proven.

Notification system in place

Salmonella infection in turkeys (TSV, Art. 4 (disease to be controlled) and Article 255-261) is notifiable.

Results of the investigation

In 2014 there were no positive flocks for a serovars covered by the target. In total two flocks of turkeys were tested positive for Salmonella in environmental samples (S. Indiana (1x), Salmonella spp. (1x)).

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

As there are not many turkey flocks and Salmonella did not appear to be a specific problem in turkeys in Switzerland, the baseline study on the prevalence of Salmonella in turkey flocks was not conducted. The results of the control program in the recent years showed that the target of the control program can be reached.

Additional information

Further information can be found on the FSVO website www.blv.admin.ch.

3.2 CAMPYLOBACTERIOSIS

3.2.1 General evaluation of the national situation

3.2.1.1 Thermophilic Campylobacter spp., unspecified - general evaluation

History of the disease and/or infection in the country

Human campylobacteriosis is notifiable (ordinance of the Federal Department of Home Affairs (FDHA) on medical doctor and laboratory reporting). In the 1980s, campylobacteriosis was the second most reported food borne disease in humans behind salmonellosis. In 1995 the case curve for campylobacteriosis crossed over that for enteric salmonellae. Since then campylobacteriosis has been the main reported food-borne infectious disease in Switzerland. After reaching a peak in 2000 with 97 reports per 100,000 inhabitants, the incidence declined steadily until 2005, but always remained over 65 reports per 100,000 inhabitants. From 2005 until 2012 an increasing trend could be observed, reaching its peak of 105 reports per 100,000 inhabitants in 2012. C. jejuni has always been the most isolated species in humans. Campylobacteriosis in animals is notifiable (TSV, Article 5: disease to be monitored). Infected animals usually dont get ill. Thus, only a few campylobacteriosis cases were reported by cantonal veterinarians. From 2004 until 2012 the reports ranged between 5 and 26 per year. In 2013 and 2014, an increase in case numbers was observed. In the past 10 years (2005 2014) on average 34 cases per year were reported (Min: 49, Max: 164), affecting mainly dogs (71%), cattle (13%) and cats (12%). As poultry represents the most important reservoir of Campylobacter, the occurrence of this pathogen in broiler chicken farms is studied since 2002 as part of the monitoring programme on antimicrobial resistance. From 2002 until 2007 sampling took place only during 2 months in spring. The percentage of positive flocks was approximately 25%, only in 2002 and 2007 it was higher with roughly 40%. The EU-wide baseline study in 2008 revealed that there are remarkable differences in the percentages of positive flocks during the year. Thus, from 2009 onwards samples were taken evenly distributed throughout the year. In caecum samples in 2009 the obtained prevalence was 44%. Since 2010 cloacal swabs were taken, resulting in a slightly lower prevalence ranging between 33% (2010) and 38% (2013). In the EU-wide baseline study in 2008 71% of the broiler carcasses at the slaughter house were Campylobacter-positive (cumulated qualitative and quantitative approach). The prevalence of Campylobacter in poultry meat at retail in 2007 and in broiler meat at retail in 2009/2010 was estimated to be 44% and 38%, respectively. In both studies 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. A survey conducted in 2006 in calves revealed a Campylobacter prevalence of 40%. In the framework of the antimicrobial resistance monitoring the prevalence in calves in 2010 was much lower (15%, 37 of 245; C. jejuni (25x) and C. coli (12x)). Prevalence was also lower in meat producing cattle (>12 months) 10% (10 of 100, C. jejuni (10x)) in 2008 and 13% (48 of 373; C. jejuni (38x) and C. coli (10x)) in 2012. The Campylobacter prevalence in pigs remained stable from 2009 until 2011 (66% - 68%) and dropped in 2012 to 48% (144x C. coli and 1x C. jejuni; N= 305). The main species in pigs is C. coli. In 2013, the prevalence reached the higher level of the years 2009 until 2011: 226 of 348 samples (65%) were Campylobacter-positive. All 226 isolates were C. coli.

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

The number of notified human campylobacteriosis cases in 2014 stayed at the high level as in the previous year (92.5 new infections per 100000 inhabitants compared to 7479 cases or 91.5 per 100000 in 2013). 2012 remained the peak with the highest rate of new infections since the introduction of mandatory notification (8440 cases or 105 per 100000 inhabitants). In the last 5 years case numbers fluctuated between 6613 and 8440. Similar to previous years, the most affected age group were adults aged 15 to 24 years (137/100000). There is an increase of case reports among the elderly aged > 65: the notification rate rose steadily and almost doubled within the past ten years (from 55/100000 in 2005 to 103/100000 in 2014). With 4002 cases (53%) more men than women (3507 cases; 43%) were affected. In accordance with other years, most cases were caused by C. jejuni (75% of all cases, in 15% of cases no distinction was made between C. jejuni and C. coli). The winter peak with 910 cases was again higher than 2013 and 2012. The typical summer peak occurred in August 2014 and included 957 cases. In 2014, the random sample of broilers was investigated at slaughter in the framework of the antimicrobial resistance monitoring programme using cloacal swabs.179 of 493 broiler herds (36%) were Campylobacter-positive (C. jejuni (163x) and C. coli (16x)). These results lie within the range of 33-38% measured since 2010. 164 cases of campylobacteriosis were reported in animals by cantonal veterinarians in 2014. As in 2013, the notification rate was again much higher than in previous years. As usual, mainly dogs (117x), cattle (28x) and cats (13x) were affected. As not more laboratory tests for campylobacteriosis in the context of clinical investigations were carried out since 2012, more testing can be ruled out as a reason for this increase. However, more confirmation tests in the national reference laboratory were conducted. The higher number of confirmed positive cases by the reference laboratory might have lead to a better knowledge of these cases and a change on the reporting behavior of the cantonal veterinarians. A real increase in new campylobacter infections among animals cannot be excluded. If so, a human health impact would be estimated as low.

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

Mainly the handling of raw poultry meat and the consumption of undercooked contaminated poultry meat and poultry liver leads to campylobacteriosis cases in humans. Meat from cattle and pigs and the contact to pets seem to be less important. Molecular typing of Swiss isolates from humans and animals collected between 2001 and 2012 identified chickens as the main source for human campylobacteriosis (71% of the human cases were attributed to chickens, 19% to cattle, 9% to dogs and 1% to pigs [2]. It is assumed that the high rate of disease in young adults aged 15-24 years is attributable to less regard for kitchen hygiene at this age and increased travel. Data from 2009 indicated that approximately 18% of the cases were travel associated (Niederer et al. 2012). Infections above average in summer (July/August) could be related to the higher infection rate in poultry flocks, higher barbecue activities and travels abroad, the peak around New Years Eve to increased consumption of meat dishes such as Fondue Chinoise and travelling abroad.

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 the persisting high incidence of human campylobacteriosis, the high prevalence in broiler flocks and the lack of efficient control options. The platforms aim is information exchange, coordination and evaluation of control measures, identification of gaps of knowledge and initialization of applied research projects with the focus on risk factors for human infection, Campylobacter-free broiler production and disease awareness along the food chain. Concrete achievements were different scientific publications and also two legal regulations. One of these regulations decrees that from January 1st 2014 poultry liver from Campylobacter-positive herds can only be sold frozen (SR 817.024.1, Ordinance on Hygiene, article 33a). Up to now, there is no official method in Switzerland for testing Campylobacter freedom on herd level. In consequence, poultry liver is sold only frozen in Switzerand since then. According to the second regulation, pre-packed fresh poultry meat and meat preparations need a label informing the consumers to thoroughly cook the products before consumption and to follow certain rules of kitchen hygiene (SR 817.022.108, Ordinance on Food of Animal Origin, article 9).

Additional information

[1] 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 92% 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. No imported meat samples were included in the data analysis. In total 1595 tests were done in 2014 including 90% single samples and 10% batch-related. 335 (21%) of them proved positive for Campylobacter spp. [C. jejuni (51x), C. coli (16x) and unspecified (268x), see also Campylobacter poultry meat table]. _ [2] Kittl et al. (2013a). Source attribution of human Campylobacter isolates by MLST and fla-typing and association of genotypes with quinolone resistance. PLoS One 8(11): e81796. _ [3] Kittl S, Korczak BM, Niederer L, Baumgartner A, Buettner S, Overesch G, Kuhnert P., (2013b): Comparison of genotypes and antibiotic resistances of Campylobacter jejuni and Campylobacter coli on chicken retail meat and at slaughter. Appl Environ Microbiol. Jun 2013; 79(12): 38753878._ [4] Niederer L, Kuhnert P, Egger R, Bttner S, Hchler H, Korczak, BM., 2012: Genotypes and antibiotic resistances of Campylobacter jejuni and Campylobacter coli isolates from domestic and travel-associated human cases. Appl Environ Microbiol.Jan; 78(1):288-91._ [5] Wirz SE, Overesch G, Kuhnert P, Korczak BM, (2010): Genotype and antibiotic resistance analysis of Campylobacter isolates from ceaca and the carcasses of slaughtered broiler flocks. Appl Environ Microbiol. 2010 Oct; 76(19):6377-86. _ [6] Kittl S, Kuhnert P, Hchler H, Korczak BM., 2011: Comparison of genotypes and antibiotic resistance of Campylobacter jejuni isolated from humans and slaughtered chickens in Switzerland. J Appl Microbiol. 2011 Feb; 110 (2):513-520._ [7] Egger R, Korczak BM, Niederer L, Overesch G, Kuhnert P. (2011): Genotypes and antibiotic resistance of Campylobacter coli in fattening pigs. Vet Microbiol. 2011 Aug 19._ [8] Further information can be found on the FSVO website www.blv.admin.ch.

3.2.2 Campylobacter in foodstuffs

3.2.2.1 Thermophilic Campylobacter spp., unspecified in food - Meat from broilers (Gallus gallus)

Control program/mechanisms

The control program/strategies in place

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 92% 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. No imported meat samples were included in the data analysis

Results of the investigation

In the framework of the self auditing system of the poultry meat industry 1537 samples of broiler meat were tested for Campylobacter in 2014. 317 of 1537 (20.6%) were Campylobacter spp. positive. Furthermore, 58 samples of turkey meat were tested for Campylobacter in 2014. 18 of 58 (31%) were Campylobacter spp. positive.

3.2.3 Campylobacter in animals

3.2.3.1 Thermophilic Campylobacter spp., unspecified in animal - Gallus gallus (fowl)

Monitoring system

Sampling strategy

In 2014, a random sample of 493 broiler herds was investigated at slaughter using cloacal swabs (5 swabs pooled per herd). The samples were taken in the framework of the antimicrobial resistance monitoring and the number of samples should provide at least 170 isolates for the susceptibility testing. The broiler slaughter plants included in the monitoring programme account for > 90% 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.

Frequency of the sampling

At slaughter

From January to December approximately 9 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 from different broilers of one 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 which tested positive for C. jejuni or C. coli.

Diagnostic/analytical methods used

At slaughter

At the laboratory, cloacal swabs were pooled and direct culture was carried out on a selective medium for Campylobacter (mCCDA, Oxoid, Pratteln, Switzerland). Speciation of suspect colonies was carried out using Matrix-assisted laser desorption/ ionization time-of-flight mass spectrometry (MALDI TOF MS) (Bruker Daltonics, Bremen, Germany).

Vaccination policy

No vaccination available.

Other preventive measures than vaccination in place

The poultry industry encourages farmers to lower the Campylobacter-burden by incentives for negative herds at slaughter. No immunoprophylactic measures are allowed.

Measures in case of the positive findings or single cases

No measures are taken.

Notification system in place

Mandatory notification for the detection of Campylobacter spp..

Results of the investigation

In 2014, 179 (36%) of the 493 sampled broiler flocks were positive for Campylobacter. 163 isolates of C. jejuni and 16 C. coli were identified.

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

Since 2010, the Campylobacter-prevalence in cloacal swabs ranged between 33% and 38%.

Additional information

Further information can be found on the FSVO website www.blv.admin.ch.

3.3 LISTERIOSIS

3.3.1 General evaluation of the national situation

3.3.1.1 Listeria - general evaluation

History of the disease and/or infection in the country

Listeriosis in humans is notifiable (ordinance of the Federal Department of Home Affairs (FDHA) on medical doctor and laboratory reporting). People mainly affected are adults aged over 60. In the 1990s human listeriosis cases fluctuated between 19 and 45 cases per year, from 2000 onwards between 28 and 76 cases per year. Especially in 2005 and 2006 there was an increase in listeriosis cases with more than 70 cases. 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 higher number of cases in 2006 could not be linked to a particular outbreak. The biggest epidemic outbreak in Switzerland with 122 cases occurred in the 1980s due to contaminated cheese. In the aftermath of the epidemic outbreak in the late 1980s the Swiss government decreed the creation of appropriate means to prevent a repetition of such a case. Agroscope Istitute for Food Science (IFS) was given the order to create a Listeria Monitoring Program (LMP) in cooperation with the Swiss dairy industry. From 1990 on milk and milk products have been tested for Listeria spp. as part of quality assurance programs. Since 2007 Listeria monocytogenes was present in less than in 1% of the samples in all years. Usually samples from the environment were tested positive. If rarely cheese samples were positive, L. monocytogenes was only found on the cheese surface. A Listeria Advisory Team can be called in for planning and consultation in decontamination of facilities and providing checkups of company safety concepts. An evaluation in 2008 showed that in 85% of cases the measures advised proved successful over the subsequent years of operation. In addition, from 2002 until 2011 several hundred samples of semi-hard and soft-cheese from either raw or pasteurized cows, sheeps and goats milk were tested every year for Listeria spp. within the framework of the national testing program in the dairy industry by official food control. As only a few samples were positive each year the program was stopped 2011. Listeriosis in animals is notifiable (TSV, Article 5: disease to be monitored). From 1991 until 1995 not more than 3 cases of listeriosis per year were reported. Between 1999 and 2004 it were 27 to 34 per year. In the last ten years (2005-2014) on average 13 listeriosis cases per year were notified (Min: 6, Max: 21). 98% of them affected ruminants (36% cattle, 39% sheep and 23% goats).

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

In 2014, the number of reported cases in humans increased again compared to 2012 to 98 laboratory confirmed cases with a notification rate of 1.2 per 100000 inhabitants (2013: 64 cases, 0.8 per 100000 inhabitants). This anew increase was mainly due to an outbreak with Serotype 4b lasting from October 2013 to April 2014, adding to a total of 32 cases. Persons over 65 years of age remain the most affected age group (4,3/100000). In the two cases of infection in newborns transmission from the mother to her child was likely. The cases occurred during the whole year. Like in previous years the two most frequently identified serovars were 1/2a (26%) and 4b (60%). The latter increased considerable due to the abovementioned outbreak. In the framework of the Listeria Monitoring Program (LMP) 2345 samples were tested for the presence of Listeria spp. in 2014. L. monocytogenes were detected in 3 samples (0.2%), 1 of which was a sample from 387 environmental samples, 1 from the surface of 1340 semi-hard cheese samples and 1 from the surface of 618 hard cheese samples. Other species of Listeria spp. were found in 51 samples (2%). To examine Swiss cheese made of raw or low heat-treated milk, 222 samples were examined 2014 for Listeria monocytogenes. None of 222 samples was positive on L. monocytogenes. No other species of Listeria were detected. In 2014, 9 cases of animal listeriosis were registered, as usual mainly in rumninants (5 in cattle, 2 in sheep, 1 in goats and 1 in monkeys). In veterinary diagnostic laboratories 57 tests for listeriosis were carried out in the context of clinical investigations (38% in ruminants, 32% in dogs and cats, 16% in horses, 12% in pigs and 2% in other animals). In a border control inspection program risk-based random samples are taken. In 2014, 19 fish samples (16 raw fish, 2 fishproducts, 1 ready to eat fish product) from third countries were tested negative for Listeria monocytogenes (see prevalence data).

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

L. monocytogenes is 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. Monitoring the occurrence of Listeria spp. at different stages in the food chain is extremely important to prevent infections with contaminated food. Milk products and cheeses are a potential source of infection. With regard to Listeria spp. in the dairy industry, the situation has remained on a constantly low level for many years. In animals, the reported listeriosis cases have remained stable at a low level over the last years.

Recent actions taken to control the zoonoses

Agroscope Institute for Food Science (IFS) started in 2014 with the analysis of cheeses made from raw or low heat-treated milk for the presence of various pathogens (results see above).

Additional information

Further information can be found on the FSVO website www.blv.admin.ch.

3.3.2 Listeria in foodstuffs

3.3.2.1 Listeria in food

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. Agroscope Istitute for Food Science (IFS) is running a Listeria monitoring program for early detection of Listeria in production facilities.

Measures in case of the positive findings or single cases

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

3.4 E. COLI INFECTIONS

3.4.1 General evaluation of the national situation

3.4.1.1 Escherichia coli, pathogenic - general evaluation

History of the disease and/or infection in the country

Detection of VTEC in humans is notifiable since 1999 (ordinance of the Federal Department of Home Affairs (FDHA) on medical doctor and laboratory reporting). Until 2013 the notification rate of VTEC infections was never above 1.1 reports per 100,000 inhabitants. Children under 5 years were the age group mostly affected, ranging between 3 and 9 reports per 100000 inhabitant. In human non-O157 VTEC strains isolated from patients between 2000 and 2009 (N=97) 40 different serotypes were found. Nevertheless, serotypes O26:H11/H-; O103:H2; O121:H19; O145:H28/H- dominated. The high genetic diversity between the strains indicated that non-O157 STEC infections in Switzerland are often sporadic. O26:H11/H- was most frequently associated with HUS. Linked to 44 O157 VTEC strains non-bloody diarrhoea was experienced by 16%, BD by 61% of the patients, and 30% developed HUS. All strains belonged to MLST type 11 and were positive for vtx2 variants, eae and hlyA. Nine phage types (PTs) were detected the most frequent being PT32 (43%) and PT8 (18%) [7,8]. Ruminants, especially small ruminants, are an important reservoir for VTEC. In 2000, 14% of fecal samples from cattle, 30% from sheep and 22% from pigs were VTEC-positive. Younger bovines excrete VTEC more frequently. Thus, caution is needed when interpreting average figures on VTEC for the whole cattle population. Shiga toxin genes and the top-five serogroups were frequently found in young Swiss cattle at slaughter. 74.1% of the fecal samples tested positive for vtx genes. Moreover, 42%of these samples tested positive by PCR for O145, 26% for O103, 24% for O26, 8% for O157 and 1% for O111; N=563). Success rates for STEC strain isolation, however, were low. Only 17 O26 strains could be isolated. All of them were eae-positive, 9 strains harbored vtx (vtx1 (8x), vtx2 (1x)). Of the 28 isolated O145 strains, 10 were eae-positive including 4 harboring vtx1 or vtx2. Of the 12 O157 strains 5 harbored vtx2 and eae and were identified as VTEC O157:H7/H(-). The other 7 O157 strains were negative for vtx and eae or positive only for eae [6]. VTEC strains from fattening pigs are harboring mainly vtx2e and therefore belong to the low pathogenic VTEC group. Wild boars, wild ruminants and rabbits are possible reservoirs. In wild boars from canton Geneva in 2007/2008, VTEC was detected in 9% (14/153) of the tonsils using real-time PCR. Fecal samples of 73 wild boars were all negative indicating that wild boars are carriers of foodborne pathogens in tonsils, but shedding in feces occurs rarely [10]. 2011, 33% of fecal samples of wild ruminants tested positive for vtx, 7% for eae and 14% for both (N=239). 45% harbored genes from the Vtx2 group, 30% from the Vtx1 group, and 21% from both (N=56). Strains were isolated from 18 red deer, 19 roe deer, 13 chamois and 6 ibex [5]. 2008, genes for Verotoxins have only been detected in a small minority of rabbit fecal samples (3%). E. coli harboring eae were found in a high prevalence in Swiss rabbits at slaughter representing a source for carcass contamination at slaughter [13]. From 2006 to 2008, VTEC strains were detected in 2% of raw milk cheese (N=1422; 24 semi-hard and 5 soft cheeses). All isolated strains belonged to non-O157 serotypes (13 strains belonged to the serogroups O2, O22 or O91; 9 strains harbored hlyA; none of the strains tested positive for eae). A study looking at the die-off behavior of VTEC during the ripening process of semi-hard raw milk cheeses in 2013 revealed that VTEC could be detected after 16 weeks of ripening irrespective of the selected burning temperature (40C und 46C) and the initial contamination level (low level and high level) [3]. 2013, in foods of plant origin 1 of 233 samples (ready-to-eat lettuce (142x), freshly cut fruits (64x) and sprouts (27x)) was found to be contaminated with a low pathogenic VTEC [4].

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

In 2014, 122 laboratory confirmed cases of human VTEC infections were registered The notification rate was 1.5 per 100000 inhabitants (2013: 81 cases, 1/100000). This is the highest notification rate since introduction of the notification in 1999. The number of reports increased significantly compared to the previous years. Slightly more cases in women (N=68) than men (N=54) were reported. No clusters were observed. The number of HUS cases was with 10 cases in 2014 stable compared to the previous years. 4 children each from the age group 0 to 4 years and 5 to 14 years as well as 2 persons from the age group 65 plus developed HUS. Children under 5 years of age were still the most frequently affected (6.5 per 100000 inhabitants). Their number of reports remained also stable. The rise in reports was mainly observed among adults. The more frequently usage of multiplex-assays detecting toxins might be a reason for this incline. To examine Swiss cheese made out of raw or low heat-treated milk, 222 samples were examined 2014 for the presence of VTEC. 2 samples (0.9%) were PCR-positive for vtx-genes, but no isolates could be obtained for further classification. In a study conducted 2012 O26:H11/H- isolates from human fecal samples having bloody diarrhea and/or HUS (27x) and fecal isolates from healthy cattle (11x) and sheep (1x) were further analysed. Within the E. coli O26 isolates more sequence type (ST)21 strains were identified than ST29 (60% and 75% of the human and animal isolates, respectively). Whereas all human isolates harbored at least one vtx, only one isolate each from one cattle and sheep did. Both animal strains harboring vtx belonged to ST29. The FSVO runs a border inspection program in which risked-based random samples from commodities from third countries are taken. As commodities from third countries can only be inspected at the airports and because this mode of importation is quite expensive not many samples are tested. In 2014, 29 fresh beef meat samples from Brazil, Argentina, Chile, the United States, Canada, Australia and New Zealand tested negative for E. coli.

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

Reported VTEC cases in humans rose significantly in 2014. As most of the laboratories did not routinely test for VTEC, it is very likely that the impact of VTEC was underestimated. New diagnostic tools might have led to more samples being analysed for VTEC. In view of the low infectious dose of VTEC (<100 microorganisms) an infection via contaminated food or water is easily possible. Strict maintenance of good hygiene practices at slaughter and in the context of milk production is of central importance to ensure both public health protection and meat quality. In addition, thorough cooking of critical foods prevents infection with VTEC originally present in raw products. Data from the national monitoring program for dairy products 2006-2008 confirm that raw milk cheese may constitute a possible source of VTEC infections and are a relevant hazard in this type of dairy product. Especially because VTEC can survive during the ripening process of semi-hard raw milk cheeses. Although O157:H7 is the predominant cause of HUS, O26:H11/H- has emerged to the most common non-O157 serotype causing human bloody diarrhea and HUS in many countries. Cattle and sheep are a possible reservoir of the emerging O26:H11/H- ST29 [2]. Such E. coli O26 strains can probably lose and gain vtx-encoding phages. Exchange between VTEC O26 strains and their vtx-negative variants might lead to the development of new clones.

Recent actions taken to control the zoonoses

Several studies relating to verotoxigenic E. coli in foodstuffs, in humans and animals were conducted by the national reference laboratory to generate new information in the past 5 years [1-10].

Additional information

[1] Nesch-Inderbinen, M. et al. (2015). Prevalence of Subtilase cytotoxin-encoding subAB variants among Shiga toxin-producing Escherichia coli strains isolated from wild ruminants and sheep differs from that of cattle and pigs and is predominated by the new allelic variant subAB2-2. International Journal of Medical Microbiology 305, 124-128. [2] Zweifel et al. (2013). Detection of the emerging Shiga toxin-producing Escherichia coli O26:H11/H- sequence type 29 (ST29) clone in human patients and healthy cattle in Switzerland. Applied and Environmental Microbiology 79(17): 5411-3._ [3] Peng et al. (2013). Behavoiur of Shiga toxin-producing and generic E. coli during ripening of semi-hard raw milk cheese. Journal of Dairy Science 31, 117-120._ [4] Althaus et al. (2012). Bacteriological survey of ready-to-eat lettuce, fresh-cut fruits and sprouts collected from the Swiss market. Journal of Food Protection 75, 1338-1341._ [5] Obwegeser et al. (2012). Shedding of foodborne pathogens and microbial carcass contamination of hunted wild ruminants. Veterinary Microbiology 159, 149154._ [6] Hofer et al. (2013). Application of a real-time PCR-based system for monitoring of O26, O103, O111, O145 and O157 Shiga Toxin-producing Escherichia coli in cattle at slaughter. Zoonoses and Public Health, 2013, 1863-2378 (electronic)._ [7] Kppeli et al. (2011a). Shiga toxin-producing Escherichia coli non-O157 strains associated with human infections in Switzerland: 2000-2009. Emerging Infectious Diseases 17, 180-185._ [8] Kppeli et al. (2011b). Shiga toxin-producing Escherichia coli O157 associated with human infections in Switzerland, 2000-2009. Epidemiology and Infection 139, 10971104._ [9] Zweifel 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, 73, 88-91._ [10] Wacheck et al. (2010) Wild boars as an important reservoir for foodborne pathogens. Foodborne Pathogens and Disease, Volume 7, Number 3._ [11] 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._ [12]. Federal Office of Public Health (2008). Enterohmorrhagische Escherichia coli (EHEC), epidemiologische Daten in der Schweiz von 1996 bis 2006. Bulletin of the FOPH; No. 14: 240-246._ [13] Kohler et al. (2008). Shedding of food-borne pathogens and microbiological carcass contamination in rabbits at slaughter. Veterinary Microbiology 132, 149157._ [14] Kaufmann et al. (2006). Escherichia coli O157 and non-O157 Shiga toxin-producing Escherichia coli in fecal samples of finished pigs at slaughter in Switzerland. Journal of Food Protection 69, 260266._[15] Zweifel et al. (2006). Bedeutung von Escherichia coli O157 beim Schlachtschaf in der Schweiz. Schweizer Archiv fr Tierheilkunde 148, 289295._[16] Zweifel et al. (2004). Prevalence and characteristics of Shiga toxin-producing Escherichia coli, Salmonella spp. and Campylobacter spp. isolated from slaughtered sheep in Switzerland. International Journal of Food Microbiology 92, 45-53._ [17] Al-Saigh et al (2004). Fecal shedding of Escherichia coli O157, Salmonella, and Campylobacter in Swiss cattle at slaughter. Journal of Food Protection 67, 2004, 679684._ [18] Schmid et al. (2002). Verocytotoxin-producing Escherichia coli in patients with diarrhoea in Switzerland. Eur J Clin Microbiol Infect Dis. 21:810-813._ [19] Stephan et al. (2000). Occurrence of verotoxin-producing Escherichia coli (VTEC) in fecal swabs from slaughter cattle and sheep an observation from a meat hygiene view. Schweizer Archiv fr Tierheilkunde 142, 110114._ [20] Further information can be found on the FSVO website www.blv.admin.ch.

3.5 YERSINIOSIS

3.5.1 General evaluation of the national situation

3.5.1.1 Yersinia - general evaluation

History of the disease and/or infection in the country

Since 1999 Yersiniosis in humans is no longer notifiable. From 1988 until 1998 the number of reported cases dropped from about 170 to 50 cases per year. Since 2005 the national reference laboratory NENT analysed about 20 to 36 human samples per year, detecting mainly Y. enterocolitica. From 2001 to 2010 60% of the Y. enterocolitica belonged to the pathogenic biotypes 2, 3 or 4 and 40% to the apathogenic biotype 1A (N=128) [2]. 5% (6 of 128) of the people had an anamnesis with travelling before they got ill. In animals, yersiniosis is notifiable (TSV, Article 5: disease to be monitored and Article 291). In the last 10 years (2005-2014) never more than 6 cases per year were reported, on average 2 cases per year: affected were monkeys (5), cattle (3), dogs (3) and sheep, hares, rabbits, alpacas, birds and other species (each 1). 2001 64% (56 of 88) of fattening pig farms were Yersinia positive in faecal samples. 38% of the 352 faecal samples were Y. enterocolitica belonging to Biotype 1A (37%), Biotype 2/ neither O:3 nor O:9 (29%), Biotype 2/O:9 (13,5%), Biotype 4/O:3 (10%) and Biotype 3/O:3 (4%). In this study the use of medical feed at beginning of housing was a potential risk factor. 2002 15,5% of 865 Swiss pig meat samples (Schnitzel, minced meat, chopped meat) collected in 283 different markets were Y. enterocolitica positive (mainly Biotype 1A). Only in 0.7% potentially humanpathogenic Y. enterocolitica were isolated. From 2003 until 2005 carcass surfaces of 80 slaughter pigs each year were sampled at the four largest slaughterhouses. From each pig samples from 4 different regions of the carcass were pooled. Between 1% and 6% of Yersinia contamination on the carcass surfaces were found. In 2006, 88% of tonsils of 212 slaughter pigs representing 16 farms sampled in one single slaughterhouse were positive using real-time PCR. In culture prevalence rates were much lower (34%). 69 isolates (96%) were found to be Biotype 4/O:3, 6 isolates were Biotype 2/O:5;27 and 1 Biotype 2/O:9 [5]. In 2007/2008 65% of 153 wild boars shot in the region of Geneva had antibodies in the tonsil fluids. Using PCR 44% of the tonsils were positive for Yersinia spp.: 35% for Y. enterocolitica and 20% for Y. pseudotuberculosis. In culture detection rates again were much lower: 9% for Y. enterocolitica and 3% for Y. pseudotuberculosis. In a study conducted in 2012/2013 229 of 410 tonsils of slaughter pigs were positive for Yersinia enterocolitica using culture methods according to ISO 10273:2003 (56%; 95% CI 51-61%). All isolates except one belonged to the potentially humanpathogenic Biotypes. 74% belonged to Biotype 4/O:3 and 16% to Biotype 3/O:5,27. Other rare Biotypes were Biotype 3/O:5, Biotype 3/O:9, Biotype 4/O:5 and Biotype 4/O:5,27. Biotype 1A was detected only in one sample [1]. This prevalence was higher than the 34% estimate from 2006 [5].

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

No official data for human case reports are available. However, the number of human samples send to the national reference laboratory NENT are at least an indicator for the recent situation. 2014, NENT analysed 29 human samples (28x Y. enterocolitica and 1x Y. pseudotuberculosis). Of the former 43% belonged to Biotype 1A, 32% to Biotype 2/O:9 and 25% to Biotype 4/O:3. Since 2005 never more than 36 isolates were sent to NENT. In 2014 3 animal cases of yersiniosis were reported (2 in monkeys, 1 in dogs). In reporting veterinary diagnostic laboratories 1938 tests for yersiniosis were carried out in the context of clinical investigations in 2014, mainly in dogs and cats (85%), horses (5%) and monkeys (3%). Only dogs and cats were found positive, as well as one roe deer.

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

It can be assumed that more than half of all slaughter pigs carry potentially humanpathogenic Yersinia enterocolitica in their tonsils. How often pig meat is contaminated and how often these agents cause disease in humans is not really known. The number of tests carried out in the human reference laboratory NENT and the number of reported cases in animals are constant at a very low level in the recent years in Switzerland. The reporting of Yersinia pseudotuberculosis in milk samples of three single mastitis cows remained an unusual event in 2013. However, less cattle were tested for Yersinia spp. in 2014 (23 instead of 108 in 2013).

Recent actions taken to control the zoonoses

Switzerland carried out a Yersinia prevalence study in tonsils in slaughter pigs from March 2012 to February 2013 [1] according to the technical specifications for harmonized national surveys on Yersinia enterocolitica in slaughter pigs (EFSA Journal 2009; 7(11):1374).

Additional information

[1] Meidinger, A. Countrywide survey on the detection and biotype distribution of Yersinia enterocolitica from slaughter pigs in Switzerland. Inauguraldissertation der Vetsuisse Fakultt der Universitt Bern, 2013_ [2] Fredriksson-Ahomaa, M. et al., 2012: Yersinia enterocolitica strains associated with human infections in Switzerland, 2001-2010: Eur J Clin Microbiol Infect Dis (2012) 31:15431550._ [3] Fredriksson-Ahomaa, M. et al., 2011: Different enteropathogenic yersinia strains found in wild boars and domestic pigs. Foodborne Pathog Dis 8,733-7._ [4] Fredriksson-Ahomaa, M. et al., 2009: Prevalence of pathogenic Yersinia enterocolitica and Yersinia pseudotuberculosis in wild boars in Switzerland. Int J Food Microbiol, 135, 199-202._ [5] Fredriksson-Ahomaa, M. et al., 2007: Prevalence of pathogenic Yersinia enterocolitica in pigs slaughtered at a Swiss abattoir. Int J Food Microbiol, 119, 207-212._ [6] Further information can be found on the FSVO website www.blv.admin.ch.

3.6 TRICHINELLOSIS

3.6.1 General evaluation of the national situation

3.6.1.1 Trichinella - general evaluation

History of the disease and/or infection in the country

Trichinellosis in humans is notifiable since 1st January 2009 (ordinance of the Federal Department of Home Affairs (FDHA) on medical doctor and laboratory reporting), in animals since 1966 (TSV, Article 5: disease to be monitored). Since then the Federal Office of Public Health received very few reports of human trichinellosis, never exceeding 4 per year. The testing on trichinellosis of all slaughter pigs is mandatory since 1st January 2007 according to Commission Regulation (EC) No. 2075/2005. Exceptions are made for slaughterhouses with a small capacity who do not export to the EU. Meat of pigs which have not been tested for trichinellosis from these small slaughterhouses are labeled with a special stamp and cannot be exported. Trichinella infections in pigs were not detected for many decades. From 2001 to 2004, between 400000 and 490000 pigs (15 to 19% of all slaughtered pigs) were tested per year without any positive findings. Since 2005 the number of slaughtered pigs tested increased steadily, all with negative results: 34% in 2005, 44% in 2006 and about 90% in 2007-2009. In addition, 20000 slaughter pigs were tested with an improved digestion method in 2009. All animals were free of antibodies against Trichinella (T.) spp. [4]. Since 2010 the percentage of tested slaughter pigs and horses was around 93% and 85%, respectively. Furthermore, between 1700 and 3400 wild boars were tested each year for Trichinella with negative results. Cases in the wildlife population concerned always carnivorous wild animals. In the last 10 years (2005-2014) never more than 5 cases per year were reported (on average 2 cases per year). Affected animal species were lynx (86%), foxes (10%) and wolves (5%). The nematodes involved were all T. britovi. A study conducted from 1999 until 2007 found that 15 of 55 (27.3%) assessed lynxes harbored T. britovi larvae. In 2006/2007 21 of 1298 (1.6%) assessed foxes proved positive for T. britovi larvae [2]. In 2008 all 1458 wild boars tested negative for Trichinella by artificial digestion, but 3 had antibodies against Trichinella (seroprevalence 0.2%). This illustrates that wild boars may come in contact with this nematode [3].

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

In 2014 there were no human cases reported. In 2013 a 66 year old woman most probable got infected on a recent journey to Africa, whereas a 22 year old hunter/butcher from the French part of Switzerland by eating raw sausage pastry containing wild boar meat. As the young man was tested positive only by serology, the exact Trichinella species could not be investigated. Although there were never reports of Trichinella-positive findings in Swiss wild boars it cannot be ruled out that the suspected source of infection was a Swiss wild boar. In 2014, 2539670 slaughter pigs (93% of all slaughtered pigs) were tested for Trichinella with a negative result. Due to the extensive testing over the last years with only negative results, Swiss slaughter pigs are projected to be free of Trichinella. In addition, 2492 horses (84% of all slaughtered horses) and 1713 wild boars were also tested negative for trichinellosis. However, Trichinella is sporadically detected in the wild animal population other than wild boars. 2014, 5 cases of Trichinella infections in lynx were reported by cantonal veterinarians. Only in one case T. britovi could be 100% identified. However, it can be assumed, that all infections were T. britovi, which is endemic in the Swiss wild life population.

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

Trichinellosis in humans is very rare in Switzerland and often associated with infections abroad. As infections in wild animal populations can occur and infections in wild boars in Switzerland cannot be completely excluded, meat especially from wild boars should not be consumed raw. Although the risk of transmission from wild animals to domestic pigs is negligible, the surveillance of trichinellosis in wild animals is vital. As all infections in wildlife in the past were T. britovi, Switzerland is considered free of T. spiralis.

Additional information

[1] Jakob et al., Schweiz. Arch. Tierheilk. 136: 298-308,1994._ [2] Frey et al., Veterinary Parasitology, 2009._ [3] Frey et al., Schweiz. Archiv fr Tierheilkunde, 2009._ [4] Schuppers et al., Zoonoses and Public Health, 2009._ [5] Further information can be found on the FSVO website www.blv.admin.ch.

3.6.2 Trichinella in animals

3.6.2.1 Trichinella spp., unspecified in animal - Solipeds, domestic - 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.

Measures in case of the positive findings or single cases

A positive tested animal would be traced back and the contaminated carcass disposed.

Notification system in place

Trichinellosis in animals is notifiable (TSV, Article 5).

Results of the investigation including the origin of the positive animals

In 2014, 2492 horses (84% of all slaughtered horses) were tested for Trichinella with negative results.

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.

3.6.2.2 Trichinella in animal - 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 or Latex agglutination test according to Commission Regulation (EC) No. 2075/2005.

Notification system in place

Trichinellosis in animals is notifiable (TSV, Article 5).

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.

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

In 2014, 2539670 slaughter pigs (93% of the total slaughter population) were tested and no Trichinella larvae were found.

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 in domestic pigs, it is highly unlikely that Trichinella infections acquired from domestic pig meat originating from Switzerland do occur.

3.7 ECHINOCOCCOSIS

3.7.1 General evaluation of the national situation

3.7.1.1 Echinococcus - general evaluation

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

The incidence of human AE-cases rose since 2001 steadily and reached 0.55 cases per 100000 inhabitants in 2013 (hospital- based data). Albeit the increased risk of infection, an infection of humans with E. multilocularis is rare. The increased risk was probably caused by a general increase of the fox population from 1984 to 2000 due to the successful immunization campaigns against rabies in foxes, and by the encroachment of foxes to the urban areas. The prevalence of E. multicularis in foxes is estimated to lie between 30% and 70%. The Institute of Parasitology of the University of Zurich found in a research project 2012 53% (105 of 200) and 2013 57% (57 of 100) of hunted foxes from Eastern Switzerland positive for E. multilocularis. 2013 the prevalences in rodents in the Zrich region was low: only 3 of 200 A. scherman or 6 of 259 M. arvalis were infected. 2014 8 cases in animals were registered, affecting 6 dogs and 2 monkeys. This is within the range of the recent years.

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

The life cycle of the zoonotic cestode E. multilocularis depends on canids (mainly red foxes) as definitive hosts and on their specific predation on rodent species (intermediate hosts). Host densities and predation rates are key drivers for infection with parasite eggs. Vaccination against rabies in wildlife, elimination of top predators and changing attitude towards wildlife (feeding and lower hunting rates) contribute to high fox densities and modify their anti-predator response (landscape of fear), promoting their tameness, which in turn facilitates the colonization of residential areas and modifies parasite transmission. These factors should be considered in the assessment of any intervention and prevention strategy. Thus, promoting the wariness of foxes by public campaigns that ask people not to feed or tame foxes, and to keep at a distance, is a recommended part of every prevention strategy [1]. 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 eggs.

Recent actions taken to control the zoonoses

Owners from dogs which are hunting mice are encouraged to deworm their dogs regularly [5]. The public is advised, not to feed or tame foxes and to keep at a distance. The Institute of Parasitology of the University of Zurich evaluated the control of the disease in the urban periphery of Zurich from 2006-2011 [2]. The monthly distribution of anthelmintic baits (Praziquantel) for foxes proved to be effective. Areas with bait distribution showed a significant decrease of the E. multilocularis egg contamination. However, the positive effect lasts only a short period of time. Therefore the distribution of anthelmintic baits needs to be repeated regularly which is expensive. All in all these experiments and studies in Germany, France and Japan confirmed the feasibility of this approach. Regarding the long latency of 5 15 years of alveolar echinococcosis, however, such measures can only be cost effective if they are pursued for several decades and concentrate on highly endemic areas in densely populated zones. Thus, the implementation of this approach strongly depends on factors such as public attitude, available financial resources and priority setting of political decision-makers.

Additional information

[1] Hegglin D, Bontadina F, Deplazes D. Human-wildlife interactions and zoonotic transmission of Echinococcus multilocularis. Trends Par. 31: 167-173 (2015)._ [2] Hegglin, D., & Deplazes, P., 2013, Control of Echinococcus multilocularis: Strategies, feasibility and cost-benefit analyses. Int. J. Par., 43: 327337_ [3] Torgerson, P.R., Schweiger, A., Deplazes, et al., 2008, Alveolar echinococcosis: From a deadly disease to a well-controlled infection. Relative survival and economic analysis in Switzerland over the last 35 years. J. of Hepatol. 49: 72-77._ [4]. Schweiger A, Ammann RW, Candinas D, Clavien P-A, Eckert J, Gottstein B, et al. Human alveolar echinococcosis after fox population increase, Switzerland. Emerg Infect Dis. 2007 Jun: http://www.cdc.gov/EID/content/13/6/878.htm_ [5] Information on fox tapeworm: www.paras.uzh.ch/infos, Expert group ESCCP_CH and guidelines for deworming of dogs and cats: www.ESCCAP.ch_ [6] Data for hospitalisation due to Echinococcosis (FSO): www.bfs.admin.ch._ [7] Further information can be found on the FSVO website www.blv.admin.ch.

3.8 RABIES

3.8.1 General evaluation of the national situation

3.8.1.1 Lyssavirus (rabies) - general evaluation

History of the disease and/or infection in the country

Rabies in humans is a notifiable disease (ordinance of the Federal Department of Home Affairs (FDHA) on medical 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 last imported human rabies case in Switzerland was reported 2012. An American citizen was transferred of a hospital in Dubai to a hospital in Zurich, where he died. He was bitten by a bat in California 3 months before onset of the first symptoms. 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 did not indicate a focus of rabies infection in Switzerland but an illegal import. The European fox rabies epizootic started in 1939 at the eastern border of Poland and reached Switzerland on March 3, 1967. From 1967 until 1999 a total of 17108 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. 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 37 years (1992, 1993, 2002) and remains a source, albeit little, of infection for animals and humans.

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

2014, 1216 sera from humans were tested for neutralizing antibodies at the national reference laboratory for rabies. In 828 cases (68%) antibody titers were controlled after pre-expositional immunization, in 331 of cases (27%) the blood was checked after post exposure prophylaxis (PEP), 4 were clinical suspect cases and in 53 cases no reason for the investigation was given. This amount of testing slightly rose compared to the previous year. 100 animals were tested for rabies at the national reference laboratory (Swiss Rabies Center) in 2014, none of which were positive. The samples most frequently originated from dogs (66%), cats (12%), foxes (18%) and bats (12%). 44 dog and 2 cat samples originated from illegal imported animals from rabies risk countries. Additionally, 1285 sera of dogs and cats were tested in the context of travelling procedures in order to detect the level of neutralising antibodies. This was in the range of the previous years. Compared to the number of cat and dog sera tested before 2012 the number stayed much lower. The decrease since 2012 was associated with the fact that the blood test for travelling to England, Ireland and Scandinavia was no longer mandatory for domestic rabies free countries like Switzerland.

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

Switzerland and its neighboring countries were free from European fox rabies in 2014. Due to ongoing immunization campaigns the situation in Europe further improved compared to 2013. Close collaboration with neighboring countries is important especially with regards to control measures in wild animals. Dogs and cats are illegal imported from rabies risk countries regularly. In Switzerland, 44 dogs and 2 cats were detected in 2014. None of these 46 animals were rabies cases. However, illegal imported rabies cases into the EU were reported in the past (the last ones in the EU occurred in 2013 in Spain, Germany and France, see http://www.who-rabies-bulletin.org/About_Rabies/Imported/Animals.aspx, the last one in Switzerland was reported 2003). They pose a certain risk for pets and their owners in the EU and Switzerland and lead to timely investigations, euthanisation of contact animals, post exposure prophylaxis (PEP) and prophylactic vaccinations. Also bat rabies (like the ones in 1992, 1993 and 2002) can be a source of infection. Especially in North- and South-America the prevalence of rabies virus in the bat population is quite high. Travelling to countries with rabies can pose a threat to people, especially if they are unaware of this risk. Human infections of tourists (who usually are not vaccinated against rabies) in rabies countries were reported in the past. In 2014, one man from France died after exposition in Mali and one woman from the Netherlands, after being bitten by an infected stray dog in India. In Switzerland, the last imported human case occurred in 2012, after being bitten by an infected bat in California). Thus, people travelling into rabies risk countries/areas should be better informed.

Recent actions taken to control the zoonoses

Rabies in animals is a disease to be eradicated (TSV, Art. 3, Art. 142-149). 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. Vaccination of dogs is recommended (and common), but not mandatory. (Re-)Import conditions for cats, dogs and ferrets were implemented in 2003 and adapted in 2004 according to the EU regulation 998/2003/EC. Animals with suspect symptoms originating from countries with urban rabies are tested for rabies. Furthermore, the recent situation in the neighboring countries and the EU is closely monitored.

Additional information

[1] Diagnostic/analytical methods used: All tests 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.ivv.unibe.ch/content/diagnostics/swiss_rabies_center/_ [3] http://www.promedmail.org/direct.php?id=20130623.1787886 _ [4] http://www.gideononline.com/tag/rabies/ _ [5] http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20474 _[6] http://www.who-rabies-bulletin.org/ [7] Further information can be found on the FSVO website www.blv.admin.ch.

3.8.2 Lyssavirus (rabies) in animals

3.8.2.1 Lyssavirus (rabies) in animal - 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 and 142-149). 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.

3.9 Q-FEVER

3.9.1 General evaluation of the national situation

3.9.1.1 Coxiella (Q-fever) - general evaluation

History of the disease and/or infection in the country

A big outbreak occurred back in 1983 when 12 flocks of sheep apparently shedding Coxiella (C.) burnetii were descending from mountain pastures. During this outbreak over 400 human cases were registered. Most of them lived close to the roads where the sheep passed through. From 1989 to 1991, 32 to 52 human cases were reported per year. Mandatory notification was discontinued in 1999 as the number of reported cases decreased. After a small outbreak in 2012 notification of Q-fever was reintroduced in November 2012 (ordinance of the Federal Department of Home Affairs (FDHA) on medical doctor and laboratory reporting). In 2005-2006 various foodstuff (bovine, ovine, caprine milk and egg shells) where screened for C. burnetii using PCR. In 4.7% (N=359) bovine milk samples C. burnetii could be detected, corresponding to 8 from 27 (29.6%) farms. 504 egg shells, 81 resp. 39 samples from 13 sheep resp. 39 goat farms tested negative [2]. In 2007, 49,5% (N=872) bulk tank milk samples, each representing one farm, were positive using a different PCR method with a higher sensitivity. The prevalence of C. burnetii in bovine bulk tank milk was estimated to be between 30% and 50% [3]. Coxiellosis in animals is notifiable (TSV, Article 5: disease to be monitored). Abortions in cattle after three months of pregnancy and every abortion in sheep, goats and pigs have to be reported to a veterinarian. If more than one animal in a holding of ruminants aborts within the space of four months, or if an abortion occurs in a dealers stable or during alpine pasturing, cattle, sheep and goats undergo laboratory investigation. If clinically suspected cases are confirmed by a laboratory, the cantonal veterinarian is notified. At the beginning of the 1990s numbers per year were high with about 100 reported cases a year. Numbers then steadily declined to about 40 cases per year from 1996 to 2005. Since 2006 coxiellosis reports rose again to above 60 cases per year, reaching a new peak in 2012 with 86 cases. In the past 10 years (2005-2014) the average of case reports was 68 per year (Min: 40, Max: 86). Affected were mainly cattle (85%), while in goats (10%) and sheep (5%) only sporadic cases were reported. The seroprevalence of the pathogen is estimated about 30% in cattle and about 13% in sheep and goats (data from the Swiss reference laboratory). In 2011 a herd seroprevalence of coxiellosis was 11% in goat farms (N=72) and 5% in sheep farms (N=100). At animal level the seroprevalence was 3.5% in goats (11/321) and 1.8% in sheep (9/500). In 97 collected abortion samples (43 from goats and 54 from sheep) the bacterial load was quantified by real-time PCR. In 13.4% of the tested samples a high amount of >104 bact/mg placenta was detected.

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

In 2014, 44 human cases were reported with a notification rate of 0.5 per 100000 inhabitants. As Q-Fever was not notifiable since 1999, this notification rate cannot be compared to the recent situation. However, the number of reports was comparable low, suggesting that at least cases with severe clinical symptoms are not that frequent. The last outbreak occurred from February to August 2012. 17 human Q-Fever cases were registered in the canton of Vaud, of which 10 people were hospitalised. In 12 cases an epidemiological link could be established to an infected sheep herd with roughly 200 sheep. Only 4 cases lived next to this sheep herd, most other patients came from the surrounding area. 2014 58 cases of coxiellosis in ruminants (54 in cattle, 3 in goats and 1 in sheep) were reported to the FSVO by cantonal veterinarians. This is the lowest number of reports since 2006. As usual, mainly cases among cattle were reported. In veterinary diagnostic laboratories 3831 tests for Coxiella spp. were carried out in the context of clinical investigations. Samples were derived from cattle (91%), sheep and goats (each 4%).

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

Coxiella burnetii as a cause of abortions seems to be more frequent in cattle. However, infected cattle are less dangerous for humans than infected sheep and goats. Although the seroprevalence of C. burnetii in the Swiss small ruminant population is rather low, Q-fever in small ruminants remains under certain epidemiological circumstances a public health threat.

Recent actions taken to control the zoonoses

Due to the outbreak in 2012 Q-Fever in humans is again notifiable since November 2012. Efforts to intensify disease awareness, to motivate farmers to send abortion material to the laboratories for further investigation as well as to improve knowledge how to avoid infections are ongoing.

Additional information

[1] Metzler AE et al., 1983: Distribution of Coxiella burnetii: a seroepidemiological study of domestic animals and veterinarians [in German]. Schweizer Archiv fr Tierheilkunde, 125, 507-517._ [2] Fretz, R., Schaeren, W., Tanner, M., Baumgartner, A., 2007: Screening of various foodstuffs for occurrence of Coxiella burnetii in Switzerland. Int J Food Microbiol 116, 414-418._ [3] Baumgartner, A., Niederhauser, I., Schaeren, W. 2011: Occurrence of Coxiella burnetii DNA in bulk tank milk samples in Switzerland. Archiv fr Lebensmittelhygiene 62, 200-204._ [4] Further information can be found on the FSVO website www.blv.admin.ch.

3.10 CYSTICERCOSIS, TAENIOSIS

3.10.1 Cysticerci in animals

3.10.1.1 Cysticerci spp., unspecified in animal

Monitoring system

Sampling strategy

Cattle, small ruminants and swine are inspected at slaughter for lesions of Cysticerci. According to the ordinance of 23 November 2005 on hygiene in the slaughter process (VhyS; SR 817.190.1), all cattle older than 6 months must be checked with incisions into the jaw muscles and heart.

Measures in case of the positive findings or single cases

Carcasses with few lesions are frozen, carcasses with massive lesions condemned.

Notification system in place

Cysticercosis in animals is not notifiable. However, data on carcasses with massiv lesions which needed to be condemned due to cyticerci during meat inspection according to the ordinance of 23 November 2005 on hygiene in the slaughter process (VhyS; SR 817.190.1) are documented in the FLEKO (meat inspection statistics), however without precise species diagnosis. No data exist on carcasses with few lesions which need to be frozen.

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

Intestinal Taenia infections in humans are occasionally treated in Switzerland, but no prevalence has so far been recorded. No autochthon cases of cysticercosis caused by T. solium are known, but single imported cases do occur in humans. Numbers of carcasses condemned due to massive lesions of cyticerci were constant since 2006. As data on cases with few lesions are not gathered in the Fleko, general data are lacking to describe the whole picture. A modeled prevalence in dairy cows was recently estimated to be 16.5% [3]. A case-control study in 2005/2006 considered the risk of infection for bovines to be primarily dependent on external factors: pastures bordering a railway line, the location of the pasture close to a recreational area with parking spaces and leisure activities, farmyard visitors and raw feed that has been bought to be statistically significant risk factors. In heavily infected cases, other aspects may also play a role, such as not being connected up to the sewage system or the presence of a tapeworm carrier on the farm.

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

The illness for intestinal Taenia saginata infections in humans is mostly of mild character and can be treated. Taenia saginata cysticerci infection in cattle remains an economically important parasitic disease for the livestock industry by affecting food safety. Based on the routine abattoir reports the prevalence of this zoonotic parasite in the cattle population is underestimated. Only a fraction of infected slaughter cattle are identified during meat inspection. The sensitivity of the used methods at slaughter is estimated to be 15.6% (95% CI; 13-21,[3]). The sensitivity could be improved with additional several heart incisions. No autochthon cases of cysticercosis caused by T. solium are known.

Additional information

[1] Fltsch, F. et al: Case-control study to identify risk factors for bovine cysticercosis on farms in Switzerland; Parasitology. 2008 Apr;135 (5):641-6. Epub 2008 Mar 27._ [2] Eichenberger, R.M., Stephan, R., Deplazes, P., 2011. Increased sensitivity for the diagnosis of Taenia saginata cysticercus infection by additional heart examination compared to the EU-approved routine meat inspection. Food Control 22, 989-992._ [3] Eichenberger et al., (2013) Multi-test analysis and model-based estimation of the prevalence of Taenia saginata cysticercus infection in naturally infected dairy cows in the absence of a gold standard reference test. International Journal for Parasitology, 43 (2013) 853859._ [4]. Further information can be found on the FSVO website www.blv.admin.ch.

3.11 WEST NILE VIRUS INFECTIONS

3.11.1 General evaluation of the national situation

3.11.1.1 West Nile Virus - general evaluation

History of the disease and/or infection in the country

WNF in humans is notifiable since 2006 (ordinance of the the Federal Department of Home Affairs (FDHA) on medical doctor and laboratory reporting) and in animals since 2011 (TSV, Article 5: disease to be monitored). Up to date no autochthonous cases in humans or animals were reported in Switzerland.

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

Since 2010 two confirmed, imported human cases were registered by the Federal Office of Public Health (2012: 1x Kosovo; 2013:1x Croatia). 2014 no human cases were reported. Since 2011 never more than 4 suspicious horses were analysed per year: 4 in 2014 and one each in 2013 and 2012, all with negative results. Usually, only a few wild birds found dead were sampled per year (2013: 6), with negative results. In 2014, in the framework of a research project brain samples of 235 wild birds tested negative for WNV. No mass mortality in wild birds was observed, but would also not be expected in Switzerland. In collaboration with Austria and Germany, Austrian sentinel ducks at the lake Constance are tested once a year towards the end of each year for WNV antibodies since 2013. Up to date, no WNV antibodies were found. 466 (2011), 1429 (2012), 605 (2013) pools of mosquitos (Culex, Aedes vexans and Aedes albopictus) from Canton Ticino were WNV-negative. In 36 pools (2012) and 5 pools (2013) non-WNV-Mosquito-Flavivirus were detected. From Canton Geneva 62 (2011) and 214 (2012) pools (only Culex) were negative. Furthermore, 111 mosquito pool samples (Culex, Aedes vexans and Aedes albopictus) collected North of Alps in 2013 were all WNV-negative. In 2014 a research project was conducted to optimize the capture of mosquitos in order to be able to analyse greater numbers.

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

Up to date there were no autochthonous cases of WNF reported. However, it cannot be excluded that WNV is circulating in Switzerland, especially in wild birds and mosquito populations. In Italy cases occurred in new regions which are close to the Swiss border. In eastern Austria, WNV was detected in dead found wild birds 2012, 2013 and 2014.

Recent actions taken to control the zoonoses

Disease awareness in Switzerland was strengthened. Every year the Federal Food Safety and Veterinary Office and the Federal Office of Public Health evaluate the WNF situation, with a special focus on its neighbouring countries. If cases in animals or humans appear, the responsible Federal Offices will inform themselves immediately, as laid down in a concept of how to deal with WNF when it first occurs in Switzerland. A vaccine for horses was approved in 2011. Next WNV analyses of mosquitoes are foreseen for 2016.

Additional information

[1] Engler et al. 2013: European Surveillance for West Nile Virus in Mosquito Populations. Int. J. Environ. Res. Public Health._ [2] Further information can be found on the FSVO website www.blv.admin.ch.

3.12 TOXOPLASMA

3.12.1 General evaluation of the national situation

3.12.1.1 Toxoplasma - 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. Some sporadic human cases have however been reported. In animals, toxoplasmosis is notifiable (TSV, Article 5: disease to be monitored and Article 291). Veterinarians and diagnostic laboratories must report any suspected case of toxoplasmosis to the cantonal veterinarian, who may issue an order for the suspected case to be investigated. In the past ten years (2005-2014) never more than 4 cases per year were recorded. Affected animals were goats (23%), sheep, monkeys and cats (each 14%), kangaroo and lemurs (each 9%), as well as suricates, marmots, birds and other species (each 5%). Infections with Toxoplasma (T.) gondii in meat-producing animals are widespread in Switzerland. 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 ovine 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% [6]. In 2009, again meat from various animal categories was sampled at the slaughterhouse. Using real-time PCR it could be shown that DNA of T. gondii was detectable in 4.7% of bovine, 2.2% of porcine, 2.0% of ovine and 0.7% of wild boar samples [3]. Toxoplasma antibodies were detected in 13% of calves (6/47), 37% of cattle (48/129), 62% of fattening bulls (62/100), 53% of cows (69/130), 14% of fattening pigs (7/50), 13% of free-ranging pigs (13/100), 36% of sows (43/120), 6.7% in wild boars (10/150), 33% of lambs (33/100) and 81% of ewes (121/150) [2]. As the same standardised ELISA was used and various other studies showed 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 DNA-prevalence in meat samples apparent in most species (except sheep) requires cautious interpretation. The difference in prevalence was only significant in calves. The increasing age of the animals was identified as a risk factor for Toxoplasma infection, while the housing conditions (conventional fattening pigs versus free-range pigs) appeared to have no influence on the results of serological testing. 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. In addition, a study in free-ranging alpine ibex revealed very low numbers of Toxoplasma gondii antibody positive ibex [4]. It seems unlikely that alpine ibex are a reservoir for this abortive agent. In order to address another source of human infection, faecal samples of 252 cats were investigated in the same study. Oocysts of T. gondii were found in 0.4% of the specimen. Genotyping of the isolates of the survey from 2009 indicated that all 3 classical genotypes (I, II, III) occur in Switzerland [3]. In general, findings of Toxoplasma oocysts in routine coprology of cats are notifiable. Each year, over 1000 routine coprology of cats are carried out.

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

In 2014, 1 case in animals (one in sheep) was reported by cantonal veterinarians, which was within the range of the past 10 years. In the context of clinical investigations 199 tests for toxoplasmosis were carried out in 2014 in veterinary diagnostic laboratories. 15 for the detection of Toxoplasma antigen (33% each in goats and sheep, 33% in other species) and 184 serological test (70% in cats, 29% in dogs and 1% in goats). No findings of Toxoplasma oocysts in routine coprology of cats (N > 1000) were reported in 2014. There is a risk of exposure in Switzerland both from the consumption of meat and from cats as contaminators of the environment. The results of the last study from 2009 showed, that infections with Toxoplasma gondii in meat-producing animals are widespread in Switzerland and that the risk appears to have increased in the past ten years. The oocyst excretion rate of 0.4 % found in cats may appear low. But when one considers that an infected cat may excrete large quantities of oocysts for up to 20 days, and these can survive for a year or more under favourable conditions (i.e. not too cold, hot or dry) the environmental contamination with T. gondii must not be underestimated.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source 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. Pregnant women are informed about the recommendations from the FOPH to disclaim on raw or insufficient cooked meat and that caution is generally called for when faced with cat faeces (and potentially contaminated surroundings). The serosurveillance of pregnant women for anti-Toxoplasma antibodies has been discontinued since 2009. In non-immune sheep and goats (first-time infection) Toxoplasma gondii is regarded as a major cause of abortion and loss of lambs.

Additional information

[1] Frey CF, Berger-Schoch AE, Hermann DC, Schares G, Mller N, Bernet D, Doherr MG, Gottstein B (2012): Vorkommen und Genotypen von Toxoplasma gondii in der Muskulatur von Schaf, Rind und Schwein sowie im Katzenkot in der Schweiz. Schweiz. Arch. Tierheilk. 154: 251-255 _ [2] Berger-Schoch A.E., Bernet D. et al., (2011a), Toxoplasma gondii in Switzerland: A serosurvey based on meat juice analysis of slaughter pigs, wild boar, sheep and cattle. Zoonoses and Public Health, 58(7):472-8. _ [3] Berger-Schoch A.E., Herrmann D.C. et al., (2011b) Molecular prevalence and genotypes of Toxoplasma gondii in feline faeces (oocysts) and meat from sheep, cattle and pigs in Switzerland. Veterinary Parasitology, 177: 290297. _ [4] Marreros, N. et al. (2011), Epizootiologic investigations of selected abortive agents in free-ranging Alpine ibex (Capra ibex ibex) in Switzerland, J Wildl Dis. 2011 Jul;47(3):530-43. _ [5] Spycher A, Geigy C, Howard J, Posthaus H, Gendron K, Gottstein B, Debache K, Herrmann DC, Schares G, Frey CF (2011). Isolation and genotyping of Toxoplasma gondii causing fatal systemic toxoplasmosis in an immunocompetent 10-year-old cat. J Vet Diagn Invest. 23: 104-108 _ [6] 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. _ [7] Further information can be found on the FSVO website www.blv.admin.ch.

3.13 FRANCISELLA

3.13.1 Francisella in animals

3.13.1.1 F. tularensis in animal

Notification system in place

The biological cycle of F. tularensis is not well understood. To better understand the source of infection as well as the ecology of this bacterium including the maintenance of F. tularensis and its boosting in the environment which are a matter of biological safety, a project aiming to dissect the life cycle of this microorganism sensu lato was performed between 2012 and 2014 at the University of Bern (Paola Pilo: Ecology of Francisella tularensis and its impact on biological safety). Unpublished data of positive animals tested for F. tularensis were: 24 mice, 18 hares, 2 monkeys and 1 stone marten in 2012, 9 hares in 2013 and 4 hares and 2 monkeys in 2014. Furthermore, to obtain more detailed understanding of tick-associated diseases Spiez Laboratory began in 2009 to collect samples of ticks from all over Switzerland in collaboration with NBC Defence Lab 1. It was possible to define six regions (3 in canton ZH, confirming the epidemiological data in humans, where most case were registered in Zrich, and 1 each in St. Gallen, Obwalden and Basel-Landschaft) where there is an increased prevalence of F. tularensis holarctica. Well over 100000 ticks were analysed. Only 0.01 proved to be positive for F. tularensis holarctica. In collaboration with the Robert Koch Institute in Berlin it was possible to cultivate and isolate F. tularensis from positive tick lysates for the first time. The successful cultivation has confirmed the role of ticks as vectors and is prerequisite for the subsequent phylogenetic typing with next generation sequencing methods. To determine the epidemiological connection between tick isolates and human infections more precisely, the genomes of 20 F. tularensis holarctica strains were sequenced (9 human- and 11 tick isolates from 4 different geographic regions). Genome comparison allowed the allocation of the majority (18/20) of the isolates to the Franco-Iberian strain FTNF002-00. This strain occurs primarily in France, Italy and Spain and is also prevalent in Switzerland. Two human isolates indicate a closer kinship to the north-European B.13 strain that is dominant in Scandinavia, Germany and in east-European countries. As far as kinship extent within the 20 sequenced isolates is concerned, it stands out that the geographic origin of tick isolates is reflected in the similarity of their genomes. Such micro-geographic differentiation of F. tularensis is unexpected considering the low mutation rate of the genome and underlines the potential of the method. The high degree of kinship between tick and human isolates confirms the role of ticks as a zoonotic vector.

Results of the investigation

Until 2010, human cases were usually below 10 confirmed cases per year. However, in 2012 there was an increase to 40 confirmed human cases. In 2013 the number of reports dropped slightly to 29 cases. In 2014 it were again 40 cases (0.5 reports per 100000 inhabitants). Most cases were reported in the canton of Zrich, followed by Fribourg and Lucerne. Tick bites represent one of the major infection routes (in 9 of 40 cases in 2012 a tick bite during the incubation period was reported, in 19 of 29 in 2013 and in 8 of 40 in 2014). In 2014, 4 cases in hares and 1 in monkeys were reported in animals by cantonal veterinarians. In the past ten years (2005-2014) it were on average 3 cases per year (Min: 1, Max: 9 cases). In 81% of the cases hares were affected and in 19% monkeys (from zoos). 2012 slightly more cases were detected due to a research project at the University of Bern. 2012, also wild mice which had died in a research barn in the canton of Zurich were tested positive for F. tularensis. The wild mice had free access to go in and out of this barn. None of the researchers from the research barn in the canton of Zurich developed tularemia and there was no link to any of the human cases reported in the canton of Zrich.

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

Tularemia in humans is sporadic. However, since 2012 more cases were reported than the years before. This might be due to an increased disease awareness (i.e. information on the FOPH (Federal Office of Public Health) website was reviewed and an article on Tularemia was published) as well as improved diagnostic methods (use of PCR for confirmation). Voluntary testing of wild animals found dead or hunted is clearly a big challenge of the monitoring in place. Results of the passive surveillance in wild animals need to be considered as rather poor and inconsistent. It can only be concluded, that tularemia is present in the Swiss wild hare population.

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

Tularemia affects mainly wild animals, especially hares and rodents but also zoo animals. Sources of infection for humans are contact to wild animals (mainly mice and hares), bites of ticks or insects as well as the inhalation of dust/aerosol and contaminated water or food. Those at risk are mainly gamekeepers, hunters, people who work in agriculture or forestry, wild animal veterinary practitioners and laboratory staff.

Additional information

[1] Further information can be found on the FSVO website www.blv.admin.ch, the FOPH website www.bag.admin.ch or the website of Spiez laboratory http://www.labor-spiez.ch/en/the/bs/enthebsnant.htm .

4 ANTIMICROBIAL RESISTANCE INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

4.1 SALMONELLOSIS

4.1.1 Salmonella in animals

4.1.1.1 Antimicrobial resistance in Salmonella Cattle (bovine animals)

Description of sampling designs

Salmonella infections in animals are notifiable (TSV, Art. 222 - 227). Isolates must be sent to the reference laboratory for further typing. All S. Typhimurium, S. Enteritidis and all monophasic S. Typhimurium were submitted to susceptibility testing.

Sampling strategy used in monitoring

Frequency of the sampling

Not applicable

Type of specimen taken

Clinical samples

Stratification procedures per animal populations and food categories

Not applicable

Randomisation procedures per animal populations and food categories

Not applicable

Methods of sampling (description of sampling techniques)

Different depending on disease.

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

A micro-dilution method (Sensititre-System, MCS-Diagnostics) was used for susceptibility testing including the following antimicrobials : ampicillin, azithromycin, cefotaxime, ceftazidime, chloramphenicol, ciprofloxacin, colistin, gentamicin, meropenem, nalidixic acid, sulfamethoxazol, tetracycline, tigecyclin, trimethoprim

Cut-off values used in testing

Resistance was defined following the epidemiological cut-off values published by the European Committee on Antimicrobial Susceptibility Testing (EUCAST).

Preventive measures in place

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

Control program/mechanisms

The control program/strategies in place

None

Recent actions taken to control the zoonoses

A strategy to combat antibiotic resistance is under development. It will encompass all the action fields of the different sectors (regulatory, prudent use, surveillance, research, control in hospitals etc.) with the long-term objective to ensure the effectiveness of antimicrobials for humans and animals in order to preserve their health.

Suggestions to the European Union for the actions to be taken

None

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

23 Salmonella spp. isolates from cattle of different holdings were available for susceptibility testing. 10 S. Typhimurium, 11 monophasic S. Typhimurium and 2 S. Enteritidis were available. All monophasic S. Typhimurium were resistant to tetracycline and 9 (81.8%) to ampicillin and sulfamethoxazol . 3 S. Typhimurium isolates (30%) were resistant to ampicillin, chloramphenicol, sulfamethoxazol and tetracycline. All S. Enteritidis were fully susceptible to all tested antimicrobials.

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. No resistances against third-generation cephalosporins were 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. As salmonella prevalence and resistance rates are low, relevance of beef as transmitter of resistant salmonella to humans is estimated to be small.

Additional information

Further information can be found in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2014) on the FSVO website www.blv.admin.ch

4.1.1.2 Antimicrobial resistance in Salmonella Poultry, unspecified

Description of sampling designs

Samples were collected from clinical material or were taken in the framework of the control programme for Salmonella in poultry (TSV, Art.4 and Art. 255-256).

Sampling strategy used in monitoring

Frequency of the sampling

Not applicable

Type of specimen taken

Clinical samples / samples taken in the framework of the control programme for Salmonella

Stratification procedures per animal populations and food categories

Not applicable

Randomisation procedures per animal populations and food categories

Not applicable

Methods of sampling (description of sampling techniques)

Not applicable

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

A micro-dilution method (Sensititre-System, MCS-Diagnostics) was used for susceptibility testing including the following antimicrobials : ampicillin, azithromycin, cefotaxime, ceftazidime, chloramphenicol, ciprofloxacin, colistin, gentamicin, meropenem, nalidixic acid, sulfamethoxazol, tetracycline, tigecyclin, trimethoprim

Cut-off values used in testing

Resistance was defined following the epidemiological cut-off values published by the European Committee on Antimicrobial Susceptibility Testing (EUCAST).

Preventive measures in place

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

Control program/mechanisms

The control program/strategies in place

None

Recent actions taken to control the zoonoses

A strategy to combat antibiotic resistance is under development. It will encompass all the action fields of the different sectors (regulatory, prudent use, surveillance, research, control in hospitals etc.) with the long-term objective to ensure the effectiveness of antimicrobials for humans and animals in order to preserve their health.

Suggestions to the European Union for the actions to be taken

None

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

19 Salmonella spp. isolates from different poultry holdings were available for susceptibility testing. 8 S. Typhimurium, 9 S. Enteritidis, 2 monophasic S. Typhimurium. All S. Enteritidis isolates were fully susceptible against all tested antimicrobials. 1 S. Typhimurium was resistant to ampicillin, colistin, sulfamethoxazol and tetracycline and both monophasic S. Typhimurium were resistant to ampicillin, sulfamethoxazol and tetracycline.

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. No resistances against third-generation cephalosporins were 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 and from control programme in poultry are used for AMR-Monitoring. As salmonella prevalence and resistance rates in Swiss poultry are very low, relevance of Swiss poultry products as transmitter of resistant salmonella to humans is estimated to be small.

Additional information

Further information can be found in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2014) on the FSVO website www.blv.admin.ch

4.2 CAMPYLOBACTERIOSIS

4.2.1 Campylobacter in animals

4.2.1.1 Antimicrobial resistance in Campylobacter jejuni and coli in Poultry, unspecified

Description of sampling designs

Sampling took place in the framework of an active monitoring programme on antimicrobial resistance in food-producing animals. The number of samples to be collected was calculated in order to obtain at least 170 C. jejuni isolates, given the prevalence of C. jejuni in broilers is 35%.

Sampling strategy used in monitoring

Frequency of the sampling

The samples were taken evenly distributed over the year, in order to exclude seasonal effects, around 40 samples per month.

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. Specification of suspect colonies was carried out using Matrix-assisted laser desorption/ionization time of flight mass spectrometry (MALD TOF MS) (Burker Daltonics).

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.

Stratification procedures per animal populations and food categories

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.

Randomisation procedures per animal populations and food categories

In total 2465 cloacal swabs (5 from each batch) from 493 slaughter batches of broilers were randomly collected evenly throughout the year by official samplers. Day and number of samples per day were defined in a sampling plan. Each herd should be sampled only once per year.

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 used for detection for resistance

Antimicrobials included in monitoring

A micro-dilution method (Sensititre-System, MCS-Diagnostics) was used for susceptibility testing, including the following antimicrobials: 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 European Committee on Antimicrobial Susceptibility Testing (EUCAST).

Preventive measures in place

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

Control program/mechanisms

The control program/strategies in place

None

Recent actions taken to control the zoonoses

A strategy to combat antibiotic resistance is under development. It will encompass all the action fields of the different sectors (regulatory, prudent use, surveillance, research, control in hospitals etc.) with the long-term objective to ensure the effectiveness of antimicrobials for humans and animals in order to preserve their health.

Suggestions to the European Union for the actions to be taken

None

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

159 C. jejuni and 15 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. 47.78% of the C. jejuni isolates and 26.7% of the C. coli isolates were fully susceptible to all tested antimicrobials. One C. jejuni isolate and three C. coli isolates were resistant to both, ciprofloxacin and erythromycin.

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 and erythromycin in C. jejuni. The prevalence of resistance to ciprofloxacin in C. jejuni significantly increased from about 15% in 2006 to 45.9% in 2014. The Number of C. coli isolates is too small to be able to make reliable conclusions on trends

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

Consumption of poultry meat has increased in the last years up to 11.92 kg per person in 2014, which corresponds to 23% of total meat consumption. About 45% 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 favourable 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

Further information can be found in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2014) on the FSVO website www.blv.admin.ch

4.3 ESCHERICHIA COLI, NON-PATHOGENIC

4.3.1 Escherichia coli, non-pathogenic in foodstuffs

4.3.1.1 Antimicrobial resistance in E.coli, non-pathogenic, unspecified

Description of sampling designs

Sampling took place in the framework of an active monitoring programme on antimicrobial resistance. A random sample of 319 packages of fresh broiler meat was sampled in supermarkets, discounters and butcher shops throughout Switzerland by official samplers.

Sampling strategy used in monitoring

Frequency of the sampling

Sampling took place from April to November, with 5 to 12 samples per week.

Type of specimen taken

Packages of fresh poultry meat without skin, at least 50g.

Stratification procedures per animal populations and food categories

Samples were collected in all Swiss cantons and the number of samples was proportionate to the population of the cantons. They were taken in different retailers proportionate to their market share. According to sales data, two thirds of the samples had to come from domestic and one third from foreign production.

Randomisation procedures per animal populations and food categories

Samples were randomly collected according to a sampling plan. Only one sample per batch had to be taken.

Methods of sampling (description of sampling techniques)

Packages of poultry meat were cooled and sent immediately to the Laboratory.

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

For detection of EBSL- or AmpC and carbapenemase producing E. coli a pre-enrichment step, followed by inoculation on McConkey agar containing a third-generation cephalosporin in aselective concentration was used, in accordance with the protocol for the isolation of ESBL, AmpC and carbapenemase producing E. coli from fresh meat of the EU Reference Laboratory for Antimicrobial Resistance. From each selective plate, a single colony from those showing a unique color an morphology as described in the manufacturers product documentation was further identified to species level wit Vitek2 system on AST-GN38 cards.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

A micro-dilution method (Sensititre-System, MCS-Diagnostics) was used for susceptibility testing including the following antimicrobials: ampicillin, azithromycin, cefotaxime, ceftazidime, chloramphenicol, ciprofloxacin, colistin, gentamicin, meropenem, nalidixic acid, sulfamethoxazol, tetracycline, tigecyclin, trimethoprim; cefepime, cefotaxime/clavulanic acid (1:4), cefoxitin / clavulanic acid (1:4), ceftazidime, ertapenem, imipenem, meropenem, temocillin

Cut-off values used in testing

Whenever possible the epidemiological cut-off values according to EUCAST were used. For azithromycin a cut-off value of >16 and for temocillin a cut-off value of >32 was 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.

Control program/mechanisms

The control program/strategies in place

A strategy to combat antibiotic resistance is under development. It will encompass all the action fields of the different sectors (regulatory, prudent use, surveillance, research, control in hospitals etc.) with the long-term objective to ensure the effectiveness of antimicrobials for humans and animals in order to preserve their health.

Recent actions taken to control the zoonoses

None

Suggestions to the European Union for the actions to be taken

None

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

Prevalence of ESBL/AmpC producing E. coli in broiler meat in general was 73.3% (95% CI 68.1-78.1%). Prevalence in imported meat was 85.5%, in domestic meat 65.5%. Beside resistance to beta-lactam-antimicrobials high to very high resistance rates were found to sulphonamides (53.4%), tetracycline (42.7%) and (fluoro)-quinolones (48.7% and 40.9%, respectively). Resistance rates to azithromycin and colistin were low, no resistance was found to temocillin and tigecyclin. No carbapenemase producing E. coli isolate was found.

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

Prevalence of ESBL/AmpC producing E. coli on fresh broiler meat is similar to that found in former studies. It is higher than in broiler herds at slaughter. This could indicate contamination and spreading during processing of the meat.

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

ESBL or AmpC producing E. coli can be found frequently in meat derived from broilers. However it is of note that selective isolation methods were used and therefore very low levels of contamination could be detected.

Additional information

Further information can be found in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2014) on the FSVO website www.blv.admin.ch

4.3.2 Escherichia coli, non-pathogenic in animals

4.3.2.1 Antimicrobial resistance in E.coli, non-pathogenic, unspecified

Sampling strategy used in monitoring

Frequency of the sampling

A random sample of 493 broiler herds was sampled at slaughter using cloacal swabs. The slaughter plants included in the programme account for > 95% of the total broiler production 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 evenly collected throughout the year in the framework of a permanent national monitoring programme on antimicrobial resistance in Swiss food-producing animals. 205 of these samples (determined in advance by a sampling plan) were tested with unselective methods for E.coli and 297 samples were screened for ESBL/AmpC producers by selective methods.

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 positive sample 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

Unselective method: Samples were cultured for E. coli within 72 h after sampling using standard microbiological procedures. Selective method: For detection of EBSL- or AmpC and carbapenemase producing E. coli a pre-enrichment step, followed by inoculation on McConkey agar containing a third-generation cephalosporin in a selective concentration was used, in accordance with the protocol for detection of EBSL- or AmpC and carbapenemase producing E. coli from ceacal samples of the EU Reference Laboratory for Antimicrobial Resistance. From each selective plate, a single colony from those showing a unique color and morphology as described in the manufacturers product documentation was further identified to species level with Vitek2 system on AST-GN38 cards.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Whenever possible the epidemiological cut-off values according to EUCAST were used. For azithromycin a cut-off value of >16 and for temocillin a cut-off value of >32 was used.

Antimicrobials included in monitoring

A micro-dilution method (Sensititre-System, MCS-Diagnostics) was used for susceptibility testing. All E.coli isolate (unselective and selective method) were tested with the following panel of antimicrobials : ampicillin, azithromycin, cefotaxime, ceftazidime, chloramphenicol, ciprofloxacin, colistin, gentamicin, meropenem, nalidixic acid, sulfamethoxazol, tetracycline, tigecyclin, trimethoprim; All E. coli isolates identified through the selective plating, as well as all those randomly selected isolates of E. coli that,, after testing with the first panel of antimicrobials were found to be resistantto cefotaxime, ceftazidime or meropenem, were further tested with a the following panel ofantimicrobials: cefepime, cefotaxime, cefoxitin, ceftazidime, ertapenem, imipenem, meropenem, temocillin, cefotaxime/clavulanic acid (1:4), cefoxitin / clavulanic acid (1:4),

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.

Control program/mechanisms

Recent actions taken to control the zoonoses

None

Recent actions taken to control the zoonoses

A strategy to combat antibiotic resistance is under development. It will encompass all the action fields of the different sectors (regulatory, prudent use, surveillance, research, control in hospitals etc.) with the long-term objective to ensure the effectiveness of antimicrobials for humans and animals in order to preserve their health.

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

200 E. coli isolated with unselective methods were subjected to susceptibility testing. 43.3% of these were sensitive to all tested antimicrobials. High levels of resistance were found for ampicillin, ciprofloxacin, nalidixic acid , sulfamethoxazol und tetracycline, with resistance rates between 22.5% and 33.5%. With the unselective culture method 6 E. coli were found to be resistant to third-generation cephalosporins (3%), whereas with selective methods 124 isolates were detected (41.8%). These isolates showed additionally to beta-lactam resistance high to very high resistance rates to ciprofloxacin, nalidixic acid, sulfamethoxazole, tetracycline and trimethoprim, with resistance rates between 30.6% and 62.1%. No carbapenemase producing E. coli isolates were found.

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

Prevalence of resistance to ciprofloxacin and nalidixic acid showed a significant increasing trend in isolates from broilers from 2006 to 2012 and now markedly decreased from 46% in 2012 to 32% in 2014. Decreasing trends over the last 3 to 4 years are also seen for ampicillin, sulfamethoxazole and tetracycline. With unselective methods prevalence of E. coli with resistance to third generation cephalosporins was very low. With selective methods a higher prevalence could be detected (41.8%) and it was significantly higher than last year (27.7%).

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

The occurrence of ESBL/AmpC producing E. coli in Switzerland found with unselective methods is low. With selective methods, the occurence is higher because of the higher sensitivity of the method. Although thorough cooking kills any bacteria present on food and appropriate kitchen hygiene can prevent cross-contamination, it is desirable that resistance rates to antimicrobials important to human medicine are absent or very low in zoonotic organisms. To assess the public health relevance to E. coli isolates resistant to third generation cephalosporins, these isolates have to be characterized more detailed by molecular methods and compared to clinical and subclinical isolates from humans.

Additional information

Further information can be found in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2014) on the FSVO website www.blv.admin.ch

4.4 ENTEROCOCCUS, NON-PATHOGENIC

4.4.1 Enterococcus, non-pathogenic in animals

4.4.1.1 Antimicrobial resistance in Enterococcus spp., unspecified

Sampling strategy used in monitoring

Frequency of the sampling

A random sample of 493 broiler herds was sampled at slaughter using cloacal swabs. The slaughter plants included in the programme account for > 95% of the total broiler production 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 evenly collected throughout the year in the framework of a permanent national monitoring programme on antimicrobial resistance in Swiss food-producing animals. 350 of these samples (randomly selected in advance by a sampling plan) were tested for Enterococci.

Type of specimen taken

Cloacal swabs

Methods of sampling (description of sampling techniques)

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

A micro-dilution method (Sensititre-System, MCS-Diagnostics) was used for susceptibility testing, including the following antimicrobials: ampicillin, chloramphenicol, ciprofloxacin, daptomycin*, erythromycin, gentamicin, linezolid, quinupristin/dalfopristin**,teicoplanin* tetracycline, tigecyclin*, vancomycin (* 89 E. faecalis / ** only E. faecium)

Cut-off values used in testing

Resistance was defined following the epidemiological cut-off values published by the European Committee on Antimicrobial Susceptibility Testing (EUCAST).

Preventive measures in place

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

Control program/mechanisms

The control program/strategies in place

None

Recent actions taken to control the zoonoses

A strategy to combat antibiotic resistance is under development. It will encompass all the action fields of the different sectors (regulatory, prudent use, surveillance, research, control in hospitals etc.) with the long-term objective to ensure the effectiveness of antimicrobials for humans and animals in order to preserve their health.

Suggestions to the European Union for the actions to be taken

None

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

202 Enterococcus faecalis and 80 Enterococcus faecium isolates from broilers were subjected to susceptibility testing. 31.2% of E. faecalis and 17.5% of E. faecium were sensitive to all tested antimicrobials. E. faecalis showed very high levels of resistance to tetracycline (52%) and tigecyclin (66.3%) and high levels to erythromycin (16.8%). In E. faecium extremely high resistance rates to quinupristin / dalfopristin (75%) and high rates to erythromycin (27.5%) and tetracycline (30%) were found. No resistance to linezolid or vancomycin was observed.

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

In E. faecalis a significant decreasing trend in resistance to tetracycline and erythromycin was observed over the last years. In E. faecium a decreasing trend for Ampicillin was observed.

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

Enterococci in the intestine of food producing animals are considered as a potential reservoir of resistance genes. Decreasing trends in resistance for some antimicrobials have to be confirmed in future surveillance.

Additional information

Further information can be found in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2014) on the FSVO website www.blv.admin.ch

4.5 STAPHYLOCOCCUS AUREUS METICILLIN RESISTANT (MRSA) INFECTION

4.5.1 Staphylococcus in animals

4.5.1.1 Antimicrobial resistance in S. aureus, meticillin resistant (MRSA) Pigs

Sampling strategy used in monitoring

Frequency of the sampling

A random sample of 298 fattening pigs was investigated at slaughter using nasal swabs. The slaughter plants included in the monitoring program accounted for over 70% 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 by the competent authority in the framework of the antimicrobial resistance monitoring. The samples were taken evenly distributed over the year, in order to exclude seasonal effects, around 25 samples per month.

Type of specimen taken

Nasal swabs

Methods of sampling (description of sampling techniques)

Samples were taken using transport swabs (Oxoid Ltd, Basingstoke, England) from the nares of the pigs subsequent to stunning by officials of the Swiss abattoir authorities. They were transported to the laboratory immediately after sampling without cooling.

Procedures for the selection of isolates for antimicrobial testing

From each positive sample one MRSA 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 testes for MRSA using a two-step enrichment followed by a cultivation on chromogenic agar, selective for MRSA (method defined by the EU-RL for Antimicrobial Resistance, The National Food Institute, Lyngby, DENMARK). Confirmation as S. aureus was done by MALDI TOF MS (Bruker Daltonics) und mecA-gene was detected by PCR. Spa-Typing was done, using published methods. (Harmsen et al., 2003).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

A micro-dilution method (Sensititre-System, MCS-Diagnostics) was used for susceptibility testing, including the following antimicrobials: cefoxitin, chloramphenicol, ciprofloxacin, clindamycin, erythromycin, fusidate, gentamicin, kanamycin, linezolid, mupirocin, oxacillin, penicillin, rifampicin, sulfamethoxazol, streptomycin, tetracycline, tiamulin, trimethoprim, vancomycin

Cut-off values used in testing

Resistance was defined following the epidemiological cut-off values published by the European Committee on Antimicrobial Susceptibility Testing (EUCAST).

Preventive measures in place

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

Control program/mechanisms

The control program/strategies in place

None

Recent actions taken to control the zoonoses

Further epidemiological study on farm prevalence and transmission of MRSA in and between the holdings and during transport are ongoing. A strategy to combat antibiotic resistance is under development. It will encompass all the action fields of the different sectors (regulatory, prudent use, surveillance, research, control in hospitals etc.) with the long-term objective to ensure the effectiveness of antimicrobials for humans and animals in order to preserve their health.

Suggestions to the European Union for the actions to be taken

None

Measures in case of the positive findings or single cases

None

Notification system in place

None

Results of the investigation

MRSA prevalence in fattening pigs was 26.5% (95%CI 21.6-31.9%). 57 isolates belonged to the genotype CC398-t034, 19 to the genotype CC398-t011. All isolates showed resistance to beta-lactam antibiotics and tetracycline. 28 isolates belonging to the most commonly detected genotype CC 398-t034 shared an identical resistance profile. They showed resistance to -lactams , tetracycline, macrolides, lincosamides, trimethoprim, pleuromutilins, streptomycin and quinupristin/dalfopristin. 16 additional isolates were resistant to all these antimicrobials except streptomycin.

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

MRSA prevalence in fattening pigs has significantly increased over the last years. It was 2.2% (95%CI 0.9-3.9) in 2009 and had a threefold increase in 2010 and 2011 reaching 5.9% (95% CI 3.8-8.7) and 5.6% (95% CI 3.6 - 8.4), respectively. Prevalence in 2012 reached 18.1% (95% CI 14.7-22.2) and further increased to 26.5% (95% CI 21.6 - 31.9%) in 2014. The marked increase is manly due to a spread of a single clone of CC398-t034 within the Swiss population of fattening pigs.

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, although it is known, that livestock-associated MRSA only rarely causes human infections. People in close contact with animals have been shown to have a higher risk of carrying MRSA. Nevertheless, a significant decrease in MRSA rates in humans in Switzerland was observed during the last ten years from 12.7% in 2004 to 5% in 2013.

Additional information

Further information can be found in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2014) on the FSVO website www.blv.admin.ch

5 FOODBORNE OUTBREAKS

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

5.1 Outbreaks

5.1.1 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 (version January 1 2014). 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 caseoriented 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 Bullet in. The surveillance of food-borne infectious agents follows the mandatory system. The laboratories arerequired 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 January 1 2009. Basically, the responsibility for outbreak investigations lies with the cantonal authorities. Relevant data of food-borne outbreaks are reported to the Federal Food Safety and Veterinary Office (FSVO) (formerly FOPH) in a standardized format as soon as the investigations are accomplished. On request, the FSVO and FOPH offer the cantons their 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, respectively the FSVO and FOPH, have the duty to supervise the enforcement of the concerned legislations. 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 concerned federal offices can conduct their own epidemiological investigations in cooperation with national reference laboratories. In the field of food-borne diseases the Federal Offices are supported by the National Centre for Enteropathogenic Bacteria and Listeria (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.

Description of the types of outbreaks covered by the reporting:

The outbreaks were categorised according to the Manual for reporting of food-borne outbreaks in accordance with Directive 2003/99/EC from the year 2011.

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 the number of outbreaks decreased continuously since the mid 1980 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 settings 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.

Descriptions of single outbreaks of special interest

Of particular interest was a listeriosis outbreak due to contaminated pre-cut and ready-to-eat salad (see Food Control 57 (2015), 14-17). This type of product has a high presence on the market and can be considered to be on a high level of safety. However, the registered outbreak showed that Listeria monocytogenes can pose a risk under certain circumstances and that critical points along the production line need to be carefully addressed. Worth to be mentioned is also an outbreak caused by an artisanal cheese made from goat milk. There was strong evidence that human cases of intoxication were caused by the non-classical toxins SEG and SEI (see toxins 7 (2015), 997-1004).

Control measures or other actions taken to improve the situation

In Switzerland, the number of outbreaks settled down on low level and it is therefore difficult to get a further decrease.

ANIMAL POPULATION TABLES

Table Susceptible animal population

		Population		
Animal species	**Category of animals**	**holding**	**animal**	**slaughter animal (heads)**
Cattle (bovine animals)	Cattle (bovine animals) (not specified)	38,504	1,573,540	649,357
Gallus gallus (fowl)	Gallus gallus (fowl) - breeding flocks, unspecified (not specified)	1,520	154,059	
	Gallus gallus (fowl) - broilers (not specified)	1,083	6,799,127	64,631,746
	Gallus gallus (fowl) - laying hens (not specified)	17,262	3,785,782	
Goats	Goats (not specified)	5,728	83,319	33,953
Pigs	Pigs (not specified)	7,455	1,502,461	2,742,721
Sheep	Sheep (not specified)	8,599	399,591	218,896
Solipeds, domestic	Solipeds, domestic (not specified)	8,375	51,282	2,897
Turkeys	Turkeys - fattening flocks (not specified)	315	50,432	

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

Region	Total number of herds	Number of infected herds	Number of herds with status officially free	Number of animals positive in microbiological testing under investigations of suspect cases	Number of animals tested by micriobiology under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of animals serologically tested under investigations of suspect cases	Number of infected herds tested under surveillance	Number of animals tested under surveillance	Number of herds tested under surveillance	Total number of animals
Schweiz/Suisse/ Svizzera	14,327	0	14,327	0	1	0	0	264	0	12,481	1,159	482,910

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

Region	Total number of herds	Number of infected herds	Number of herds with status officially free	Number of animals positive in microbiological testing under investigations of suspect cases	Number of animals tested by micriobiology under investigations of suspect cases	Number of animals positive to BST under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of animals serologically tested under investigations of suspect cases	Number of abortions due to Brucella abortus	Number of isolations of Brucella infections	Number of notified abortions whatever cause	Number of infected herds tested under surveillance by bulk milk	Number of animals or pools tested under surveillance by bulk milk	Number of herds tested under surveillance by bulk milk	Number of infected herds tested under surveillance	Number of animals tested under surveillance	Number of herds tested under surveillance	Total number of animals
Schweiz/Suisse/ Svizzera	38,504	0	38,504	0	0	0	0	0	4,572	0	0	4,015	0	0	0	0	0	0	1,573,540

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

Region	Total number of herds	Number of infected herds	Number of herds with status officially free	Number of animals detected positive in bacteriological examination	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals tested with tuberculin routine testing	Interval between routine tuberculin tests	Total number of animals
Schweiz/Suisse/ Svizzera	38,504	1	38,503	1	265	6,147	0	1,573,540

Table BRUCELLA in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Alpine chamois - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	3	0	Brucella - Brucella spp., unspecified	0
Hares - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	1	Brucella - B. suis	1
Pigs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	13	0	Brucella - Brucella spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Budgerigars - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	4	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Cats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	681	19	Campylobacter - C. jejuni	10
				Campylobacter - C. upsaliensis	7
				Campylobacter - Thermophilic Campylobacter spp., unspecified	2
Cattle (bovine animals) - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	38	14	Campylobacter - C. hyointestinalis	2
				Campylobacter - C. jejuni	4
				Campylobacter - Thermophilic Campylobacter spp., unspecified	8
Chinchillas - pet animal - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Deer - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Dogs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1203	161	Campylobacter - C. coli	1
				Campylobacter - C. jejuni	61
				Campylobacter - C. lari	3
				Campylobacter - C. upsaliensis	36
				Campylobacter - Thermophilic Campylobacter spp., unspecified	60
Elephants - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Ferrets - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	4	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Gallus gallus (fowl) - broilers - Slaughterhouse - Switzerland - animal sample - cloacal swab - Monitoring - Official sampling - Objective sampling	herd/flock	493	179	Campylobacter - C. coli	16
				Campylobacter - C. jejuni	163
				Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Gallus gallus (fowl) - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	6	2	Campylobacter - C. coli	1
				Campylobacter - C. jejuni	1
				Campylobacter - Thermophilic Campylobacter spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Goats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	7	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Guinea pigs - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	10	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Hedgehogs - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Monkeys - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	30	3	Campylobacter - Thermophilic Campylobacter spp., unspecified	3
Parrots - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	11	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Parrots - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Penguin - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Pigs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	3	1	Campylobacter - C. coli	1
				Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Polecats - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Rabbits - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	12	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Rats - pet animal - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Rhinoceros - zoo animal - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Seals - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Sheep - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	5	1	Campylobacter - C. jejuni	1
				Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Snakes - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	9	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Snakes - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Solipeds, domestic - donkeys - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	4	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Solipeds, domestic - horses - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	103	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Turtles - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	5	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Switzerland - food sample - neck skin - Monitoring - HACCP and own check - Objective sampling	batch	10	Gram	171	60	Campylobacter - Thermophilic Campylobacter spp., unspecified	60
	single	10	Gram	15	12	Campylobacter - Thermophilic Campylobacter spp., unspecified	12
Meat from broilers (Gallus gallus) - fresh - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	5	2	Campylobacter - Thermophilic Campylobacter spp., unspecified	2
		25	Gram	93	46	Campylobacter - C. coli	8
						Campylobacter - C. jejuni	23
						Campylobacter - Thermophilic Campylobacter spp., unspecified	15
Meat from broilers (Gallus gallus) - fresh - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	1	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Meat from broilers (Gallus gallus) - fresh - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	209	64	Campylobacter - Thermophilic Campylobacter spp., unspecified	64
		25	Gram	4	2	Campylobacter - Thermophilic Campylobacter spp., unspecified	2
Meat from broilers (Gallus gallus) - fresh - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	172	41	Campylobacter - Thermophilic Campylobacter spp., unspecified	41
		25	Gram	32	9	Campylobacter - Thermophilic Campylobacter spp., unspecified	9
Meat from broilers (Gallus gallus) - fresh - Slaughterhouse - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	96	51	Campylobacter - C. coli	8
						Campylobacter - C. jejuni	28
						Campylobacter - Thermophilic Campylobacter spp., unspecified	15
Meat from broilers (Gallus gallus) - meat preparation - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	58	25	Campylobacter - Thermophilic Campylobacter spp., unspecified	25
		25	Gram	21	5	Campylobacter - Thermophilic Campylobacter spp., unspecified	5
Meat from broilers (Gallus gallus) - meat products - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	660	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Meat from turkey - carcase - Slaughterhouse - Switzerland - food sample - neck skin - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	13	5	Campylobacter - Thermophilic Campylobacter spp., unspecified	5

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from turkey - fresh - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	4	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Meat from turkey - fresh - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	1	1	Campylobacter - Thermophilic Campylobacter spp., unspecified	1
Meat from turkey - fresh - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	30	10	Campylobacter - Thermophilic Campylobacter spp., unspecified	10
Meat from turkey - fresh - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	3	0	Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Meat from turkey - meat preparation - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	10	Gram	7	2	Campylobacter - Thermophilic Campylobacter spp., unspecified	2

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	N of clinical affected herds	Zoonoses	N of units positive
Alpine chamois - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0		Coxiella (Q-fever) - C. burnetii	0
Cattle (bovine animals) - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	3499	74		Coxiella (Q-fever) - C. burnetii	74
Deer - farmed - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0		Coxiella (Q-fever) - C. burnetii	0
Deer - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0		Coxiella (Q-fever) - C. burnetii	0
Goats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	159	4		Coxiella (Q-fever) - C. burnetii	4
Monkeys - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0		Coxiella (Q-fever) - C. burnetii	0
Pigs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	10	0		Coxiella (Q-fever) - C. burnetii	0
Sheep - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	156	1		Coxiella (Q-fever) - C. burnetii	1
Solipeds, domestic - horses - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0		Coxiella (Q-fever) - C. burnetii	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Badgers - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Echinococcus - Echinococcus spp., unspecified	0
Beavers - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	1	Echinococcus - E. multilocularis	1
				Echinococcus - Echinococcus spp., unspecified	0
Dogs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	5	5	Echinococcus - E. multilocularis	5
Foxes - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	5	1	Echinococcus - Echinococcus spp., unspecified	1
Marten - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Echinococcus - Echinococcus spp., unspecified	0
Monkeys - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	1	Echinococcus - E. multilocularis	1
Pigs - Slaughterhouse - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	7	0	Echinococcus - Echinococcus spp., unspecified	0
Wild boars - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Echinococcus - Echinococcus spp., unspecified	0
Wolves - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	0	Echinococcus - Echinococcus spp., unspecified	0

Table ESCHERICHIA COLI, NON-PATHOGENIC in food

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from sheep - fresh - Border inspection activities - New Zealand - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Cheeses made from cows' milk - hard - Packing centre (not specified) - Switzerland - food sample (not specified) - Monitoring - Industry sampling - Selective sampling	single	25	Gram	62	0	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0
Cheeses made from cows' milk - soft and semi-soft - Packing centre (not specified) - Switzerland - food sample (not specified) - Monitoring - Industry sampling - Selective sampling	single	25	Gram	160	2	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	2
Meat from bovine animals - fresh - Border inspection activities - Argentina - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	4	0	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0
Meat from bovine animals - fresh - Border inspection activities - Australia - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0
Meat from bovine animals - fresh - Border inspection activities - Brazil - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	10	0	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0
Meat from bovine animals - fresh - Border inspection activities - Canada - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	3	0	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0
Meat from bovine animals - fresh - Border inspection activities - Chile - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0
Meat from bovine animals - fresh - Border inspection activities - New Zealand - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0
Meat from bovine animals - fresh - Border inspection activities - United States - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	9	0	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC)	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Beavers - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Francisella - F. tularensis	0
Hares - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	7	2	Francisella - F. tularensis	2
Monkeys - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	1	Francisella - F. tularensis	1

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Cats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	3	0	Listeria - Listeria spp., unspecified	0
Cattle (bovine animals) - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	13	4	Listeria - L. monocytogenes	3
				Listeria - Listeria spp., unspecified	1
Chinchillas - pet animal - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Listeria - Listeria spp., unspecified	0
Dogs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	15	0	Listeria - Listeria spp., unspecified	0
Goats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	1	Listeria - L. monocytogenes	1
				Listeria - Listeria spp., unspecified	0
Pigs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	7	0	Listeria - Listeria spp., unspecified	0
Sheep - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	6	5	Listeria - L. monocytogenes	1
				Listeria - Listeria spp., unspecified	4
Solipeds, domestic - horses - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	9	0	Listeria - Listeria spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Method	Zoonoses	N of units tested	N of units positive
Cheeses made from cows' milk - hard - Packing centre (not specified) - Switzerland - food sample (not specified) - Monitoring - Industry sampling - Selective sampling	single	25	Gram	62	0	detection	Listeria - L. monocytogenes	62	0
Cheeses made from cows' milk - hard - Processing plant - Switzerland - food sample (not specified) - Monitoring - Industry sampling - Selective sampling	single	25	Gram	618	1	detection	Listeria - L. monocytogenes	618	1
Cheeses made from cows' milk - soft and semi-soft - Packing centre (not specified) - Switzerland - food sample (not specified) - Monitoring - Industry sampling - Selective sampling	single	25	Gram	160	0	detection	Listeria - L. monocytogenes	160	0
Cheeses made from cows' milk - soft and semi-soft - Processing plant - Switzerland - food sample (not specified) - Monitoring - Industry sampling - Selective sampling	single	25	Gram	1340	1	detection	Listeria - L. monocytogenes	1,340	1
Fish - raw - Border inspection activities - Australia - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	>100	Listeria - L. monocytogenes	1	0
						<= 100	Listeria - L. monocytogenes	1	0
Fish - raw - Border inspection activities - Japan - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	>100	Listeria - L. monocytogenes	2	0
						<= 100	Listeria - L. monocytogenes	2	0
Fish - raw - Border inspection activities - Malaysia - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	>100	Listeria - L. monocytogenes	2	0
						<= 100	Listeria - L. monocytogenes	2	0
Fish - raw - Border inspection activities - Sri Lanka - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	>100	Listeria - L. monocytogenes	2	0
						<= 100	Listeria - L. monocytogenes	2	0
Fish - raw - Border inspection activities - Viet Nam - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	9	0	>100	Listeria - L. monocytogenes	9	0
						<= 100	Listeria - L. monocytogenes	9	0
Fish - smoked - Border inspection activities - United States - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	>100	Listeria - L. monocytogenes	1	0
						<= 100	Listeria - L. monocytogenes	1	0
Fishery products, unspecified - ready-to-eat - Border inspection activities - New Zealand - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	>100	Listeria - L. monocytogenes	1	0
						<= 100	Listeria - L. monocytogenes	1	0
Fishery products, unspecified - ready-to-eat - Border inspection activities - United States - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	>100	Listeria - L. monocytogenes	1	0
						<= 100	Listeria - L. monocytogenes	1	0

Table LYSSAVIRUS (RABIES) in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Badgers - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Lyssavirus (rabies) - Lyssavirus (unspecified virus)	0
Bats - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	12	0	Lyssavirus (rabies) - European Bat Lyssavirus - unspecified	0
Cats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	12	0	Lyssavirus (rabies) - Lyssavirus (unspecified virus)	0
Dogs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	54	0	Lyssavirus (rabies) - Lyssavirus (unspecified virus)	0
Foxes - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	18	0	Lyssavirus (rabies) - Lyssavirus (unspecified virus)	0
Polecats - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Lyssavirus (rabies) - Lyssavirus (unspecified virus)	0
Squirrels - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Lyssavirus (rabies) - Lyssavirus (unspecified virus)	0

Table MYCOBACTERIUM in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Cats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	3	1	Mycobacterium - M. microti	1
				Mycobacterium - Mycobacterium spp., unspecified	0
Deer - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	4	0	Mycobacterium - Mycobacterium spp., unspecified	0
Elephants - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	10	0	Mycobacterium - Mycobacterium spp., unspecified	0
Goats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium - Mycobacterium spp., unspecified	0
Pigs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	9	0	Mycobacterium - Mycobacterium spp., unspecified	0
Sheep - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	3	0	Mycobacterium - Mycobacterium spp., unspecified	0
Solipeds, domestic - horses - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium - Mycobacterium spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Total units tested	Total units positive	Zoonoses	N of units positive
Beavers - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Budgerigars - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	3	0	Salmonella - Salmonella spp., unspecified	0
Canary - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Cats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	679	11	Salmonella - Salmonella spp., unspecified	11
Cattle (bovine animals) - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1355	298	Salmonella - S. Typhimurium	2
						Salmonella - Salmonella spp., unspecified	296
Chinchillas - pet animal - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	2	0	Salmonella - Salmonella spp., unspecified	0
Crows - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	4	0	Salmonella - Salmonella spp., unspecified	0
Deer - farmed - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	3	0	Salmonella - Salmonella spp., unspecified	0
Deer - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Deer - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	2	0	Salmonella - Salmonella spp., unspecified	0
Dogs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1092	11	Salmonella - Salmonella spp., unspecified	11
Ducks - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Eagle - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Elephants - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	2	0	Salmonella - Salmonella spp., unspecified	0
Ferrets - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	5	0	Salmonella - Salmonella spp., unspecified	0
Finches - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	2	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - broilers - Farm (not specified) - Switzerland - animal sample - organ/tissue - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock	1053	N	5	4	Salmonella - S. Enteritidis	4
Gallus gallus (fowl) - broilers - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	1053	N	557	1	Salmonella - S. 13,23:i:-	1
						Salmonella - S. Braenderup	1
						Salmonella - S. Bredeney	1
						Salmonella - S. Idikan	1
						Salmonella - S. Infantis	1
						Salmonella - S. Lexington	1
						Salmonella - S. Senftenberg	1
						Salmonella - S. Tennessee	1

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Total units tested	Total units positive	Zoonoses	N of units positive
Gallus gallus (fowl) - broilers - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	1053	N	557	1	Salmonella - S. Typhimurium	1
						Salmonella - S. Welikade	1
					2	Salmonella - S. Schwarzengrund	2
					3	Salmonella - S. Enteritidis	3
					4	Salmonella - S. Albany	4
Gallus gallus (fowl) - broilers - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	1053	Y	614	4	Salmonella - S. Enteritidis	4
						Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - broilers - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	1053	N	57	1	Salmonella - S. Chester	1
					2	Salmonella - S. Enteritidis	2
Gallus gallus (fowl) - laying hens - Farm (not specified) - Switzerland - animal sample - organ/tissue - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock	1084	N	5	1	Salmonella - S. Enteritidis	1
Gallus gallus (fowl) - laying hens - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	1084	N	862	1	Salmonella - S. Idikan	1
						Salmonella - S. Schwarzengrund	1
					2	Salmonella - S. Mbandaka	2
						Salmonella - S. Typhimurium	2
					4	Salmonella - S. Enteritidis	4
Gallus gallus (fowl) - laying hens - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	1084	Y	927	1	Salmonella - S. Enteritidis	1
						Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - laying hens - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	1084	N	375	1	Salmonella - S. Enteritidis	1
Gallus gallus (fowl) - laying hens - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	1084	N	246	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	75	N	18	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	75	Y	67	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	75	N	25	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	75	N	47	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	75	N	59	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	55	N	34	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	55	Y	44	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	55	N	10	0	Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	55	N	24	0	Salmonella - Salmonella spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Total units tested	Total units positive	Zoonoses	N of units positive
Gallus gallus (fowl) - parent breeding flocks for egg production line - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	55	N	15	0	Salmonella - Salmonella spp., unspecified	0
Goats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	41	0	Salmonella - Salmonella spp., unspecified	0
Guinea pigs - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	10	0	Salmonella - Salmonella spp., unspecified	0
Hedgehogs - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	3	0	Salmonella - Salmonella spp., unspecified	0
Mice - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	4	0	Salmonella - Salmonella spp., unspecified	0
Monkeys - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	34	0	Salmonella - Salmonella spp., unspecified	0
Other carnivores - zoo animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Otter - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Owls - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Parrots - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	13	1	Salmonella - Salmonella spp., unspecified	1
Parrots - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	3	0	Salmonella - Salmonella spp., unspecified	0
Penguin - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	2	0	Salmonella - Salmonella spp., unspecified	0
Pheasants - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Pigeons - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	4	0	Salmonella - Salmonella spp., unspecified	0
Pigs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	126	4	Salmonella - Salmonella spp., unspecified	4
Polecats - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Rabbits - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	19	0	Salmonella - Salmonella spp., unspecified	0
Rats - pet animal - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Reptiles - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	16	2	Salmonella - Salmonella spp., unspecified	2
Reptiles - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	11	3	Salmonella - Salmonella spp., unspecified	3
Rhinoceros - zoo animal - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	1	0	Salmonella - Salmonella spp., unspecified	0
Seals - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	4	0	Salmonella - Salmonella spp., unspecified	0
Sheep - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	79	7	Salmonella - Salmonella spp., unspecified	7

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Total units tested	Total units positive	Zoonoses	N of units positive
Snakes - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	15	4	Salmonella - S. Enteritidis	1
						Salmonella - Salmonella spp., unspecified	3
Snakes - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	22	11	Salmonella - Salmonella spp., unspecified	11
Solipeds, domestic - donkeys - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	7	0	Salmonella - Salmonella spp., unspecified	0
Solipeds, domestic - horses - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	221	4	Salmonella - S. Enteritidis	2
						Salmonella - Salmonella spp., unspecified	2
Turkeys - fattening flocks - Farm (not specified) - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	49	Y	42	1	Salmonella - S. Indiana	1
						Salmonella - Salmonella spp., unspecified	0
Turtles - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	7	0	Salmonella - Salmonella spp., unspecified	0
Turtles - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	6	1	Salmonella - Salmonella spp., unspecified	1
Zoo animals, all - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal		NA	21	0	Salmonella - Salmonella spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Cheeses made from cows' milk - hard - Packing centre (not specified) - Switzerland - food sample (not specified) - Monitoring - Industry sampling - Selective sampling	single	25	Gram	62	0	Salmonella - Salmonella spp., unspecified	0
Cheeses made from cows' milk - soft and semi-soft - Packing centre (not specified) - Switzerland - food sample (not specified) - Monitoring - Industry sampling - Selective sampling	single	25	Gram	160	0	Salmonella - Salmonella spp., unspecified	0
Crustaceans - unspecified - Border inspection activities - Viet Nam - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Fish - raw - Border inspection activities - Australia - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Fish - raw - Border inspection activities - Japan - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Fish - raw - Border inspection activities - Malaysia - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Fish - raw - Border inspection activities - Viet Nam - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	9	0	Salmonella - Salmonella spp., unspecified	0
Meat from bovine animals - fresh - Border inspection activities - Argentina - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	4	0	Salmonella - Salmonella spp., unspecified	0
Meat from bovine animals - fresh - Border inspection activities - Australia - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Meat from bovine animals - fresh - Border inspection activities - Brazil - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	10	0	Salmonella - Salmonella spp., unspecified	0
Meat from bovine animals - fresh - Border inspection activities - Canada - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	3	0	Salmonella - Salmonella spp., unspecified	0
Meat from bovine animals - fresh - Border inspection activities - Chile - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Meat from bovine animals - fresh - Border inspection activities - New Zealand - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Meat from bovine animals - fresh - Border inspection activities - United States - food sample (not specified) - Monitoring - Official sampling - Selective sampling	single	25	Gram	9	0	Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Switzerland - food sample - neck skin - Monitoring - HACCP and own check - Objective sampling	batch	25	Gram	257	2	Salmonella - S. Infantis	1
						Salmonella - S. Mbandaka	1
						Salmonella - Salmonella spp., unspecified	0
	single	25	Gram	15	0	Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - fresh - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	122	0	Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - fresh - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	46	0	Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - fresh - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	batch	25	Gram	4	0	Salmonella - Salmonella spp., unspecified	0
	single	25	Gram	168	0	Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - fresh - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	batch	25	Gram	34	1	Salmonella - Salmonella spp., unspecified	1

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from broilers (Gallus gallus) - fresh - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	128	1	Salmonella - S. Mbandaka	1
						Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - fresh - Slaughterhouse - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	215	0	Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - meat preparation - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	batch	25	Gram	76	0	Salmonella - Salmonella spp., unspecified	0
	single	25	Gram	346	1	Salmonella - Salmonella spp., unspecified	1
Meat from broilers (Gallus gallus) - meat products - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	660	0	Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - mechanically separated meat (MSM) - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	465	1	Salmonella - S. Agona	1
						Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - minced meat - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	35	0	Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - minced meat - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	batch	25	Gram	58	0	Salmonella - Salmonella spp., unspecified	0
	single	25	Gram	200	0	Salmonella - Salmonella spp., unspecified	0
Meat from turkey - carcase - Slaughterhouse - Switzerland - food sample - neck skin - Monitoring - HACCP and own check - Objective sampling	batch	25	Gram	130	0	Salmonella - Salmonella spp., unspecified	0
	single	25	Gram	13	0	Salmonella - Salmonella spp., unspecified	0
Meat from turkey - fresh - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	4	0	Salmonella - Salmonella spp., unspecified	0
Meat from turkey - fresh - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Meat from turkey - fresh - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	25	0	Salmonella - Salmonella spp., unspecified	0
Meat from turkey - fresh - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Meat from turkey - meat preparation - Processing plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	6	0	Salmonella - Salmonella spp., unspecified	0
Meat from turkey - mechanically separated meat (MSM) - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	65	0	Salmonella - Salmonella spp., unspecified	0
Meat from turkey - minced meat - Cutting plant - Switzerland - food sample - meat - Monitoring - HACCP and own check - Objective sampling	single	25	Gram	45	0	Salmonella - Salmonella spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Compound feedingstuffs for cattle - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	173	2	Salmonella - Salmonella spp., unspecified	2
Compound feedingstuffs for fish - final product - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for horses - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for pigs - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	61	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	77	2	Salmonella - Salmonella spp., unspecified	2
Compound feedingstuffs for rabbits - final product - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	5	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for sheep - final product - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	4	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs, not specified - final product - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	3	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs, not specified - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	3	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - maize derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - maize derived - Feed mill - Non European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	49	4	Salmonella - Salmonella spp., unspecified	4
Feed material of cereal grain origin - maize derived - Feed mill - Unknown - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - other cereal grain derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - other cereal grain derived - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - wheat derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - wheat derived - Feed mill - Non European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - wheat derived - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	4	0	Salmonella - Salmonella spp., unspecified	0
Feed material of land animal origin - dairy products - Feed mill - Non European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of land animal origin - dairy products - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	28	0	Salmonella - Salmonella spp., unspecified	0
Feed material of marine animal origin - fish meal - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	8	0	Salmonella - Salmonella spp., unspecified	0
Feed material of marine animal origin - fish meal - Feed mill - Non European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of marine animal origin - fish meal - Feed mill - Unknown - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - Non European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Unknown - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	3	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	14	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Non European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	57	2	Salmonella - Salmonella spp., unspecified	2
Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Unknown - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	8	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Premixtures - final product - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Cheeses made from cows' milk - soft and semi-soft - Packing centre (not specified) - Switzerland - food sample (not specified) - Monitoring - Industry sampling - Selective sampling	single	25	Gram	108	0	Staphylococcal enterotoxins - Enterotoxin, unspecified	0

Table STAPHYLOCOCCUS AUREUS METICILLIN RESISTANT (MRSA) in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Pigs - fattening pigs - Slaughterhouse - Switzerland - animal sample - nasal swab - Monitoring - Official sampling - Objective sampling	animal	298	79	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	1
				Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t011	19
				Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034	57
				Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t208 - spa-type t208	1
				Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t899	1

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from broilers (Gallus gallus) - fresh - Retail - Austria - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	7	0	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0
Meat from broilers (Gallus gallus) - fresh - Retail - Brazil - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	1	0	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0
Meat from broilers (Gallus gallus) - fresh - Retail - France - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	17	1	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0
						Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t032	1
Meat from broilers (Gallus gallus) - fresh - Retail - Germany - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	58	18	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0
						Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t011	3
						Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034	13
						Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t571	1
						Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t899	1
Meat from broilers (Gallus gallus) - fresh - Retail - Hungary - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	18	1	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0
						Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034	1
Meat from broilers (Gallus gallus) - fresh - Retail - Italy - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	2	0	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0
Meat from broilers (Gallus gallus) - fresh - Retail - Netherlands - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	3	0	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0
Meat from broilers (Gallus gallus) - fresh - Retail - Slovenia - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	19	0	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0
Meat from broilers (Gallus gallus) - fresh - Retail - Switzerland - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	194	2	Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from broilers (Gallus gallus) - fresh - Retail - Switzerland - food sample - meat - Monitoring - Official sampling - Objective sampling	batch	25	Gram	194	2	Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t032	2

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Alpine chamois - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Toxoplasma - T. gondii	0
Camels - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Toxoplasma - T. gondii	0
Cats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	129	0	Toxoplasma - Toxoplasma spp., unspecified	0
Dogs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	53	0	Toxoplasma - Toxoplasma spp., unspecified	0
Foxes - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Toxoplasma - T. gondii	0
Goats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	0	Toxoplasma - Toxoplasma spp., unspecified	0
Goats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	5	0	Toxoplasma - T. gondii	0
Hedgehogs - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Toxoplasma - T. gondii	0
Monkeys - zoo animal - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Toxoplasma - T. gondii	0
Sheep - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	5	1	Toxoplasma - T. gondii	1

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Badgers - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Trichinella - Trichinella spp., unspecified	0
Foxes - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Trichinella - Trichinella spp., unspecified	0
Lynx - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	10	4	Trichinella - T. britovi	1
				Trichinella - Trichinella spp., unspecified	3
Pigs - Slaughterhouse - Switzerland - animal sample (not specified) - Surveillance - Official sampling - Census	animal	2539670	0	Trichinella - Trichinella spp., unspecified	0
Solipeds, domestic - horses - Slaughterhouse - Switzerland - animal sample (not specified) - Surveillance - Official sampling - Census	animal	2492	0	Trichinella - Trichinella spp., unspecified	0
Wild boars - wild - Hunting - Switzerland - animal sample (not specified) - Unspecified - Not applicable - Census	animal	1713	0	Trichinella - Trichinella spp., unspecified	0
Wolves - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	1	Trichinella - Trichinella spp., unspecified	1

Table WEST NILE VIRUS in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Vaccination status	Total units tested	Total units positive	Zoonoses		N of units positive
Birds - wild - Unspecified - Switzerland - animal sample (not specified) - Unspecified - Not applicable - Not specified	animal	No	235	0		West Nile virus	0
Solipeds, domestic - horses - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	Unknown	3	0		West Nile virus	0
Solipeds, domestic - horses - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	Unknown	1	0		West Nile virus	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Beavers - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia - Yersinia spp., unspecified	0
Budgerigars - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	3	0	Yersinia - Yersinia spp., unspecified	0
Cats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	637	1	Yersinia - Yersinia spp., unspecified	1
Cattle (bovine animals) - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	23	0	Yersinia - Yersinia spp., unspecified	0
Chinchillas - pet animal - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia - Yersinia spp., unspecified	0
Deer - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	1	Yersinia - Y. enterocolitica	1
Dogs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1011	16	Yersinia - Yersinia spp., unspecified	16
Elephants - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia - Yersinia spp., unspecified	0
Gallus gallus (fowl) - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	3	0	Yersinia - Yersinia spp., unspecified	0
Goats - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	7	0	Yersinia - Yersinia spp., unspecified	0
Guinea pigs - pet animals - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	10	0	Yersinia - Yersinia spp., unspecified	0
Hedgehogs - wild - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia - Yersinia spp., unspecified	0
Penguin - zoo animals - Zoo - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia - Yersinia spp., unspecified	0
Pigs - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	3	0	Yersinia - Yersinia spp., unspecified	0
Sheep - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	4	0	Yersinia - Yersinia spp., unspecified	0
Solipeds, domestic - donkeys - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	4	0	Yersinia - Yersinia spp., unspecified	0
Solipeds, domestic - horses - Unspecified - Switzerland - animal sample (not specified) - Clinical investigations - Not applicable - Not specified	animal	102	0	Yersinia - Yersinia spp., unspecified	0

Foodborne Outbreaks: summarized data

		Outbreak strenght	Strong				Weak			
Causative agent	**Food vehicle**		**N outbreaks**	**N human cases**	**N hospitalized**	**N deaths**	**N outbreaks**	**N human cases**	**N hospitalized**	**N deaths**
Bacillus - B. cereus	Other foods		1	41	4	0				
Campylobacter - Campylobacter spp., unspecified	Meat and meat products		1	5	2	0				
Listeria - L. monocytogenes - L. monocytogenes serovar 4b	Vegetables and juices and other products thereof		1	31	0	4				
Salmonella - S. Bovismorbificans	Vegetables and juices and other products thereof		1	23	0	0				
Salmonella - S. Szentes	Vegetables and juices and other products thereof		1	11	0	0				
Staphylococcal enterotoxins	Cheese		1	5	0	0				
Staphylococcal enterotoxins - Enterotoxin A	Cheese		1	15	0	0				
Unknown	Mixed food						3	38	2	0
Viruses	Meat and meat products						1	3	1	0

Causative agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Bacillus - B. cereus		General	Other foods	Gratin de pâtes + sauce béchamel	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Canteen or workplace catering	Canteen or workplace catering	Switzerland	Storage time/temperature abuse		1	41	4	0
Campylobacter - Campylobacter spp., unspecified		General	Meat and meat products	Table grill with raw poultry meat	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Switzerland	Cross-contamination		1	5	2	0
Listeria - L. monocytogenes - L. monocytogenes serovar 4b		General	Vegetables and juices and other products thereof	Pre-cut salad	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans	Household	Processing plant	Switzerland	Cross-contamination		1	31	0	4
Salmonella - S. Bovismorbificans		General	Vegetables and juices and other products thereof	Sprouts	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Processing plant	Germany	Unknown		1	23	0	0
Salmonella - S. Szentes		General	Vegetables and juices and other products thereof	Sprouts	Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans	Household	Processing plant	Switzerland	Unknown		1	11	0	0

Causative agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Staphylococcal enterotoxins		General	Cheese	Semi-hard cheese from goat milk	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Household	Processing plant	Switzerland	Unknown	Staphylococcal enterotoxins - Enterotoxin G and I (no code available)	1	5	0	0
Staphylococcal enterotoxins - Enterotoxin A		General	Cheese	Tomme soft cheese	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	School or kindergarten	School or kindergarten	Switzerland	Storage time/temperature abuse		1	15	0	0

Weak Foodborne Outbreaks: detailed data

Causative agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Unknown		General	Mixed food	Kebab	Descriptive epidemiological evidence	Take-away or fast-food outlet	Take-away or fast-food outlet	Switzerland	Unknown		1	2	2	0
				Salad with sauce	Descriptive epidemiological evidence	School or kindergarten	School or kindergarten	Switzerland	Unknown		1	30	0	0
				Spaghetti sauce	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Switzerland	Unknown		1	6	0	0
Viruses		General	Meat and meat products	Frying sausage	Descriptive epidemiological evidence	Take-away or fast-food outlet	Unknown	Switzerland	Unknown		1	3	1	0

Table Antimicrobial susceptibility testing of Campylobacter - C. coli in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - cloacal swab

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Fluoroquinolones - Ciprofloxacin	Macrolides - Erythromycin	Quinolones - Nalidixic acid	Tetracyclines - Tetracycline
	ECOFF	**2**	**4**	**16**	**0.5**	**8**	**16**	**2**
	Lowest limit	**0.12**	**1**	**2**	**0.06**	**0.5**	**2**	**0.25**
	Highest limit	**16**	**16**	**32**	**4**	**32**	**64**	**16**
	N of tested isolates	**15**	**15**	**15**	**15**	**15**	**15**	**15**
MIC	**N of resistant isolates**	**0**	**7**	**0**	**6**	**3**	**6**	**5**
<=0.06					3			
<=0.12		1						
0.12					4			
<=0.25								1
0.25		5			2			
<=0.5						4		
0.5		9						6
<=1			3					
1						1		1
2			5			5		2
4				7	1	2	3	
>4					5			
8				7			5	
16			1	1		1	1	
>16			6					5
>32						2		
>64							6	

Table Antimicrobial susceptibility testing of Campylobacter - C. jejuni in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - cloacal swab

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Fluoroquinolones - Ciprofloxacin	Macrolides - Erythromycin	Quinolones - Nalidixic acid	Tetracyclines - Tetracycline
	ECOFF	**2**	**4**	**16**	**0.5**	**4**	**16**	**1**
	Lowest limit	**0.12**	**1**	**2**	**0.06**	**0.5**	**2**	**0.25**
	Highest limit	**16**	**16**	**32**	**4**	**32**	**64**	**16**
	N of tested isolates	**159**	**159**	**159**	**159**	**159**	**159**	**159**
MIC	**N of resistant isolates**	**2**	**5**	**0**	**73**	**1**	**74**	**43**
<=0.06					27			
<=0.12		46						
0.12					52			
<=0.25								62
0.25		82			6			
<=0.5						34		
0.5		29			1			45
<=1			151					
1					1	61		9
<=2				32			10	
2			3			49		2
4		2		110		14	61	
>4					72			
8				17			14	
16			1					1
>16			4					40
>32						1		
>64							74	

Table Antimicrobial susceptibility testing of Salmonella - S. Enteritidis in Gallus gallus (fowl) (not specified)

Sampling Stage: Farm (not specified)

Sampling Type: unknown

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	**2**	**16**	**0.125**	**0.5**	**2**	**0.064**	**1**	**16**	**8**	**2**	**16**	**256**	**8**	**2**
	Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
	Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
	N of tested isolates	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03				9											
0.03							7								
0.06							1								
<=0.25					9			8							8
<=0.5		9				9									
0.5								1							1
<=1										6	2				
<=2														9	
2										3	7				
<=4												9			
4									2						
<=8			9												
8									7						
32													5		
64													3		
128													1		

Sampling Stage: Farm (not specified)

Sampling Type: unknown

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	**2**	**16**	**0.125**	**0.5**	**2**	**0.064**	**1**	**16**	**8**	**2**	**16**	**256**	**8**	**2**
	Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
	Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03				1											
0.06							1								
<=0.25					1			1							1
<=0.5		1				1									
<=1										1					
<=2														1	
2											1				
<=4												1			
<=8			1												
8									1						
32													1		

Sampling Stage: Farm (not specified)

Sampling Type: unknown

Sampling Context: Clinical investigations

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	**2**	**16**	**0.125**	**0.5**	**2**	**0.064**	**1**	**16**	**8**	**2**	**16**	**256**	**8**	**2**
	Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
	Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03				1											
<=0.25					1			1							1
<=0.5		1				1									
<=2														1	
2										1	1				
<=4												1			
<=8			1												
8									1						
64													1		

Sampling Stage: Farm (not specified)

Sampling Type: unknown

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	**2**	**16**	**0.125**	**0.5**	**2**	**0.064**	**1**	**16**	**8**	**2**	**16**	**256**	**8**	**2**
	Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
	Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
	N of tested isolates	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**	**1**	**1**	**0**
<=0.015							3								
<=0.03				4											
0.03							3								
0.06				3			1								
<=0.25					7			5							7
<=0.5		7				7									
0.5								2							
<=1										4	1				
<=2														6	
2										2	3				
<=4												7			
4									7		1				
<=8			7												
8											2				
64													5		
>64										1				1	
256													1		
>1024													1		

Sampling Stage: Farm (not specified)

Sampling Type: unknown

Sampling Context: Clinical investigations

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	**2**	**16**	**0.125**	**0.5**	**2**	**0.064**	**1**	**16**	**8**	**2**	**16**	**256**	**8**	**2**
	Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
	Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03				1											
<=0.25					1			1							1
<=0.5		1				1									
<=1										1					
<=2														1	
<=4												1			
4									1						
<=8			1												
8											1				
32													1		

Sampling Stage: Farm (not specified)

Sampling Type: unknown

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	**2**	**16**	**0.125**	**0.5**	**2**	**0.064**	**1**	**16**	**8**	**2**	**16**	**256**	**8**	**2**
	Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
	Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
	N of tested isolates	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
MIC	**N of resistant isolates**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**3**	**0**
<=0.015							2								
<=0.03				9											
0.03							7								
<=0.25					9			7							8
<=0.5		8				9									
0.5								2							1
<=1										4	5				
1		1													
<=2														6	
2										2	4				
<=4												8			
4									3						
<=8			6												
8									4			1			
16									2						
32														1	
64													6	2	
>64										3					
>128			3												
>1024													3		

Sampling Stage: Farm (not specified)

Sampling Type: unknown

Sampling Context: Clinical investigations

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	**2**	**16**	**0.125**	**0.5**	**2**	**0.064**	**1**	**16**	**8**	**2**	**16**	**256**	**8**	**2**
	Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
	Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03				1											
<=0.25					1			1							1
<=0.5		1				1									
<=1										1					
<=2														1	
2											1				
<=4												1			
4									1						
<=8			1												
64													1		

Sampling Stage: Farm (not specified)

Sampling Type: unknown

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	**2**	**16**	**0.125**	**0.5**	**2**	**0.064**	**1**	**16**	**8**	**2**	**16**	**256**	**8**	**2**
	Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
	Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**2**	**2**	**0**
<=0.03				2											
0.03							2								
<=0.25					2			1							2
<=0.5		2				2									
0.5								1							
<=1											2				
<=4												2			
4									1						
<=8			2												
8									1						
>64										2				2	
>1024													2		

Sampling Stage: Farm (not specified)

Sampling Type: unknown

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	**2**	**16**	**0.125**	**0.5**	**2**	**0.064**	**1**	**16**	**8**	**2**	**16**	**256**	**8**	**2**
	Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
	Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
	N of tested isolates	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**0**	**0**	**9**	**11**	**0**
<=0.015							2								
<=0.03				11											
0.03							9								
<=0.25					11			8							11
<=0.5		10				11									
0.5								3							
<=1										2	9				
1		1													
2											2				
<=4												11			
4									8						
<=8			11												
8									3						
64													2		
>64										9				11	
>1024													9		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse
Sampling Type: animal sample - cloacal swab
Sampling Context: Monitoring - EFSA specifications
Sampler: Official sampling
Sampling Strategy: Objective sampling
Programme Code: AMR MON pnl2
Analytical Method: Dilution - sensititre
Country of Origin: Switzerland

AM substance	Carbapenems - Ertapenem			Carbapenems - Imipenem			Carbapenems - Meropenem			Cephalosporins - Cefepime			Cephalosporins - Cefotaxime			Cephalosporins - Cefoxitin			Cephalosporins - Ceftazidime			Cephalosporins + ß lactamase inhibitores - Cefotaxime + Clavulanic acid			Cephalosporins + ß lactamase inhibitores - Ceftazidime + Clavulanic acid			Penicillins - Temocillin		
ESBL genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
AMPC genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
CARBAPENEM genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
Cefotaxime synergy test	Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent
ECOFF	0.06	0.06	0.06	0.5	0.5	0.5	0.125	0.125	0.125	0.125	0.125	0.125	0.25	0.25	0.25	8	8	8	0.5	0.5	0.5	0.25	0.25	0.25	0.5	0.5	0.5	32	32	32
Lowest limit	0.015	0.015	0.015	0.12	0.12	0.12	0.03	0.03	0.03	0.06	0.06	0.06	0.25	0.25	0.25	0.5	0.5	0.5	0.25	0.25	0.25	0.06	0.06	0.06	0.12	0.12	0.12	0.5	0.5	0.5
Highest limit	2	2	2	16	16	16	16	16	16	32	32	32	64	64	64	64	64	64	128	128	128	64	64	64	64	64	64	64	64	64
N of tested isolates	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
MIC N of resistant isolates	0	0	0	0	0	0	0	0	0	5	5	5	6	6	6	2	2	2	5	5	5	3	3	3	2	2	2	0	0	0
<=0.015	2	1	2																											
<=0.03							2	1	4																					
0.03			1																											
<=0.06												2										2	1	1						
0.06			1																											
<=0.12				1	1	3																			2	1	1			
<=0.25															1						1									
0.25				1		1						2																		
0.5															1					1				1			1			
1																			2											
2											1										1									2
4										1						2		1									1	2	1	1
8													1	2		1	1				2			2			1			1
16										1																				
32													2																	
64																	2													

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - cloacal swab

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of OriginSwitzerland

MIC	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	2	16	0.125	0.25	0.5	0.064	1	16	8	2	16	64	8	2
	Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
	Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
	N of tested isolates	200	200	200	200	200	200	200	200	200	200	200	200	200	200
	N of resistant isolates	2	6	0	6	5	64	0	1	45	0	67	50	45	24
<=0.015							122								
>=0.03				197											
0.03							9								
0.06				3			5								
0.12							19								
>=0.25					194			187							134
0.25							25								
>=0.5		140				195									
0.5					1		7	13							37
>=1										37	200				
1		56				2									5
>=2									16					153	
2		2				1				65					
>=4												131			
4		2			1		1		119	51				2	
>8					4										
<=8			193										49		
8						1	6		60	2		1			
>8						1	6								
16			1						4			1	53		
32												10	43	2	
>32															24
64												8	5	24	
>64									1	45				19	
128												26			
>128			6									23			
>1024													50		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse | Sampling Type: animal sample - cloacal swab | Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling | Sampling Strategy: Objective sampling | Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of OriginSwitzerland

AM substance	Carbapenems - Ertapenem				Carbapenems - Imipenem			
ESBL genotype	NOT AVAILABLE				NOT AVAILABLE			
AMPC genotype	NOT AVAILABLE				NOT AVAILABLE			
CARBAPENEM genotype	NOT AVAILABLE				NOT AVAILABLE			
Cefotaxime synergy test	Positive/Present		Negative/Absent		Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
ECOFF	0.06	0.06	0.06	0.06	0.5	0.5	0.5	0.5
Lowest limit	0.015	0.015	0.015	0.015	0.12	0.12	0.12	0.12
Highest limit	2	2	2	2	16	16	16	16
N of tested isolates	124	124	124	124	124	124	124	124
MIC N of resistant isolates	22	22	22	22	0	0	0	0
<=0.015	48	14		6				
<=0.03								
0.03	4		1	14				
<=0.06								
0.06	2			13				
<=0.12					31	11		13
0.12		2		18				
0.25				1	22	5		36
0.5					1		1	4
1				1				
2								
4								
8								
16								
32								
>32								
64								
>64								
128								

AM substance	Carbapenems - Meropenem				Cephalosporins - Cefepime			
ESBL genotype	NOT AVAILABLE				NOT AVAILABLE			
AMPC genotype	NOT AVAILABLE				NOT AVAILABLE			
CARBAPENEM genotype	NOT AVAILABLE				NOT AVAILABLE			
Cefotaxime synergy test	Positive/Present		Negative/Absent		Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
ECOFF	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
Lowest limit	0.03	0.03	0.03	0.03	0.06	0.06	0.06	0.06
Highest limit	16	16	16	16	32	32	32	32
N of tested isolates	124	124	124	124	124	124	124	124
MIC N of resistant isolates	0	0	0	0	106	106	106	106
<=0.015								
<=0.03	53	16	1	49				
0.03								
<=0.06								4
0.06	1			3				
<=0.12								
0.12				1	3			11
0.25					9	1		29
0.5					6		1	7
1					4			1
2					2	1		
4					15	7		1
8					9	7		
16					3			
32					2			
>32					1			
64								
>64								
128								

AM substance	Cephalosporins - Cefotaxime				Cephalosporins - Cefoxitin			
ESBL genotype	NOT AVAILABLE				NOT AVAILABLE			
AMPC genotype	NOT AVAILABLE				NOT AVAILABLE			
CARBAPENEM genotype	NOT AVAILABLE				NOT AVAILABLE			
Cefotaxime synergy test	Positive/Present		Negative/Absent		Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
ECOFF	0.25	0.25	0.25	0.25	8	8	8	8
Lowest limit	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5
Highest limit	64	64	64	64	64	64	64	64
N of tested isolates	124	124	124	124	124	124	124	124
MIC N of resistant isolates	124	124	124	124	55	55	55	55
<=0.015								
<=0.03								
0.03								
<=0.06								
0.06								
<=0.12								
0.12								
0.25								
0.5	1	1		3				
1	10							
2	4				8	2		
4	6			12	35	10		
8	2		1	29	9	2		3
16	13	5		7	2			
32	8	8		1			1	14
>32								
64	7	1		1		2		18
>64	3	1						18
128								

AM substance	Cephalosporins - Ceftazidime				Cephalosporins + ß lactamase inhibitores - Cefotaxime + Clavulanic acid			
ESBL genotype	NOT AVAILABLE				NOT AVAILABLE			
AMPC genotype	NOT AVAILABLE				NOT AVAILABLE			
CARBAPENEM genotype	NOT AVAILABLE				NOT AVAILABLE			
Cefotaxime synergy test	Positive/Present		Negative/Absent		Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
ECOFF	0.5	0.5	0.5	0.5	0.25	0.25	0.25	0.25
Lowest limit	0.25	0.25	0.25	0.25	0.06	0.06	0.06	0.06
Highest limit	128	128	128	128	64	64	64	64
N of tested isolates	124	124	124	124	124	124	124	124
MIC N of resistant isolates	113	113	113	113	53	53	53	53
<=0.015								
<=0.03								
0.03								
<=0.06					49	13		
0.06								
<=0.12								
0.12					5	1		
0.25								3
0.5		11						
1	18	3		3				
2	17							3
4	5			9			1	18
8	9	1		24		2		24
16	5	1		14				4
32			1	2				
>32								
64								
>64								1
128				1				

AM substance	Cephalosporins + ß lactamase inhibitores - Ceftazidime + Clavulanic acid				Penicillins - Temocillin			
ESBL genotype	NOT AVAILABLE				NOT AVAILABLE			
AMPC genotype	NOT AVAILABLE				NOT AVAILABLE			
CARBAPENEM genotype	NOT AVAILABLE				NOT AVAILABLE			
Cefotaxime synergy test	Positive/Present		Negative/Absent		Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
ECOFF	0.5	0.5	0.5	0.5	32	32	32	32
Lowest limit	0.12	0.12	0.12	0.12	0.5	0.5	0.5	0.5
Highest limit	64	64	64	64	64	64	64	64
N of tested isolates	124	124	124	124	124	124	124	124
MIC N of resistant isolates	55	55	55	55	0	0	0	0
<=0.015								
<=0.03								
0.03								
<=0.06								
0.06								
<=0.12	42	11						
0.12								
0.25	10	3						
0.5	1			2				
1	1			1				
2				4	4	3		5
4		1	1	21	24	9	1	16
8		1		20	21	4		29
16				4	5			3
32								
>32								
64				1				
>64								
128								

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - cloacal swab

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of OriginSwitzerland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	**2**	**16**	**0.125**	**0.25**	**0.5**	**0.064**	**1**	**16**	**8**	**2**	**16**	**64**	**8**	**2**
Lowest limit	**0.5**	**8**	**0.03**	**0.25**	**0.5**	**0.015**	**0.25**	**2**	**1**	**1**	**4**	**8**	**2**	**0.25**
Highest limit	**32**	**128**	**16**	**4**	**8**	**8**	**8**	**64**	**64**	**16**	**128**	**1024**	**64**	**32**
N of tested isolates	**124**	**124**	**124**	**124**	**124**	**124**	**124**	**124**	**124**	**124**	**124**	**124**	**124**	**124**
MIC **N of resistant isolates**	**0**	**23**	**0**	**124**	**113**	**55**	**0**	**0**	**124**	**0**	**49**	**77**	**65**	**38**
<=0.015						61								
>=0.03			122											
0.03						7								
0.06			1			1								
0.12			1			6								
>=0.25							103							74
0.25						12								
>=0.5	70				11									
0.5				4		10	20							9
>=1										123				
1	50			8	27	4	1							3
>=2								2					57	
2	4			9	16	2				1				
>=4											68			
4				13	12			73					1	
>4				90										
<=8		101										13		
8					29	11		48			5			
>8					29	10								
16								1			2	19		
32		2									1	11	2	
>32														38
64									2		4	4	43	
>64									122				21	
128		2									12			
>128		19									32			
>1024												77		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of Origin:Italy

	AM substance	Carbapenems - Ertapenem		Carbapenems - Imipenem		Carbapenems - Meropenem		Cephalosporins - Cefepime		Cephalosporins - Cefotaxime		Cephalosporins - Ceftiofur		Cephalosporins - Ceftazidime		Cephalosporins + ß lactamase inhibitores - Cefotaxime + Clavulanic acid		Cephalosporins + ß lactamase inhibitores - Ceftazidime + Clavulanic acid		Penicillins - Temocillin	
	ESBL genotype	NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE	
	AMPC genotype	NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE	
	CARBAPENEM genotype	NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE	
	Cefotaxime synergy test	Positive/Present		Positive/Present		Positive/Present		Positive/Present		Positive/Present		Positive/Present		Positive/Present		Positive/Present		Positive/Present		Positive/Present	
	Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
	ECOFF	0.06	0.06	0.5	0.5	0.125	0.125	0.125	0.125	0.25	0.25	8	8	0.5	0.5	0.25	0.25	0.5	0.5	32	32
	Lowest limit	0.015	0.015	0.12	0.12	0.03	0.03	0.06	0.06	0.25	0.25	0.5	0.5	0.25	0.25	0.06	0.06	0.12	0.12	0.5	0.5
	Highest limit	2	2	16	16	16	16	32	32	64	64	64	64	128	128	64	64	64	64	64	64
	N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MIC	N of resistant isolates	0	0	0	0	0	0	2	2	2	2	0	0	0	0	0	0	0	0	0	0
<=0.015		1	1																		
<=0.03						1	1														
<=0.06																1	1				
<=0.12				1														1	1		
0.25					1																
0.5														1	1						
2												1	1								
4								1	1											1	
8																					1
16										1	1										

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin:Italy

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	2	16	0.125	0.25	0.5	0.064	1	16	8	2	16	64	8	2
	Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
	Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
	N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MIC	N of resistant isolates	0	1	0	2	2	2	0	0	2	0	2	2	0	1
	<=0.03			2											
	>=0.25							2							1
	<=0.5	2													
	>=1										2				
	1					2									
	>=2													2	
	4						1		1						
	>4				2										
	<=8		1												
	8						1		1						
	>32														1
	>64									2					
	128		1										1		
	>128											2			
	>1024												1		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail
Sampling Type: food sample - meat
Sampling Context: Monitoring - EFSA specifications
Sampler: Official sampling
Sampling Strategy: Objective sampling
Programme Code: ESBL MON pnl2
Analytical Method: Dilution - sensititre
Country of OriginAustria

AM substance	Carbapenems - Ertapenem			Carbapenems - Imipenem			Carbapenems - Meropenem			Cephalosporins - Cefepime			Cephalosporins - Cefotaxime			Cephalosporins - Cefoxitin			Cephalosporins - Ceftazidime			Cephalosporins + B lactamase inhibitorss - Cefotaxime + Clavulanic acid			Cephalosporins + B lactamase inhibitorss - Ceftazidime + Clavulanic acid			Penicillins - Temocillin		
ESBL genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
AMPC genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
CARBAPENEM genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
Cefotaxime synergy test	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent
Ceftazidime synergy test	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent
ECOFF	0.06	0.06	0.06	0.5	0.5	0.5	0.125	0.125	0.125	0.125	0.125	0.125	0.25	0.25	0.25	8	8	8	0.5	0.5	0.5	0.25	0.25	0.25	0.5	0.5	0.5	32	32	32
Lowest limit	0.015	0.015	0.015	0.12	0.12	0.12	0.03	0.03	0.03	0.06	0.06	0.06	0.25	0.25	0.25	0.5	0.5	0.5	0.25	0.25	0.25	0.06	0.06	0.06	0.12	0.12	0.12	0.5	0.5	0.5
Highest limit	2	2	2	16	16	16	16	16	16	32	32	32	64	64	64	64	64	64	128	128	128	64	64	64	64	64	64	64	64	64
N of tested isolates	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
MIC N of resistant isolates	1	1	1	0	0	0	0	0	0	5	5	5	6	6	6	2	2	2	5	5	5	2	2	2	2	2	2	0	0	0
<=0.015	3	1																												
<=0.03							3	1	2																					
0.03			1																											
<=0.06																						3	1							
<=0.12				3	1																				3	1				
0.12			1									1																		
0.25						2						1																		
0.5																				1										
1										1									2											
2											1					1												1		
4										1			1		1	2					1			1			2	2		2
8										1			1	1	1	1			1		1			1				1		
32													1																	
64																		2												

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of OriginAustria

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.25	0.5	0.064	1	16	8	2	16	64	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	6	6	6	6	6	6	6	6	6	6	6	6	6	6
MIC N of resistant isolates	0	0	0	6	6	3	0	0	6	0	3	5	2	5
<=0.015						2								
>=0.03			6											
0.03						1								
>=0.25							6							
0.25						1								
<=0.5	3													
<=1										6				
1	3				3									1
<=2													4	
>=4											3			
4				1				1						
>=4				5										
<=8		6												
8					3			5						
>8						2								
32												1		
>32														5
>64									6				2	
128											1			
>128											2			
>1024												5		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of OriginNetherlands

	AM substance	Carbapenems - Ertapenem		Carbapenems - Imipenem		Carbapenems - Meropenem		Cephalosporins - Cefepime		Cephalosporins - Cefotaxime		Cephalosporins - Ceftiofur		Cephalosporins - Ceftazidime		Cephalosporins + ß lactamase inhibitores - Cefotaxime + Clavulanic acid		Cephalosporins + ß lactamase inhibitores - Ceftazidime + Clavulanic acid		Penicillins - Temocillin	
	ESBL genotype	NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE	
	AMPC genotype	NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE	
	CARBAPENEM genotype	NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE		NOT AVAILABLE	
	Cefotaxime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
	Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
	ECOFF	0.06	0.06	0.5	0.5	0.125	0.125	0.125	0.125	0.25	0.25	8	8	0.5	0.5	0.25	0.25	0.5	0.5	32	32
	Lowest limit	0.015	0.015	0.12	0.12	0.03	0.03	0.06	0.06	0.25	0.25	0.5	0.5	0.25	0.25	0.06	0.06	0.12	0.12	0.5	0.5
	Highest limit	2	2	16	16	16	16	32	32	64	64	64	64	128	128	64	64	64	64	64	64
	N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MIC	N of resistant isolates	0	0	0	0	0	0	1	1	2	2	1	1	2	2	1	1	1	1	0	0
<=0.015		1	1																		
<=0.03							1														
<=0.06									1							1					
0.06						1															
<=0.12				1	1													1			
0.25								1													
1										1											
2																	1		1	1	
4											1	1			1						1
8														1							
32													1								

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of OriginNetherlands

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	2	16	0.125	0.25	0.5	0.064	1	16	8	2	16	64	8	2
	Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
	Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
	N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MIC	N of resistant isolates	0	1	0	2	2	0	0	0	2	0	0	1	1	0
	<=0.015						2								
	<=0.03			2											
	<=0.25							2							2
	<=0.5	1													
	<=1										2				
	1	1			1										
	<=2													1	
	<=4											2			
	4				1	2			1						
	<=8		1												
	8								1						
	16												1		
	64		1											1	
	>64									2					
	>1024												1		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail | Sampling Type: food sample - meat | Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling | Sampling Strategy: Objective sampling | Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of OriginSlovenia

AM substance	Carbapenems - Ertapenem				Carbapenems - Imipenem				Carbapenems - Meropenem				Cephalosporins - Cefepime				Cephalosporins - Cefotaxime				Cephalosporins - Cefoxitin				Cephalosporins - Ceftazidime				Cephalosporins + ß lactamase inhibitores - Cefotaxime + Clavulanic acid				Cephalosporins + ß lactamase inhibitores - Ceftazidime + Clavulanic acid				Penicillins - Temocillin			
ESBL genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
AMPC genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
CARBAPENEM genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
Cefotaxime synergy test	Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
ECOFF	0.06	0.06	0.06	0.06	0.5	0.5	0.5	0.5	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.25	0.25	0.25	0.25	8	8	8	8	0.5	0.5	0.5	0.5	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	32	32	32	32
Lowest limit	0.015	0.015	0.015	0.015	0.12	0.12	0.12	0.12	0.03	0.03	0.03	0.03	0.06	0.06	0.06	0.06	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.25	0.25	0.06	0.06	0.06	0.06	0.12	0.12	0.12	0.12	0.5	0.5	0.5	0.5
Highest limit	2	2	2	2	16	16	16	16	16	16	16	16	32	32	32	32	64	64	64	64	64	64	64	64	128	128	128	128	64	64	64	64	64	64	64	64	64	64	64	64
N of tested isolates	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
MIC N of resistant isolates	2	2	2	2	0	0	0	0	0	0	0	0	15	15	15	15	17	17	17	17	15	15	15	15	17	17	17	17	15	15	15	15	15	15	15	15	0	0	0	0
<=0.015	1	1		1																																				
<=0.03									1	1	1	13																												
0.03			1	6																																				
<=0.06																													1	1										
0.06				5								1																												
<=0.12					1	1		4																									1							
0.12				2												2																								
0.25							1	10								11																		1						
0.5																1																								
1															1										1	1														
2																						1										1								
4													1	1						4								1			1	3				3		1		2
8																			1	9	1							7				9			1	11	1		1	12
16																	1	1		1				1				6				1								
32																							1	2																
64																								6			1													
>64																								5																

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin:Slovenia

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.25	0.5	0.064	1	16	8	2	16	64	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	17	17	17	17	17	17	17	17	17	17	17	17	17	17
MIC **N of resistant isolates**	1	1	0	17	17	11	0	0	17	0	8	7	4	2
<=0.015						4								
<=0.03			17											
0.03						2								
<=0.25							16							12
0.25						5								
<=0.5	11													
0.5						3	1							3
<=1										17				
1	4				1									
<=2													13	
2	1				1									
<=4											7			
4				5	2			13						
>4				12										
<=8		16										1		
8					5			4			2			
>8					8	3								
16												1		
32												8		
>32	1													2
64									1		1		2	
>64									16				2	
128											3			
>128		1									4			
>1024												7		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail | Sampling Type: food sample - meat | Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling | Sampling Strategy: Objective sampling | Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of OriginSwitzerland

AM substance	Carbapenems - Ertapenem				Carbapenems - Imipenem				Carbapenems - Meropenem			
ESBL genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
AMPC genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
CARBAPENEM genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
Cefotaxime synergy test	Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
ECOFF	0.06	0.06	0.06	0.06	0.5	0.5	0.5	0.5	0.125	0.125	0.125	0.125
Lowest limit	0.015	0.015	0.015	0.015	0.12	0.12	0.12	0.12	0.03	0.03	0.03	0.03
Highest limit	2	2	2	2	16	16	16	16	16	16	16	16
N of tested isolates	126	126	126	126	126	126	126	126	126	126	126	126
MIC N of resistant isolates	7	7	7	7	0	0	0	0	0	0	0	0
<=0.015	51	7		13								
<=0.03									59	7	1	57
0.03	6			32								
<=0.06												
0.06	1		1	8								1
<=0.12					48	6		24				
0.12	1			5								1
<=0.25												
0.25				1	10	1	1	32				
0.5					1			3				
1												
2												
4												
8												
16												
32												
>32												
64												
>64												

AM substance	Cephalosporins - Cefepime				Cephalosporins - Cefotaxime				Cephalosporins - Cefoxitin				Cephalosporins - Ceftazidime			
ESBL genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
AMPC genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
CARBAPENEM genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
Cefotaxime synergy test	Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
ECOFF	0.125	0.125	0.125	0.125	0.25	0.25	0.25	0.25	8	8	8	8	0.5	0.5	0.5	0.5
Lowest limit	0.06	0.06	0.06	0.06	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	0.25	0.25	0.25	0.25
Highest limit	32	32	32	32	64	64	64	64	64	64	64	64	128	128	128	128
N of tested isolates	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MIC N of resistant isolates	75	75	75	75	125	125	125	125	63	63	63	63	121	121	121	121
<=0.015																
<=0.03																
0.03																
<=0.06				8												
0.06																
<=0.12																
0.12	14			29												
<=0.25								1								
0.25	11			18												
0.5	2			2	15			2					1	4		
1	1		1		11			2					21	3		2
2	4	2						8	5	3			28			6
4	14	5		2	2			22	36	4			4			14
8	10				1	2	1	22	14			1	4			31
16	2				11	4		2	4			5				6
32					18	1						30	1			
>32	1															
64											1	18			1	
>64					1							5				

AM substance	Cephalosporins + ß lactamase inhibitores - Cefotaxime + Clavulanic acid				Cephalosporins + ß lactamase inhibitores - Ceftazidime + Clavulanic acid				Penicillins - Temocillin			
ESBL genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
AMPC genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
CARBAPENEM genotype	NOT AVAILABLE				NOT AVAILABLE				NOT AVAILABLE			
Cefotaxime synergy test	Positive/Present		Negative/Absent		Positive/Present		Negative/Absent		Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent	Positive/Present	Negative/Absent
ECOFF	0.25	0.25	0.25	0.25	0.5	0.5	0.5	0.5	32	32	32	32
Lowest limit	0.06	0.06	0.06	0.06	0.12	0.12	0.12	0.12	0.5	0.5	0.5	0.5
Highest limit	64	64	64	64	64	64	64	64	64	64	64	64
N of tested isolates	126	126	126	126	126	126	126	126	126	126	126	126
MIC N of resistant isolates	60	60	60	60	58	58	58	58	0	0	0	0
<=0.015												
<=0.03												
0.03												
<=0.06	54	7										
0.06												
<=0.12					46	4						
0.12	4											
<=0.25												
0.25				1	12	3						
0.5				2				3				
1				5	1			3				
2	1			10				12	3	1		5
4			1	29			1	28	20	5		30
8				12				12	33	1	1	22
16								1	3			2
32												
>32												
64												
>64												

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of OriginSwitzerland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.25	0.5	0.064	1	16	8	2	16	64	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	126	126	126	126	126	126	126	126	126	126	126	126	126	126
MIC N of resistant isolates	2	6	0	125	122	50	0	0	126	0	40	63	61	23
<=0.015						71								
>=0.03			124											
0.03						5								
0.06			2											
0.12						10								
<=0.25				1			103							89
0.25						19								
<=0.5	93				4									
0.5				10		7	23							11
<=1										126				
1	27			18	32	4								3
<=2								8					64	
2	4			10	29									
<=4											78			
4				29	19			68					1	
>4				58										
<=8		119										8		
8	1				33	3		50			7			
>8					9	7								
16		1									1	27		
32									2		5	23	6	
>32	1													23
64									7		6	5	28	
>64									117				27	
128											11			
>128		6									18			
>1024												63		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail
Sampling Type: food sample - meat
Sampling Context: Monitoring - EFSA specifications
Sampler: Official sampling
Sampling Strategy: Objective sampling
Programme Code: ESBL MON pnl2
Analytical Method: Dilution - sensititre
Country of OriginGermany

AM substance	Carbapenems - Ertapenem			Carbapenems - Imipenem			Carbapenems - Meropenem			Cephalosporins - Cefepime			Cephalosporins - Cefotaxime			Cephalosporins - Ceftiofur			Cephalosporins - Ceftazidime			Cephalosporins + ß lactamase inhibitorss - Cefotaxime + Clavulanic acid			Cephalosporins + ß lactamase inhibitorss - Ceftazidime + Clavulanic acid			Penicillins - Temocillin		
ESBL genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
AMPC genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
CARBAPENEM genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
Cefotaxime synergy test	Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent	
Ceftiofur synergy test	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent
ECOFF	0.06	0.06	0.06	0.5	0.5	0.5	0.125	0.125	0.125	0.125	0.125	0.125	0.25	0.25	0.25	8	8	8	0.5	0.5	0.5	0.25	0.25	0.25	0.5	0.5	0.5	32	32	32
Lowest limit	0.015	0.015	0.015	0.12	0.12	0.12	0.03	0.03	0.03	0.06	0.06	0.06	0.25	0.25	0.25	0.5	0.5	0.5	0.25	0.25	0.25	0.06	0.06	0.06	0.12	0.12	0.12	0.5	0.5	0.5
Highest limit	2	2	2	16	16	16	16	16	16	32	32	32	64	64	64	64	64	64	128	128	128	64	64	64	64	64	64	64	64	64
N of tested isolates	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
MIC N of resistant isolates	5	5	5	0	0	0	0	0	0	36	36	36	48	48	48	22	22	22	46	46	46	22	22	22	22	22	22	0	0	0
<=0.015	20	3	4																											
<=0.03							24	3	21																					
0.03	3		11																											
<=0.06												2										21	3							
0.06	1		1																											
<=0.12				12	2	13																			21	2				
0.12			5							2		8										2								
0.25				12	1	7				4		5													2	1				
0.5						1				3		6	1							2										
1										2			5						7	1										
2										2			2		3	1	1		6		1			7		1			1	1
4										9	2		2		8	14	1		3		4	1		5				8	13	1	7
8										2	1		1		7	8	1		3		8			8				7	10	1	12
16													8	3	3				3		7			1				1	1		1
32													4			1		11	2		1										
64													1					5													
>64																		5													

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin:Germany

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.25	0.5	0.064	1	16	8	2	16	64	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	48	48	48	48	48	48	48	48	48	48	48	48	48	48
MIC N of resistant isolates	5	4	0	48	45	27	0	3	48	4	24	31	16	22
<=0.015						17								
<=0.03			46											
0.03						4								
0.06			2											
0.12						4								
<=0.25							43							21
0.25						11								
<=0.5	31				3									
0.5				1		4	5							4
<=1										43				
1	11			3	10	1								1
<=2								3					31	
2	1			11	4					1				
<=4											21			
4				7	9	3		29		1			1	
>4				26										
<=8		43										4		
8					13	2		13		3	2			
>8					9	2								
16	1	1									1	6		
32	1	3						1			3	6	1	
>32	3													22
64								1	6		5	1	3	
>64								1	42				12	
128											9			
>128		1									7			
>1024												31		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail
Sampling Type: food sample - meat
Sampling Context: Monitoring - EFSA specifications
Sampler: Official sampling
Sampling Strategy: Objective sampling
Programme Code: ESBL MON pnl2
Analytical Method: Dilution - sensititre
Country of OriginFrance

AM substance	Carbapenems - Ertapenem			Carbapenems - Imipenem			Carbapenems - Meropenem			Cephalosporins - Cefepime			Cephalosporins - Cefotaxime			Cephalosporins - Cefoxitin			Cephalosporins - Ceftazidime			Cephalosporins + ß lactamase inhibitorss - Cefotaxime + Clavulanic acid			Cephalosporins + ß lactamase inhibitorss - Ceftazidime + Clavulanic acid			Penicillins - Temocillin		
ESBL genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
AMPC genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
CARBAPENEM genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
Cefotaxime synergy test	Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent		Positive/Present	Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent
ECOFF	0.06	0.06	0.06	0.5	0.5	0.5	0.125	0.125	0.125	0.125	0.125	0.125	0.25	0.25	0.25	8	8	8	0.5	0.5	0.5	0.25	0.25	0.25	0.5	0.5	0.5	32	32	32
Lowest limit	0.015	0.015	0.015	0.12	0.12	0.12	0.03	0.03	0.03	0.06	0.06	0.06	0.25	0.25	0.25	0.5	0.5	0.5	0.25	0.25	0.25	0.06	0.06	0.06	0.12	0.12	0.12	0.5	0.5	0.5
Highest limit	2	2	2	16	16	16	16	16	16	32	32	32	64	64	64	64	64	64	128	128	128	64	64	64	64	64	64	64	64	64
N of tested isolates	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
N of resistant isolates	1	1	1	0	0	0	0	0	0	12	12	12	15	15	15	8	8	8	11	11	11	6	6	6	6	6	6	0	0	0
MIC																														
<=0.015	4	3	1																											
<=0.03							5	4	6																					
0.03	1	1	3																											
<=0.06																						5	4							
0.06			1																											
<=0.12				4	2	3																			4	4				
0.12			1									3																		
0.25				1	2	3						3													1					
0.5										1										4										
1											1								3				2							
2													1		2	1	1	2									1	1		
4										2	3			1	1	1	3				1			1			2	1	3	2
8										2					3	1					4			3			3	2		4
16													3	3		2					1						1	1		
32													1					3												
64																		1												
>64																		2												

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of OriginFrance

MIC	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	ECOFF	2	16	0.125	0.25	0.5	0.064	1	16	8	2	16	64	8	2
	Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
	Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
	N of tested isolates	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	N of resistant isolates	0	0	0	15	11	7	0	0	15	0	7	7	8	2
	<=0.015						6								
	>=0.03			15											
	0.03						2								
	0.12						1								
	<=0.25							10							8
	0.25						5								
	<=0.5	13				4									
	0.5						1	5							2
	<=1										14				
	1	1				3									3
	<=2								1					7	
	2	1			3	2					1				
	<=4											8			
	4				3	1			7						
	>4				9										
	<=8		15										2		
	8					2			7						
	>8					3									
	16												2	1	
	32												3		
	>32														2
	64											3	1	1	
	>64									15				6	
	128											2			
	>128											2			
	>1024												7		

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of OriginHungary

AM substance	Carbapenems - Ertapenem			Carbapenems - Imipenem			Carbapenems - Meropenem			Cephalosporins - Cefepime			Cephalosporins - Cefotaxime			Cephalosporins - Cefoxitin			Cephalosporins - Ceftazidime			Cephalosporins + B lactamase inhibitorss - Cefotaxime + Clavulanic acid			Cephalosporins + B lactamase inhibitorss - Ceftazidime + Clavulanic acid			Penicillins - Temocillin		
ESBL genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
AMPC genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
CARBAPENEM genotype	NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE			NOT AVAILABLE		
Cefotaxime synergy test	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	Positive/Present		Negative/Absent	
Ceftazidime synergy test	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent	Positive/Present	Negative/Absent	Negative/Absent
ECOFF	0.06	0.06	0.06	0.5	0.5	0.5	0.125	0.125	0.125	0.125	0.125	0.125	0.25	0.25	0.25	8	8	8	0.5	0.5	0.5	0.25	0.25	0.25	0.5	0.5	0.5	32	32	32
Lowest limit	0.015	0.015	0.015	0.12	0.12	0.12	0.03	0.03	0.03	0.06	0.06	0.06	0.25	0.25	0.25	0.5	0.5	0.5	0.25	0.25	0.25	0.06	0.06	0.06	0.12	0.12	0.12	0.5	0.5	0.5
Highest limit	2	2	2	16	16	16	16	16	16	32	32	32	64	64	64	64	64	64	128	128	128	64	64	64	64	64	64	64	64	64
N of tested isolates	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
N of resistant isolates	3	3	3	0	0	0	0	0	0	11	11	11	16	16	16	12	12	12	14	14	14	12	12	12	12	12	12	0	0	0
MIC																														
<=0.015	2	2	4																											
<=0.03							2	3	10																					
0.03		1	3																											
<=0.06											2											2	2							
0.06			1						1																					
<=0.12					1	3																			2	1				
0.12			1								3																			
0.25			2	2	2	7					2															1				
0.5						1				1	4									2										
1															1								3							
2										1					1	1							1			2			1	
4											3		1		2	1	2		1	4		1	2		1	4	1	3	5	
8													1		3				1	2			2			3	1		3	
16														1	4				1	4			3			2			2	
32														1			1	6		1										
64														1				1												
>64																		4												

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin:Hungary

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.25	0.5	0.064	1	16	8	2	16	64	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	16	16	16	16	16	16	16	16	16	16	16	16	16	16
MIC N of resistant isolates	2	3	0	16	14	13	0	0	16	0	11	8	7	4
<=0.015						2								
>=0.03			16											
0.03						1								
0.12						1								
<=0.25							15							11
0.25						3								
<=0.5	10				2									
0.5						2	1							1
<=1										16				
1	3													
<=2								3					9	
2	1			3										
<=4											3			
4				4	5			10						
>4				9										
<=8		13										3		
8					4	5		3			1			
>8					5	2								
16											1	3	1	
32	2	1									1	1	1	
>32														4
64									2		1	1	4	
>64									14				1	
128											1			
>128		2									8			
>1024												8		

Table Antimicrobial susceptibility testing of Enterococcus, non-pathogenic - E. faecalis in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - cloacal swab

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Fluoroquinolones - Ciprofloxacin	Glycopeptides (Cyclic peptides, Polypeptides) - Daptomycin	Glycopeptides (Cyclic peptides, Polypeptides) - Teicoplanin	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Glycylcyclines - Tigecycline	Macrolides - Erythromycin	Oxazolidines - Linezolid	Penicillins - Ampicillin	Tetracyclines - Tetracycline
	ECOFF	**32**	**32**	**4**	**4**	**2**	**4**	**0.25**	**4**	**4**	**4**	**4**
	Lowest limit	**8**	**4**	**0.12**	**0.25**	**0.5**	**1**	**0.03**	**1**	**0.5**	**0.5**	**1**
	Highest limit	**1024**	**128**	**16**	**32**	**64**	**128**	**4**	**128**	**64**	**64**	**128**
	N of tested isolates	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**1**	**0**	**0**	**59**	**14**	**0**	**0**	**45**
0.25				7				30				
<=0.5						88					2	
0.5				6				59				
<=1							44		46			28
1				45	7	1				1	31	
2				28	26		42		21	53	52	16
<=4			2									
4				3	55		3		8	35	4	
<=8		35										
8			60		1							
16		53	26									2
32			1									1
64												15
128												27
>128									14			
>1024		1										

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - cloacal swab

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Amphenicols - Chloramphenicol	Fluoroquinolones - Ciprofloxacin	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Macrolides - Erythromycin	Oxazolidines - Linezolid	Penicillins - Ampicillin	Tetracyclines - Tetracycline
	ECOFF	**32**	**4**	**4**	**4**	**4**	**4**	**4**
	Lowest limit	**2**	**0.5**	**1**	**0.5**	**0.5**	**2**	**1**
	Highest limit	**64**	**32**	**32**	**16**	**32**	**128**	**32**
	N of tested isolates	**113**	**113**	**113**	**113**	**113**	**113**	**113**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**20**	**0**	**1**	**60**
<=0.5			33		22			
<=1				62				45
1			57		45	18		
<=2							110	
2			23	45	19	92		8
4		9		6	7	3	2	
8		87			1		1	
16		16						
>16					19			
>32								60
64		1						

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - cloacal swab

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Amphenicols - Chloramphenicol	Fluoroquinolones - Ciprofloxacin	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Macrolides - Erythromycin	Oxazolidines - Linezolid	Penicillins - Ampicillin	Streptogramins - Quinupristin/Dalfopristin	Tetracyclines - Tetracycline
	ECOFF	**32**	**4**	**4**	**4**	**4**	**4**	**1**	**4**
	Lowest limit	**2**	**0.5**	**1**	**0.5**	**0.5**	**2**	**0.5**	**1**
	Highest limit	**64**	**32**	**32**	**16**	**32**	**128**	**32**	**32**
	N of tested isolates	**80**	**80**	**80**	**80**	**80**	**80**	**80**	**80**
MIC	**N of resistant isolates**	**0**	**3**	**0**	**22**	**0**	**4**	**60**	**24**
<=0.5			5		22	1		4	
<=1				76					53
1			24		21	11		16	
<=2		3					70		
2			24	1	11	45		24	2
4		15	24	3	4	23	6	30	1
8		53	3		2		3	1	1
16		8			2			3	4
>16					18				
32		1						2	1
>32									18
64							1		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t011 in Pigs - fattening pigs (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	19	19	19	19	19	19	19	19	19	19	19	19	19	19
MIC	N of resistant isolates	1	1	9	0	0	19	1	0	0	5	5	0	0	19
<=0.016						18									
0.03						1									
<=0.12											14				
<=0.25								16							
<=0.5									19				18		
0.5								2				14			
<=1		18								19					
1													1		
2								1						19	
<=4			18												
4															2
>4											5				
8				10	19										8
>8							19					5			9
>16		1													
>32				9											
>64			1												

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t011 in Pigs - fattening pigs (not specified) - CONTINUED

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	19	19	19	19	19
MIC	N of resistant isolates	19	4	0	19	2
<=0.5			6			
1			9			
<=2						17
>2		19				
>4			4			
>16					19	
>32						2
<=64				19		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t011 in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	3	3	3	3	3	3	3	3	3	3	3	3	3	3
MIC	N of resistant isolates	0	0	0	0	0	3	0	0	0	3	2	0	0	3
<=0.016						3									
<=0.5									3				3		
0.5								3			1	1			
<=1		3								3					
2														3	
<=4			3												
4															1
>4											2				
8				3	2										1
>8							3					2			1
16					1										

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t011 in Meat from broilers (Gallus gallus) - fresh (not specified) - CONTINUED

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	3	3	3	3	3
MIC	N of resistant isolates	3	1	2	3	0
<=0.5			2			
<=2						3
>2		3				
>4			1			
>16					3	
<=64				1		
256				2		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t032 in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	2	2	2	2	2	2	2	2	3	2	2	2	2	2
MIC	N of resistant isolates	0	0	0	0	0	2	2	0	0	0	0	0	0	2
<=0.016						2									
<=0.12											2				
<=0.25												2			
<=0.5									2						
<=1		2								3					
1													2		
2														2	
<=4			2	2											
8					2										
>8							2	2							2

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t032 in Meat from broilers (Gallus gallus) - fresh (not specified) - CONTINUED

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	2	2	2	2	2
MIC	N of resistant isolates	2	0	0	0	2
<=0.5					2	
1			2			
>2		2				
8						2
<=64				2		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t032 in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: France

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin	Penicillins - Penicillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	0.25	1	1	4	2	0.125
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	0.12	0.25	0.5	1	0.25	0.12
	Highest limit	16	64	32	64	0.5	8	8	4	4	8	256	8	8	2
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	0	0	0	0	0	1	1	0	0	0	0	0	1	1
<=0.016						1									
<=0.12										1					
<=0.5									1						
0.5											1				
<=1		1													
1												1			
2													1		
>2															1
<=4			1	1											
8					1										
>8							1	1						1	

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t032 in Meat from broilers (Gallus gallus) - fresh (not specified) - CONTINUED

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: France

	AM substance	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No
	ECOFF	2	128	1	2
	Lowest limit	0.5	64	0.5	2
	Highest limit	4	512	16	32
	N of tested isolates	1	1	1	1
MIC	N of resistant isolates	0	0	0	1
<=0.5				1	
1		1			
8					1
<=64			1		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034 in Pigs - fattening pigs (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	57	57	57	57	57	57	57	57	57	57	57	57	57	57
MIC	N of resistant isolates	3	5	37	0	1	57	5	0	0	56	54	0	0	57
<=0.016						56									
<=0.12											1				
<=0.25								29				1			
<=0.5									57				57		
0.5								23			1	1			
>0.5						1									
<=1		53								56				3	
1												1			
2		1						1		1	1			52	
<=4			49	1	2										
4											1			2	5
>4											53				
8			3	19	54		6	3							41
>8							51	1				54			11
16			2		1										
>16		3													
>32				37											
>64			3												

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034 in Pigs - fattening pigs (not specified) - CONTINUED

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	57	57	57	57	57
MIC	N of resistant isolates	57	55	2	57	55
<=0.5			2			
<=2						2
>2		57				
>4			55			
>16					57	
>32						55
<=64				55		
256				2		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034 in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	13	13	13	13	13	13	13	13	13	13	13	13	13	13
MIC	N of resistant isolates	0	0	4	0	0	13	2	0	0	13	11	0	0	13
<=0.016						13									
<=0.25								10							
<=0.5									13				13		
0.5								1				2			
<=1		13								13				1	
2														12	
<=4			11												
4															3
>4											13				
8			2	9	12		1	1							6
>8							12	1				11			4
16					1										
>32				4											

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034 in Meat from broilers (Gallus gallus) - fresh (not specified) - CONTINUED

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	13	13	13	13	13
MIC	N of resistant isolates	13	13	1	13	13
>2		13				
>4			13			
>16					13	
>32						13
<=64				12		
256				1		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034 in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Hungary

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	0	0	0	0	0	1	0	0	0	1	1	0	0	1
<=0.016						1									
<=0.25								1							
<=0.5									1				1		
<=1		1								1					
2														1	
<=4			1												
4															1
>4											1				
8				1	1		1								
>8												1			

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034 in Meat from broilers (Gallus gallus) - fresh (not specified) - CONTINUED

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Hungary

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	1	1	1	1	1
MIC	N of resistant isolates	1	1	0	1	1
>2		1				
>4			1			
>16					1	
>32						1
<=64				1		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t208 - spa-type t208 in Pigs - fattening pigs (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	0	0	0	0	0	1	0	0	0	0	0	0	0	1
<=0.016						1									
<=0.25								1							
0.25											1				
<=0.5									1				1		
0.5												1			
<=1		1								1					
2														1	
<=4			1												
4															1
8				1	1		1								

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	1	1	1	1	1
MIC	N of resistant isolates	1	1	1	1	0
<=2						1
>2		1				
>4			1			
>16					1	
512				1		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t2741 in Pigs - fattening pigs (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	1	1	1	0	0	1	0	0	0	1	1	0	0	1
<=0.016						1									
<=0.5									1				1		
0.5								1							
<=1										1					
2														1	
>4											1				
8					1										1
>8							1					1			
16		1													
>32				1											
>64			1												

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	1	1	1	1	1
MIC	N of resistant isolates	1	1	0	1	1
>2		1				
>4			1			
>16					1	
>32						1
<=64				1		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t571 in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	0	0	0	0	0	1	0	0	0	1	1	0	0	1
<=0.016						1									
<=0.5									1				1		
0.5								1							
<=1		1								1					
2														1	
<=4			1												
>4											1				
8				1	1										1
>8							1					1			

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t571 in Meat from broilers (Gallus gallus) - fresh (not specified) - CONTINUED

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	1	1	1	1	1
MIC	N of resistant isolates	1	1	0	1	1
>2		1				
>4			1			
>16					1	
>32						1
<=64				1		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t899 in Pigs - fattening pigs (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	0	0	0	0	0	1	1	0	0	1	0	0	0	1
<=0.016						1									
<=0.5									1				1		
0.5											1	1			
<=1		1								1					
2								1						1	
<=4			1												
8				1	1										
>8							1								1

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - nasal swab

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	1	1	1	1	1
MIC	N of resistant isolates	1	1	0	1	1
>2		1				
>4			1			
>16					1	
>32						1
128				1		

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t899 in Meat from broilers (Gallus gallus) - fresh (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

	AM Substance	Aminoglycosides - Gentamicin	Aminoglycosides - Kanamycin	Aminoglycosides - Streptomycin	Amphenicols - Chloramphenicol	Antimycobacterial drugs - Rifampicin	Cephalosporins - Cefoxitin	Fluoroquinolones - Ciprofloxacin	Fusidanes - Fusidic acid	Glycopeptides (Cyclic peptides, Polypeptides) - Vancomycin	Lincosamides - Clindamycin	Macrolides - Erythromycin	Monocarboxylic acid - Mupirocin	Oxazolidines - Linezolid	Penicillins - Oxacillin
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	ECOFF	2	8	16	16	0.032	4	1	0.5	2	0.25	1	1	4	2
	Lowest limit	1	4	4	4	0.016	0.5	0.25	0.5	1	0.12	0.25	0.5	1	0.25
	Highest limit	16	64	32	64	0.5	8	8	4	16	4	8	256	8	8
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	0	0	0	0	0	1	0	0	0	1	1	0	0	1
<=0.016						1									
<=0.25								1							
<=0.5									1				1		
<=1		1								1					
2														1	
<=4			1												
>4											1				
8				1	1										1
>8							1					1			

Table Antimicrobial susceptibility testing of Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t899 in Meat from broilers (Gallus gallus) - fresh (not specified) - CONTINUED

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - active

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

	AM substance	Penicillins - Penicillin	Pleuromutilins - Tiamulin	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
	Performed CC MRSA characterisation	Yes	Yes	Yes	Yes	Yes
	Performed MLST MRSA characterisation	No	No	No	No	No
	ECOFF	0.125	2	128	1	2
	Lowest limit	0.12	0.5	64	0.5	2
	Highest limit	2	4	512	16	32
	N of tested isolates	1	1	1	1	1
MIC	N of resistant isolates	1	1	0	1	1
>2		1				
>4			1			
>16					1	
>32						1
<=64				1		