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 2016

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 2016.

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.

---

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

List of Contents

1 ANIMAL POPULATIONS

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

1.1 Populations

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 Farmer's Federation).

Dates the figures relate to and the content of the figures

Number of animals held in farms in Switzerland in 2016 (data status May 2017). Number of animals slaughtered in the year 2016.

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.

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. Poultry industry: the number of holdings with laying hens increased by 7.7% and the one with broilers increased by 2.6%. 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. However, the number of holdings with more than 250 breeding hens is quite constant (2016 it were 40) keeping 99% of all breeding hens.

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

Average size of the farms in 2016: 43 cattle, 219 pigs, 41 sheep, 12 goats, 215 laying hens and 6830 broilers.

Additional information

Day-old chicks and hatching eggs are imported on a large scale to Switzerland. In the broiler sector far more fertilized eggs than day-old chicks are imported. Whereas the number of imported fertilized eggs of the broiler type decreased from 35.9 in 2015 to 34 million in 2016 (-5.3%), the number of imported day-old chicks of the broiler type decreased from 243'960 to 76'262. Day-old chicks of the eggline were imported more (16'290 in 2016 instead of 11'874 in 2015). 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 notification of observations on communicable diseases). 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. 111‘394 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). Whereas the origin of infection of the first outbreak (M. bovis) remained unclear, the origin of infection of the M. caprae outbreak was deer in Austria. All infected animals of the second M. caprae outbreak were kept during summer on Alpine pastures in Austria in regions where M. caprae is endemic. These cases were the first in cattle since 1998. Next to these bovine cases other reports in the last 10 years (2007 to 2016) affected cats (5x), dogs, horses, elephants and lamas (each 1x).

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

In 2016, 553 diagnostically confirmed human cases of tuberculosis and 74 non-laboratory confirmed cases were reported. 446 of the laboratory confirmed cases were caused by M. tuberculosis, 5 by M. bovis and 5 by M. africanum. 97 strains were M. tuberculosis-complex positive, but could not be identified further. From the 5 human cases of M. bovis all were over 37 years old (median 80). 3 of the 5 people originated from another country than Switzerland. In animals, 2 tuberculosis outbreaks were reported in 2016, affecting cats (M. microti). There were no further outbreaks in cattle after the two outbreaks in 2013/2014.

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

Human tuberculosis cases due to M. bovis / M. caprae were reported on a low scale and corresponded to less than 2% of all reported tuberculosis cases over the last 10 years. 2016 they comprised 0.8%. Swiss livestock is recognized free of bovine tuberculosis. The outbreaks in 2013/2014 showed that isolated TB cases can occur. 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 70°C) 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 proved, 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 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. 2016 lymphatic tissue with unspecific alterations of 121 cattle were analysed using Ziehl-Neelsen staining and a genus-specific mycobacterial PCR (2015: 119). All samples were negative for bacteria of the M. tuberculosis-complex. In 2014 an early detection and monitoring programme for bovine TB in wildlife was launched in the eastern part of Switzerland and the Principality of Liechtenstein in areas bordering Austria. Lymphatic tissue and organ material were analysed in a multi-step diagnostic scheme consisting of a detailed pathological investigation, Ziehl-Neelsen staining, a genus-specific mycobacterial PCR and MTBC culture. No Bovine TB was detected in wildlife (2014: 97 red deer, 1 roe deer, 1 ibex; 2015: 260 red deer, 4 chamoix, 5 ibex, 2 roe deer; 2016: 166 red deer, 5 roe deer, 1 ibex). 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] Schöning, J. 2012: Untersuchungen zum Vorkommen der Rindertuberkulose bei Wildtieren und zum Risiko der Entwicklung eines Reservoirs bei Wildungulaten in der Schweiz und im Fürstentum Liechtenstein. Inauguraldissertation der Vetsuisse Fakultät der Universität 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 Mycobacterium tuberculosis complex (MTC) in animal - Cattle (bovine animals) - animal sample

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

Switzerland is officially acknowledged as free from bovine tuberculosis since 1959. Freedom from disease has been proven in 1997 conducting a survey in a randomized sample of 4874 farms. 111‘394 cattle 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

In 2016 no cases in cattle were reported.

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 notification of observations on communicable diseases). 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 139‘655 cows (in general older than 24 months) from 4’874 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 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 2016 7 brucellosis cases in humans were reported (in 2015: 1 case). In 2 cases B. melistenis could be identified. Affected were 4 men and 3 women between the age of 27 and 66 years. In the last 10 years the notified cases ranged between 1 and 14 cases per year. In 2016, no cases of brucellosis in animals were reported by the cantonal veterinarians. In the yearly national survey 464 sheep farms (6749 blood samples) and 767 goat farms (7228 blood samples) were tested negative for B. melitensis. In diagnostic laboratories for 26 animals other than ovine, caprine or bovine antigen testing for brucellosis was carried out 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, Thür B, Miserez R, Garin-Bastuji B, Rüfenacht J, Stärk KD (2007): Prevalence of classical swine fever, Aujeszky's disease and brucellosis in a population of wild boar in Switzerland, Vet Rec; 160(11):362-8. _ [2] Hinić V., Brodard I., Thomann A., Cvetnić Z., Makaya P.V., Frey J., Abril C. (2008): Novel identification and differentiation of Brucella melitensis, B. abortus, B. suis, B. ovis, B. canis, and B. neotomae suitable for both conventional and real-time PCR systems; J Microbiol Methods Oct 75(2):375-8_ [3] Hinić V, Brodard I, Thomann A, Holub M, Miserez R, Abril C. (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] Hinić 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., Thür, B., Fattebert, J., Hüssy, 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) - animal sample

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Switzerland is officially acknowledged as free from bovine brucellosis since 1959. Bovine brucellosis is notifiable since 1956. Requirements of section 3.2.1.5 of the OIE International Animal Health Code are fulfilled since 1963. Free status is recognised by EU (Bilateral Agreement on Agriculture, Veterinary Annex). Freedom from disease has been proven in 1997 conducting a survey in a randomized sample of 4874 farms. 139'655 cows (in general older than 24 months) were tested using serological test. 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).

Results of the investigation

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

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 - animal sample

Status as officially free of caprine brucellosis during the reporting year

The entire country free

see chapter Brucella melitensis in sheep

2.2.2.3 B. melitensis in animal - Sheep - animal sample

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 2016 a randomized sample of 464 sheep farms (6749 blood samples) and 767 goat farms (7228 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 notification of observations on communicable diseases)). 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 including the monophasic variant S. enterica serovar 4,[5],12:i:-. 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 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. In the last 10 years, not more than 8 cases per year were reported. Most cases covered by the control program occurred in laying hens. In broiler chickens 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 (2007-2016) on average 74 salmonellosis cases per year were recorded by cantonal veterinarians (Min: 50, Max: 127). Mainly cows (32%), reptiles (30%), dogs/cats (21%) and sheep (5%) 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 2016, 1517 human cases were reported representing a notification rate of 18 cases per 100’000 inhabitants (2015: 1375 cases or 16/100’000). As in previous years the most affected age group was children under 5 years (<1 year: 42/100‘000, 1 to 4 years: 55/100‘000). The typical seasonal increase of notifications during summer and autumn was observable also in 2016. The most frequently reported serovars remained S. Enteritidis (35%), S. Typhimurium (12%) and the monophasic strain 4,12:i:- (14%). In 2016, 6 cases (all S. Enteritidis) of salmonella infection were detected in the framework of the control program in poultry flocks, affecting only laying hens > 1000 places. Further suspect cases for S. Enteritidis / S. Typhimurium / S. Typhimurium monophasic (positive environmental samples not confirmed in animal samples) were as follows: in laying hen flocks > 1000 places: S. Typhimurium (4x); in broiler flocks > 5000 places S. Enteritidis (1x) and S. Typhimurium monophasic variant 4,[5],12:i:- (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. Agona (1x), S. Amsterdam (1x), S. Bareilly (1x); S. Mbandaka (1x), S. Oranienburg (1x), S. Senftenberg (1x), S. Tenessee (1x); in broiler flocks > 5000 places: S. Chester (2x), S. Cubana (1x); S. enterica subsp. diarizonae (1x), S. Livingstone (1x), S. Rissen (1x); in turkey flocks > 500 places: S. Albany (1x). Outside from the control program, 2 further smaller laying hen flocks (100 and 600 animals, respectively) were confirmed positive for Salmonella (2x S. Enteritidis). In addition, following serovars were detected in environmental samples in small flocks: S. Enteritidis (1x), S. Typhimurium monophasic variant 4,[5],12:i:- (1x), Mbandaka (1x) and S. Albany (1x). 2016, 127 salmonellosis cases in animals were reported. As usual mainly cows (46x), reptiles (30x) and dogs/cats (27x) were affected. This number of reports lies within the range of normal yearly fluctuations.

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 3511 tests were done in 2016 (55% single samples and 45% batch-related) of which 20 (0.6%) proved positive for Salmonella (S. Typhimurium (4), S. Albany (5), 4,12:i:- (5), S. Welikade (1), S. Chester (2), S. Rissen (1), and S. Agona (2)). 3 of these 20 positive samples were batch samples._ [2] 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., Käppeli, U., Cernela, N., Adank, L., Hächler, H. Salmonella enterica serotype Kentucky associated with human infections in Switzerland: genotype and resistance trends 2004-2009, International Food Research (May 2011)]._ [3] Further information can be found on the FSVO website www.blv.admin.ch.

3.1.2 Salmonella in foodstuffs

3.1.2.1 Salmonella in food - Cheeses made from cows' milk - animal sample

Monitoring system

Sampling strategy

In an additional study to the listeria monitoring program the prevalence of certain pathogenic organisms (including Salmonella) is evaluated to examine Swiss cheese made out of raw or low heat-treated milk.

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

2016 104 semi-soft cheese samples were tested for the presence of Salmonella. No Salmonella was detected.

3.1.2.2 Salmonella in food - Meat from broilers (Gallus gallus) - animal sample

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 3511 samples of broiler meat were tested for Salmonella in 2016 of which 20 (0.3%) were Salmonella positive (S. Typhimurium (4x), S. Albany (5x), S. 4,[5],12:i:- (5x), Agona (2x), S. Chester (2x), S. Welikade (1x), S. Rissen (1x). Positive samples were neck skin samples (8x broilers, 4x turkeys), fresh meat (3x broiler, 4x turkey), and mechanically separated meat (1x).

3.1.2.3 Salmonella in food - Meat from turkey - animal sample

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 418 samples of turkey meat were tested for Salmonella in 2016. 8 samples (2%) tested positive for Salmonella.

3.1.2.4 Salmonella in food - Dairy products, unspecified - animal sample

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.

3.1.3 Salmonella in animals

3.1.3.1 Salmonella in animal - All animals - animal sample

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 including the origin of the positive animals

2016, 127 salmonellosis cases in animals were reported. As usual mainly cows (46x), reptiles (30x) and dogs/cats (27x) were affected. The number of case reports rose compared to previous years. In veterinary diagnostic laboratories the number of tests for salmonellosis in the context of clinical investigations rose as well to 7309. They were mainly carried out in cattle (65%) and dogs/cats (20%). To examine Swiss cheese made out of raw or low heat-treated milk, 104 samples were examined 2016 for the presence of Salmonella. No Salmonella could be detected.

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

The number of salmonellosis reports and test in animals rose compared to recent years. This is mainly linked to the cattle population. The positivity rate in cattle animals is in general higher than in other non-farmed animals, as often several animals are infected on a positive farm. The number of tests rose in 2016 probably mainly due to an outbreak in a bigger clinic which lead to intensive investigations afterwards. Animals from some holdings were tested more than once positive during this time period. Serovars found in cattle are mainly S. Typhimurium and the monophasic variant 4,[5],12:i:-. In horses there was an unusual outbreak of S. Newport in one holding, affecting in total 6 horses.

Additional information

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

3.1.3.2 Salmonella in animal - Gallus gallus (fowl) - broilers - animal sample

Vaccination policy

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

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,[5],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,[5],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 2016, no cases of Salmonella infection in the framework of the control program in in broilers > 5000 places were detected. 2 suspect cases (S. Enteritidis (1x), S. Typhimurium monophasic variant 4,[5],12:i:- (1x), positive environmental samples not confirmed in animal samples) were reported. 6 other serovars not covered in the control program were S. Chester (2x), S. Cubana (1x); S. enterica subsp. diarizonae (1x), S. Livingstone (1x), S. Rissen (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. The target of max. 1% of S. Enteritids / S. Typhimurium including the monophasic variant 4,[5],12:i:- could be reached each year.

Additional information

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

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

Vaccination policy

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

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,[5],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,[5],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 2016, 6 cases of Salmonella infections were detected in the framework of the control program in laying hen flocks > 1000 places (S. Enteritidis (6x)). Further 4 suspect cases (S. Typhimurium (4x); positive environmental samples not confirmed in animal samples) were reported. In addition, 7 serovars not covered in the control program were detected: S. Agona (1x), S. Amsterdam (1x), S. Bareilly (1x); S. Mbandaka (1x), S. Oranienburg (1x), S. Senftenberg (1x), S. Tenessee (1x). Outside from the control program, 2 very small laying hen flocks (100 and 600 animals, respectively) were tested positive for S. Enteritidis. In addition, following serovars were detected in environmental samples in small flocks: S. Enteritidis (1x), S. Typhimurium monophasic (1x), Mbandaka (1x) and S. Albany (1x).

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 including the monophasic variant 4,[5],12:i:- could be reached each year.

Additional information

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

3.1.3.4 Salmonella in animal - Gallus gallus (fowl) - parent breeding flocks, unspecified - animal sample

Vaccination policy

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

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,[5],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

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,[5],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 2016 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. The target of max. 1% of S. Enteritids / S. Typhimurium including the monophasic variant 4,[5],12:i:- , S. Virchow, S. Hadar and S. Infantis could be reached each year.

Additional information

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

3.1.3.5 Salmonella in animal - Turkeys - fattening flocks - animal sample

Vaccination policy

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

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,[5],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,[5],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 2016 no cases of Salmonella infection in the framework of the control program in turkeys > 500 places were detected.1 other serovars not covered in the control program was S. Albany (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 target of max. 1% of S. Enteritidis / S. Typhimurium including the monophasic variant 4,[5],12:i:- could be reached each year.

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 Campylobacter - 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 notification of observations on communicable diseases). 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, always remaining 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 do not 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. Since 2013 case numbers increased and reach a peak of about 160 cases per Year in 2014 and 2015. In the past 10 years (2007 – 2016) reported cases fluctuated between 6 and 164 per year, affecting mainly dogs (69%), cattle (13%) and cats (11%). As poultry meat represents the most important reservoir of human 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%, 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.From 2009 onwards samples were taken evenly distributed throughout the year. In caecum samples in 2009 the obtained prevalence was 44%. 2010 to 2014 cloacal swabs resulted 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% in 2008 (10 of 100, C. jejuni (10x)) and 13% in 2012 (48 of 373; C. jejuni (38x) and C. coli (10x)). 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). In 2013, the prevalence reached again the higher level of 2009 until 2011: 65% (226 of 348 samples) were Campylobacter-positive. All 226 isolates were C. coli. The main species in pigs is C. coli.

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

The number of notified human campylobacteriosis cases increased slightly from 7058 in 2015 to 7688 reported cases in 2016 (2016: 92 new infections per 100'000 inhabitants; 2015: 84 infections per 100'000). 2012 remains the year with the highest rate of new infections since the introduction of mandatory notification (8442 cases or 105 per 100'000 inhabitants). Similar to previous years, the most affected age group was adults aged 15 to 24 years (137/100'000). Within the past two decades, there was a notable increase in case reports among the elderly aged > 65: the notification rate almost doubled (from 55/100'000 in 1996 to 105/100'000 in 2016). Whereas over the same time span the notification rate in children under the age of 5 decreased to almost half (from 155 to 85 cases per 100'000). With 4090 cases (54%) slightly more men than women (3479 cases; 46%) were affected. In accordance with previous years, most cases were caused by C. jejuni (70% of all cases, in 16% of cases no distinction was made between C. jejuni and C. coli). In 2016 the typical summer peak occurred in the months of July and August accounting for 1875 cases. The winter peak stretched from December 15 to January 16 leading to 1579 cases. In 2016, a random sample of broilers was investigated at slaughter in the framework of the antimicrobial resistance monitoring programme using caecal samples. 171 of 493 broilers (35%) were Campylobacter-positive (141x C. jejuni, 30x C. coli). 142 cases of campylobacteriosis were reported in animals by cantonal veterinarians in 2016, corresponding to a slight decline in notifications since 2013. As usual, mainly dogs (86x), cattle (19x) and cats (18x) were affected. In veterinary diagnostic laboratories 1917 tests for campylobacteriose were carried out in the context of clinical investigations, mainly in dogs/cats (79%), horses (5%), monkeys (3%) and cattle (4%). A higher number of confirmed positive cases by the reference laboratory might have led to a better knowledge of these cases and a change on the reporting behavior of the cantonal veterinarians. However, a real increase in new campylobacter infections among animals cannot be excluded.

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. Cattle and the contact to pets was shown 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

Two legal regulations were put into place. One of them 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). As there is no official method in Switzerland for testing Campylobacter freedom on herd level poultry liver is sold only frozen. 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 1194 tests were done in 2016. 333 (28%) of them proved positive for Campylobacter spp. [C. jejuni (64x), C. coli (29x) and unspecified (240x), see also Campylobacter poultry meat table]._ [2] Jonas et al. 2015. Genotypes and antibiotic resistance of bovine Campylobacter and their contribution to human campylobacteriosis. Epidemiol Infect. 2015 Aug;143(11):2373-80. doi: 10.1017/S0950268814003410. Epub 2014 Dec 16. _ [3] Amar et al 2014. Genotypes and antibiotic resistance of canine Campylobacter jejuni isolates. Vet Microbiol. 2014 Jan 10;168(1):124-30. doi: 10.1016/j.vetmic.2013.10.006. Epub 2013 Oct 22._ [4] 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. _ [5] 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): 3875–3878._ [6] Niederer L, Kuhnert P, Egger R, Büttner S, Hächler 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._ [7] 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. _ [8] Kittl S, Kuhnert P, Hächler 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._ [9] 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._ [10] Further information can be found on the FSVO website www.blv.admin.ch.

3.2.2 Campylobacter in foodstuffs

3.2.2.1 Campylobacter in food - Meat from broilers (Gallus gallus) - animal sample

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 1146 samples of broiler meat were tested for Campylobacter in 2016 of which 306 (27%) were Campylobacter spp. positive. Furthermore, 27 of 48 samples (56%) of turkey meat tested Campylobacter spp. positive.

3.2.3 Campylobacter in animals

3.2.3.1 Campylobacter in animal - Gallus gallus (fowl) - animal sample

Monitoring system

Sampling strategy

In 2016, a random sample of 496 broiler herds was investigated at slaughter using caecal samples (5 samples 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

Caecal samples

Methods of sampling (description of sampling techniques)

At slaughter

In total 5 caecal samples from different broilers of one slaughter batch were taken. 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, caecal samples 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 2016, 170 (34%) of the 496 sampled broiler flocks were positive for Campylobacter. 140 isolates of C. jejuni and 30 C. coli were identified.

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

From 2010 until 2014, the Campylobacter-prevalence in cloacal swabs ranged between 33% and 38%. Data 2016 in caecal samples were also within this range.

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 notification of observations on communicable diseases). 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. The last outbreaks, leading most times to an increased number of cases, occurred 2013/2014 (Serotyp 4b, most probable cause was ready-to-eat salad). 2011 (Serotyp 1/2a, imported boiled ham) and 2005 (Serotyp 1/2a; cheese). The biggest epidemic outbreak (Serotyp 4b) in Switzerland with 122 cases and 33 deaths took place 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 Institute 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 cow's, sheep's and goat's 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 (2006-2015) on average 12 listeriosis cases per year were notified (Min: 6, Max: 21). 97% of them affected ruminants (39% cattle, 35% sheep and 23% goats).

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

In 2016, 50 human cases were reported (notification rate: 0.6 per 100’000 inhabitants). After a significant increase of cases in 2014 due to an outbreak with Serotype 4b, the number of notifications lies again within the range of normal annual fluctuations. Persons over 65 years of age remain the most affected age group. Like in previous years the two most frequently identified serovars were 1/2a (36%) and 4b (44%). In the framework of the Listeria Monitoring Program (LMP) 1864 samples (182 environmental samples, 1666 cheese samples and 16 samples of raw milk) were tested for the presence of Listeria spp. in 2016. L. monocytogenes were detected in 7 samples (0.4%): 1 environmental sample, 6 surface samples from hard cheese. Other species of Listeria spp. were found in 34 samples (1.9%). Included in the LMP count were end product controls to examine Swiss semi-hard cheese made of raw or low heat-treated milk. In the frame of end product controls, the edible part of 75 semi-hard cheese samples was examined 2016 for Listeria monocytogenes. No L. monocytogenes was found in these cheese samples. No other species of Listeria were detected. In 2016, 13 cases of animal listeriosis were registered, as usual mainly in ruminants (4 in cattle, 6 in goats, 3 in sheep). In veterinary diagnostic laboratories 46 tests for listeriosis were carried out in the context of clinical investigations, mainly in ruminants (cattle, goats and sheep, 50%), pigs (30%), dogs and cats (4%) and horses (9%).

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 - Cheeses made from cows' milk - animal sample

Monitoring system

Sampling strategy

2007 a Listeria Monitoring Programme (LMP) was set up by ALP. Products are tested for Listeria as part of quality assurance programmes. In an additional study to the Listeria Monitoring Program the prevalence of various other pathogenic organisms is evaluated to examine Swiss cheese made out of raw or low heat-treated milk. 2016 75 semi-hard cheese samples made out of raw or low heat-treated milk were tested for the presence of VTEC and Stapylococci Enterotoxines and 104 samples for the presence of Salmonella. All tests showed negative results.

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 Institute for Food Science (IFS) is running a Listeria monitoring program for early detection of Listeria in production facilities. The 2015 LMP campaign was complemented with end product controls to examine Swiss cheese made of raw or low heat-treated milk. For this, the edible part of 75 semi-hard cheese samples was examined 2016 for Listeria monocytogenes. No L. monocytogenes was found in these cheese samples. No other species of Listeria were detected.

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.

Results of the investigation

In the framework of the Listeria Monitoring Program (LMP) 1864 samples (182 environmental samples, 1666 cheese samples and 16 samples of raw milk) were tested for the presence of Listeria spp. in 2016. L. monocytogenes were detected in 7 samples (0.4%): 1 environmental sample, 6 surface samples from hard cheese. Other species of Listeria spp. were found in 34 samples (1.9%). Included in the LMP count were end product controls to examine Swiss semi-hard cheese made of raw or low heat-treated milk. In the frame of end product controls, the edible part of 75 semi-hard cheese samples was examined 2016 for Listeria monocytogenes. No L. monocytogenes was found in these cheese samples. No other species of Listeria were detected.

3.4 YERSINIOSIS

3.4.1 General evaluation of the national situation

3.4.1.1 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 43 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 (2007-2016) never more than 12 cases per year were reported, on average 3 cases per year: affected were dogs (33%) monkeys (12%), cattle (9%), rabbits (6%), hares (6%), guinea pigs (6%), as well as a singing bird, wild bird, pigeon, cat, lama, horse, hedgehog, red deer and a bat from a zoo (each 3%). 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 [6]. 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 [2]. This prevalence was higher than the 34% estimate from 2006 [6].

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

No official data for human case reports are available because, in Switzerland, Yersiniosis is not a notifiable disease. However, the number of human samples sent to the national reference laboratory NENT are at least an indicator for the recent situation. 2016, NENT tested 35 human samples positive for Yersinia (Y. enterocolitica (33x), Y. intermedia (1x) and Yersinia spp. (1x)). Of the isolated Y. enterocolitica 51% belonged to Biotype 1A, 36% to Biotype 4/O:3, 6% to Biotype 2/O:9 and in 6% the Biotyope could not be identified. Since 2005 never more than 43 isolates were sent to NENT. In 2016 12 animal cases of yersiniosis were reported (4 in dogs, 1 each in a hare, rabbit, horse, pigeon, cat, hedgehog, red deer, a bat from a zoo). In reporting veterinary diagnostic laboratories 1596 tests for yersiniosis were carried out in the context of clinical investigations in 2016, mainly in dogs and cats (79%), horses (6%) and monkeys (3%).

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. Schneeberger et al. 2015 demonstrated that Y. enterocolitica BT 4 isolates from porcine tonsils, as well as from faeces, show the same virulence-associated gene pattern and antibiotic resistance properties as human isolates from clinical cases, consistent with the etiological role of porcine BT 4 in human yersiniosis [1]. 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.

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 [2] according to the technical specifications for harmonized national surveys on Yersinia enterocolitica in slaughter pigs (EFSA Journal 2009; 7(11):1374).

Additional information

[1] Virulence-associated gene pattern of porcine and human Yersinia enterocolitica biotype 4 isolates. Schneeberger M, Brodard I, Overesch G. Int J Food Microbiol. 2015 Apr 2;198:70-4. doi: 10.1016/j.ijfoodmicro.2014.12.029. Epub 2014 Dec 30 _ [2] Meidinger, A. Countrywide survey on the detection and biotype distribution of Yersinia enterocolitica from slaughter pigs in Switzerland. Inauguraldissertation der Vetsuisse Fakultät der Universität Bern, 2013_ [3] Fredriksson-Ahomaa, M. et al., 2012: Yersinia enterocolitica strains associated with human infections in Switzerland, 2001-2010: Eur J Clin Microbiol Infect Dis (2012) 31:1543–1550._ [4] Fredriksson-Ahomaa, M. et al., 2011: Different enteropathogenic yersinia strains found in wild boars and domestic pigs. Foodborne Pathog Dis 8,733-7._ [5] 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._ [6] 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._ [7] Further information can be found on the FSVO website www.blv.admin.ch.

3.5 TRICHINELLOSIS

3.5.1 General evaluation of the national situation

3.5.1.1 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 notification of observations on communicable diseases), 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 400'000 and 490'000 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 2009, 20'000 slaughter pigs were tested additionally with an improved digestion method. 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 4200 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 (2007-2016) never more than 5 cases per year were reported (on average 2 cases per year). Affected animal species were lynx (90%) and foxes (10%). 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 2016 no human cases were reported. Since the reinforcement of the notification in 2009, there were never more than 4 human cases notified per year. Usually the exact Trichinella species is not known as cases are only tested by serology. Most of the time infections are assumed to have been acquired abroad. Only in 2013 a 22 year old hunter/butcher from the French part of Switzerland got infected by eating raw sausage pastry containing wild boar meat. Again, the young man was tested positive only by serology with unknown Trichinella species. 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 2016, 2'519'980 slaughter pigs (94% 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, 2317 horses (89% of all slaughtered horses) and 4142 wild boars were also tested negative for trichinellosis. However, Trichinella is sporadically detected in the wild animal population other than wild boars. 2016, 1 case of Trichinella infections (T. britovi) in lynx was reported by cantonal veterinarians.

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 für 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.

3.5.2 Trichinella in animals

3.5.2.1 Trichinella in animal - Solipeds, domestic - horses - animal sample

Monitoring system

Sampling strategy

Animals at slaughter (herd based approach)

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

Frequency of the sampling

Animals at slaughter (herd based approach)

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

Type of specimen taken

Animals at slaughter (herd based approach)

Piece of tongue

Case definition

Animals at slaughter (herd based approach)

Detection of Trichinella spp. larvae.

Diagnostic/analytical methods used

Animals at slaughter (herd based approach)

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

In 2016, 2317 horses (89% 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.

3.5.2.2 Trichinella in animal - Pigs - animal sample

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.

Measures in case of the positive findings or single cases

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

Notification system in place

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

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

In 2016, 2'519'980 slaughter pigs (94% 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.

3.6 ECHINOCOCCOSIS

3.6.1 General evaluation of the national situation

3.6.1.1 Echinococcus - general evaluation

History of the disease and/or infection in the country

Echinococcus granulosus sensu lato, the causative agent of Cystic Echinococcosis has nearly been extinct in Switzerland, sporadically imported cases are diagnosed in humans or animals (dogs or cattle and sheep, probably infected from imported infected dogs). Alveolar echinococcosis (AE) is caused by the fox tapeworm Echinococcus multilocularis. An infection results in disease with severe consequences for the person concerned. Since 1999 no official data of human cases of Echinococcosis are available, as they are no longer notifiable to FOPH. However, the Institute of Parasitology of the University of Zurich collects data on human cases from cohorts of large treatment centres and centres for serodiagnosis of the disease. The frequency of AE increased between 2001 - 2005 by the 2.5-fold compared to the time period 1990-2000. From 2006-2010 the average incidence was 0.25 cases per 100'000 inhabitants per year, adding up to approximately 20 newly diagnosed cases annually. From 1984 to 2010 the average age at time of diagnosis was roughly 55 years. With every 20 years of life the age specific incidence increased significantly. 55% had been diagnosed in patients living in urban areas. However, the incidence in rural areas was still significantly higher (0.26 per 100'000 per year compared to 0.12 in urban areas). Incidence increased mainly in 6 major agglomeration areas: around Constanz, Zurich, Bern, Basel, Lausanne and Geneva. 55% were female cases. Data on hospitalizations due to alveolar echinococcosis are available at the Federal Statistical Office (FSO) from 2008 until 2015 [6]. The numbers are comparable to the aforementioned data. From 2008 to 2009 11 new cases more were registered, until 2013 cases still increased by 3 to 4 new cases per year (28, 31, 35, 38 and 45 cases). 2015 the number of people hospitalized the first time even increased further to 55 patients. Thus cases of people being hospitalised the first time ranged from 17 to 55 people in 2008 to 2015, corresponding to an incidence rate of 0.22 to 0.66 cases per 100'000 inhabitants per year. Although cases can occur already at the age of 19, the data from 2008 until 2014 of the FSO show that the risk of infection rose constantly the older the people were (0.2 cases per 100000 in the age group 15-24, 0.3 in the age group 25-44, 0.5 in the age group 45-64, 1.3 > 65 years old). In animals, echinococcosis is notifiable (TSV, Article 5: disease to be monitored). In the past ten years (2007 to 2016) on average 7 cases per year were reported (Min: 1, Max: 11), affecting mainly dogs (40%) and foxes (27%). These data exclude reports in pigs (see below). In 2007 and 2008, the Institute of Parasitology of the University of Zurich tested mice and faecal fox samples in the region of Zurich. About 17% of the mice (100 mice from 634 in 2007 resp. 66 from 393 in 2008) were positive for E. multilocularis. In the fox faecal samples the number of positive samples declined in general from 26% in 2007 to 19% in 2008 (361/1376 in 2007 resp. 202/1044 in 2008). However in regions without deworming baits containing praziquantel fox faecal samples remained at the same level (63/254 (25%)). In a dog survey in 2009 the prevalence of E. multilocularis (determined by egg isolation and species specific PCR) was found to be 0% (0.0/0.0-2.5) in 118 randomly collected pet dogs, but 2.4% (0.5-6.9%) in 124 farm dogs with free access to the surrounding fields. Eggs were also isolated from hair samples of dogs: no taeniid-eggs were found on the surface of pet dogs, whereas in 2 cases (1.6%) taeniid-eggs were isolated from farm dogs. Species identification in these two cases could not be achieved by PCR. In 2012, the first reported case in a cow since 1991 was detected during meat inspection. No laboratory data was available for this case.

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

The incidence of human AE-cases rose steadily since 2001 and reached a new peak of 0.66 cases per 100'000 inhabitants in 2015 (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 2016 25% (20 of 79) hunted foxes only from the Zurich region positive for E. multilocularis, 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 Zürich region was low: only 3 of 200 A. scherman or 6 of 259 M. arvalis were infected. 2016 38 outbreaks in animals were registered: 34 in pigs, 2 in monkeys, 1 in lemurs and 1 in beavers. Without the case reports in pigs the reported cases were within the range of previous years. The much higher reports in pigs were due to a pilot research project. Organs with lesions of parasites are not fit for human consumption and are destroyed at slaughterhouse. Usually, there is no testing for the exact source of these lesion. Without laboratory confirmation, these alterations do not need to be reported. The pilot study included laboratory testing. In total 42 from 58 pig livers were E. multilocularis positive. Due to these laboratory confirmations, these liver lesions became cases with an obligation to be reported. Therefore, there were much more cases reported in slaughter pigs 2016. In 2017 a research study will start to examine the prevalence in pigs further. Its aim is to be able to roughly estimate the contamination of E. multilocularis in the environment.

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. Pigs are – like humans – dead-end-hosts for E. multilocularis, Infected Pigs thus are no threat for human health. The aim of the research project is to use the number of infected pigs as an indirect measure how contaminated the environment is with E. multilocularis 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: 327–337_ [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.

3.7 RABIES

3.7.1 General evaluation of the national situation

3.7.1.1 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 notification of observations on communicable diseases). 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 17'108 rabies cases, of which 73% in foxes and 14% in domestic animals were diagnosed. To eliminate rabies, in 1978 the first field trial world-wide for the oral immunization of foxes against rabies was conducted in Switzerland. 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. Since 1976 bat rabies has been diagnosed one each in 1992, 1993 and 2002. Bat rabies remains a source, albeit little, of infection for animals and humans.

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

2016, 963 sera from humans were tested for neutralizing antibodies at the national reference laboratory for rabies. In 523 cases (54%) antibody titers were controlled after pre-expositional immunization, in 421 of cases (44%) the blood was checked after post exposure prophylaxis (PEP) and in 19 cases no reason for the investigation was given. This amount of testing is comparable with the previous year. 110 animals were tested for rabies at the national reference laboratory (Swiss Rabies Center) in 2016, none of which were positive. The samples most frequently originated from dogs (62%), cats (16%), bats (12%) and foxes (7%). 50 dog samples and 8 cat samples originated from illegal imported animals from rabies risk countries. Additionally, 1385 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. In 2012 there was drop in testing numbers due to 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 2016. 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, 50 dogs and 8 cats were detected in 2015. None of these 58 animals were rabies cases. However, illegal imported rabies cases into the EU were reported in the past (2015 in France, 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 (occurring in Switzerland 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 situation in 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.

3.7.2 Lyssavirus (rabies) in animals

3.7.2.1 Rabies virus (RABV) in animal - Dogs - animal sample

Monitoring system

Case definition

Animals at farm

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.

3.8 Q-FEVER

3.8.1 General evaluation of the national situation

3.8.1.1 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 notification of observations on communicable diseases)). 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 dealer's 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 the number of notifications was high with about 100 reported cases a year. Notifications then steadily declined to about 40 cases per year in the timeperiod 1996 to 2005. From 2006 coxiellosis reports rose again to above 60 cases per yearIn 2012 a new peak with 86 cases was reached. In the past 10 years (2006-2015) the average of case reports was 72 per year (Min: 58, Max: 86). Affected were mainly cattle (84%), while in goats (11%) and sheep (5%) less cases were reported. The seroprevalence of the pathogen is estimated about 30% in cattle and about 1–3% 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% 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 2016, 48 human cases were reported with a notification rate of 0.6 per 100'000 inhabitants. The number of reported cases stayed rather low as in the year before, suggesting that cases with severe clinical symptoms are not that frequent in Switzerland. 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. 2016 94 cases of coxiellosis in ruminants (74 in cattle, 16 in goats, 3 in sheep and 1 in pigs) were reported to the FSVO by cantonal veterinarians. The number of reports thus stagnated on the high level of 2012 and 2015. As usual, mainly cases among cattle were reported. In veterinary diagnostic laboratories 3840 tests for Coxiella spp. were carried out in the context of clinical investigations. Samples were derived from cattle (89%), sheep (4%) and goats (6%).

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. Disease awareness and knowledge how to avoid infections must be improved. Farmers need to be motivated to send abortion material to the laboratories for further investigation.

Additional information

[1] Metzler AE et al., 1983: Distribution of Coxiella burnetii: a seroepidemiological study of domestic animals and veterinarians [in German]. Schweizer Archiv für Tierheilkunde, 125, 507-517._ [2] 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 für Lebensmittelhygiene 62, 200-204._ [4] Further information can be found on the FSVO website www.blv.admin.ch.

3.9 CYSTICERCOSIS, TAENIOSIS

3.9.1 Cysticerci in animals

3.9.1.1 Cysticerci in animal - All animals - animal sample

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 massive 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.

Results of the investigation including the origin of the positive animals

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 2016 support that cows are the most affected species: of 335 carcasses with massive lesions 81% were cattle, 15% sheep, 4% pigs and 0.3% goats. On average 33 carcasses (ranging from 13 to 45) with massive lesions are detected each year. This corresponds to at most 0.05% of the total slaughtered population. 2016, 44 carcasses with massive lesions were entered in the Fleko (40 cattle, 4 sheep). Unfortunately, a precise species diagnosis in the slaughterhouses is not performed. 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.

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

Intestinal Taenia sp. 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 animal 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] Flütsch, 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) 853–859._ [4]. Further information can be found on the FSVO website www.blv.admin.ch.

3.10 TOXOPLASMA

3.10.1 General evaluation of the national situation

3.10.1.1 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 (2007-2016) never more than 7 cases per year were recorded (on average 3 cases per year). Affected animals were goats (22%), sheep (19%), cats (13%), monkeys (9%), suricates (9%), kangaroo (6%), lemurs (6%), as well as, marmots, singing birds, ibis, chicken and other species (each 3%). 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 2016, 7 cases in animals (sheep (2), surricates (2), goats (1), ibis (1), monkey (1)) were reported by cantonal veterinarians, which was within the range of the past 10 years. In the context of clinical investigations 343 tests for toxoplasmosis were carried out in 2016 in veterinary diagnostic laboratories. 39 for the detection of the Toxoplasma agent (70% in goats and sheep, 13% in dogs and cats) and 215 serological test (85% in cats and dogs, 15% in sheep). No findings of Toxoplasma oocysts in routine coprology of cats (N > 1000) were reported in 2016. 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, Müller 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: 290–297. _ [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.

3.11 FRANCISELLA

3.11.1 Francisella in animals

3.11.1.1 Francisella in animal - All animals - animal sample

Notification system in place

Tularemia is notifiable in humans (ordinance of the Federal Department of Home Affairs (FDHA) on notification of observations on communicable diseases) and in animals (TSV, Article 5: disease to be monitored).

Results of the investigation including the origin of the positive animals

Until 2010, the annual number of human cases usually was below 10 confirmed cases. However, since 2012 an increase in reported human cases can be observed. In 2012 there were 40 confirmed cases, in 2016 there were 55 confirmed cases (0.7 reports per 100‘000 inhabitants). There are regional differences with most cases reported in the north-east of Switzerland. Tick bites were the most often reported infection route (in 9 of 40 cases in 2012 a tick bite during the incubation period was reported, in 19 of 29 in 2013, in 7 of 39 in 2014, in 15 of 50 in 2015 and in 21 of 55 in 2016). In animals 5 cases in hares were reported by cantonal veterinarians in 2016. In the past ten years (2007-2016) it were on average 4 cases per year (Min: 0, Max: 9 cases). In 85% of the cases hares were affected and in 10% monkeys (from zoos). The maximum of 9 cases in 2012 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 Zürich. 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”). 2012 24 mice, 18 hares, 2 monkeys and 1 stone marten, 2013 9 hares and 2014 4 hares and 2 monkeys tested positive for F. tularensis.

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.

Results of the investigation

Investigations of the human contacts with positive cases

To obtain more detailed understanding of tick-associated diseases Spiez Laboratory launched a study 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 Zürich, and 1 each in St. Gallen, Obwalden and Basel-Landschaft) where there is an increased prevalence of F. tularensis holarctica. Well over 100'000 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.

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] Origgi, F. C. et al (in press). Francisella tularensis clades B.FTN002-00 and B.13 are associated with distinct pathology in the European brown hare (Lepus europaeus). Vet. Path._ [2] Origgi, F. C. et al (2015). Tularemia among Free-Ranging Mice without Infection of Exposed Humans, Switzerland, 2012. Emerg Infect Dis. 2015 Jan; 21(1): 133–135. _ [3] Dobay, A. et al (2015). Dynamics of a tularemia outbreak in a closely monitored free-roaming population of wild house mice. PLoS ONE. 10(11):e0141103. _ [4] Origgi, F. C. et al (2014). Characterisation of a new group of Francisella tularensis subsp. holarctica in Switzerland with altered antimicrobial susceptibilities, 1996 to 2013. Eurosurveillance, Volume 19, Issue 29, 24 July 2014. _ [5] Information on the study is published under http://www.labor-spiez.ch/en/dok/ge/pdf/88_003_e_laborspiez_jahresbericht_2015_web.pdf. General information can be found on the website of Spiez laboratory http://www.labor-spiez.ch/en/the/bs/enthebsnant.htm _ [6] Further information can be found on the FSVO website www.blv.admin.ch._[7] Further information can be found on the FOPH website www.bag.admin.ch.

3.12 VTEC

3.12.1 General evaluation of the national situation

3.12.1.1 Verotoxigenic E. coli (VTEC) - 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 notification of observations on communicable diseases). 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 100'000 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 (40°C und 46°C) 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 2016, 463 laboratory confirmed cases of human VTEC infections were registered. The notification rate was 5.5 per 100'000 inhabitants (2015: 315 cases, 3.8/100'000). This is the highest notification rate since the introduction of the notification in 1999. The number of reports continued to increase compared to the previous years. There were more women (N=259, 56 %) than men (N=204, 44%) affected. No source of infection could be identified. The number of HUS cases remained stable with 14 cases in 2016, thereof 7 were children under 5 years of age and 5 were children between 5 and 14 years of age. Children under 5 years remained the most frequently affected age group (15.6 per 100'000 inhabitants) accounting for 14% of all cases. However, the biggest share of the rise in reports concerned adults comprising 79% of all cases. The notification rate in the age group "65 plus" rose from 5.6 per 100'000 inhabitants in 2015 to 8.2 in 2016. The more extensive usage of multiplex-assays detecting toxins might be the main reason for this sharp increase. A study (characterization of the clinical strains isolated between 2010 and 2015) to elucidate reasons for this increase is ongoing. 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 characterization. In a study conducted in 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 ST21 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.

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

Reported VTEC cases in humans are on the rise since 2014. As most of the laboratories did not routinely test for VTEC until then, 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 for 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 performed by the national reference laboratory to generate new information in the past 5 years [1-10].

Additional information

[1] Nüesch-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, 149–154._ [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] Käppeli 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] Käppeli et al. (2011b). Shiga toxin-producing Escherichia coli O157 associated with human infections in Switzerland, 2000-2009. Epidemiology and Infection 139, 1097–1104._ [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). Enterohämorrhagische 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, 149–157._ [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, 260–266._[15] Zweifel et al. (2006). Bedeutung von Escherichia coli O157 beim Schlachtschaf in der Schweiz. Schweizer Archiv für Tierheilkunde 148, 289–295._[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, 679–684._ [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 für Tierheilkunde 142, 110–114._ [20] Further information can be found on the FSVO website www.blv.admin.ch.

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 spp., unspecified 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.

Stratification procedures per animal populations and food categories

Not applicable

Randomisation procedures per animal populations and food categories

Not applicable

Sampling strategy used in monitoring

Frequency of the sampling

Not applicable

Type of specimen taken

Clinical samples

Methods of sampling (description of sampling techniques)

Different depending on disease.

Procedures for the selection of isolates for antimicrobial testing

All S. typhimurium, S. enteritidis and all monophasic S. typhimurium 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 by direct culture on different selective agar and/or selective enrichment in tetrathionate broth depending on the diagnostic material. Identification of suspicious colonies was carried out by biochemical tests according to standard microbiological procedures, serotyping was performed according to the Kauffman-White-Le Minor scheme.

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, sulfamethoxazole, 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).

Additional information

Further information to the usage of antibiotics and occurence of antibitoic resistance in bacteria from humans and animals in Switzerland can be found in the Swiss Antibiotic Resistance Report (published every other year) and in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2017) on the FSVO website www.blv.admin.ch

4.1.1.2 Antimicrobial resistance in Salmonella spp., unspecified Gallus gallus (fowl)

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. Samples were collected from clinical material.

Stratification procedures per animal populations and food categories

Not applicable

Randomisation procedures per animal populations and food categories

Not applicable

Sampling strategy used in monitoring

Frequency of the sampling

Not applicable

Type of specimen taken

Clinical samples

Methods of sampling (description of sampling techniques)

Different depending on disease.

Procedures for the selection of isolates for antimicrobial testing

All S. typhimurium, S. enteritidis and all monophasic S. typhimurium 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 by direct culture on different selective agar and/or selective enrichment in tetrathionate broth depending on the diagnostic material. Identification of suspicious colonies was carried out by biochemical tests according to standard microbiological procedures, serotyping was performed according to the Kauffman-White-Le Minor scheme.

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, sulfamethoxazole, 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).

Additional information

Further information to the usage of antibiotics and occurence of antibitoic resistance in bacteria from humans and animals in Switzerland can be found in the Swiss Antibiotic Resistance Report (published every other year) and in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2017) 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 spp., unspecified Gallus gallus (fowl)

Description of sampling designs

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

Stratification procedures per animal populations and food categories

The slaughterhouses included in the monitoring program produce over 95% of slaughterd broilers in Switzerland. The number of samples for each slaughterhouse has been determined in proportion to the number of animals slaughtered per year. The samples were taken by the competent authority.

Randomisation procedures per animal populations and food categories

A random sample of 496 broiler flocks was investigated at slaughter. A random sample of five broilers of each flock were pooled. Day and number of samples per day were defined in a sampling plan. Each herd should be sampled only once a year. All of these samples were tested for Campylobacter spp.

Sampling strategy used in monitoring

Frequency of the sampling

The samples were evenly collected throughout the year

Type of specimen taken

Ceacal samples

Methods of sampling (description of sampling techniques)

From each sampled animal, the whole intestine was taken at slaughter line without impairing the caecum. The samples were sent to the laboratory within 24h. The ceacal content of each sample was taken under sterile conditions in the laboratory. 5 samples per flock were pooled.

Procedures for the selection of isolates for antimicrobial testing

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

Methods used for collecting data

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

Laboratory methodology used for identification of the microbial isolates

For direct detection modified Charcoal Cefaperazon Desoxycholat agar (mCCDA) was used. Identification of suspicious colonies was carried out by MALDI TOF MS.

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: ciprofloxacin, erythromycin, gentamicin, nalidixic acid, streptomycin and tetracycline.

Cut-off values used in testing

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

Additional information

Further information to the usage of antibiotics and occurence of antibitoic resistance in bacteria from humans and animals in Switzerland can be found in the Swiss Antibiotic Resistance Report (published every other year) and in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2017) 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 Meat from broilers (Gallus gallus)

Description of sampling designs

Stratified random sampling in the framework of an active monitoring programme on antimicrobial resistance in Swiss food-producing animals.

Stratification procedures per animal populations and food categories

Samples were gathered in all Swiss cantons throughout the year. The applied sampling scheme considered each canton's population density and market shares of retailers. Approximately 43% of the chicken meat consumed in Switzerland is imported. Therefore, two third of domestic and one third of imported meat samples were collected.

Randomisation procedures per animal populations and food categories

A random sample of 302 packages of fresh chicken meat was collected from the competent authority. Number of samples per week per canton and per retailer were defined in a sampling plan. 205 meat samples were from domestic and 97 from foreign production. All samples were tested for ESBL/pAmpC and carbapenemase producing E. coli.

Sampling strategy used in monitoring

Frequency of the sampling

Samples were collected weekly per canton according to a sampling plan.

Type of specimen taken

Meat samples (at least 50 g) of fresh, skinless, chilled and untreated packed chicken meat

Methods of sampling (description of sampling techniques)

Not applicable

Procedures for the selection of isolates for antimicrobial testing

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

Methods used for collecting data

The purchased meat packages were immediately sent to the Laboratory (Centre for Zoonoses, Bacterial Animal Diseases and Antibiotic Resistance, University of Bern, Switzerland) in a cooling transport box.

Laboratory methodology used for identification of the microbial isolates

For detection of EBSL- or AmpC producing E. coli a pre-enrichment step, followed by inoculation on Mac Conkey agar containing 1 µg/ml Cefotaxime according to the protocol of the European reference laboratory of the EU-RL for Antimicrobial Resistance, The National Food Institute, Lyngby, Denmark was performed. Suspected E. coli colonies were identified by MALDI TOF MS. Confirmation of the isolated E. coli by beta-lactamase type was carried out phenotypically by MIC determination on an EUVSEC2 plate. For detection of carbapenemase producing E. coli a pre-enrichment step, followed by inoculation on ChromID Carba and ChromID Oxa-48 agar according to the protocol of the European reference laboratory of the EU-RL for Antimicrobial Resistance, The National Food Institute, Lyngby, Denmark was performed. Suspected E. coli colonies were identified by MALDI TOF MS. Confirmation of the isolated E. coli was carried out phenotypically by MIC determination on an EUVSEC2 plate.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

A micro-dilution method (Sensititre®-System, MCS-Diagnostics) was used for susceptibility testing. All E.coli isolates 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 were further tested with the following panel of antimicrobials: cefepime, cefotaxime, cefoxitin, ceftazidime, ertapenem, imipenem, meropenem, temocillin, cefotaxime/clavulanic acid (1:4), cefoxitin / clavulanic acid (1:4)

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.

Additional information

Further information to the usage of antibiotics and occurence of antibitoic resistance in bacteria from humans and animals in Switzerland can be found in the Swiss Antibiotic Resistance Report (published every other year) and in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2017) 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 Gallus gallus (fowl)

Description of sampling designs

Stratified random sampling in the framework of an active monitoring programme on antimicrobial resistance in Swiss food-producing animals.

Stratification procedures per animal populations and food categories

The slaughterhouses included in the monitoring program produce over 95% of slaughterd broilers in Switzerland. The number of samples for each slaughterhouse has been determined in proportion to the number of animals slaughtered per year. The samples were taken by the competent authority.

Randomisation procedures per animal populations and food categories

A random sample of 496 broiler flocks was investigated at slaughter. A random sample of five broilers of each flock were pooled. Day and number of samples per day were defined in a sampling plan. Each herd should be sampled only once a year. 197 of these samples were tested for E. coli (direct detection) and 307 samples were testet for presumtive ESBL/pAmpC and carbapenemase producing E. coli (selective detection).

Sampling strategy used in monitoring

Frequency of the sampling

The samples were evenly collected throughout the year

Type of specimen taken

Ceacal samples

Methods of sampling (description of sampling techniques)

From each sampled animal, the whole intestine was taken at slaughter line without impairing the caecum. The samples were sent to the laboratory within 24h. The ceacal content of each sample was taken under sterile conditions in the laboratory. 5 samples per flock were pooled.

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

For direct detection of E. coli Mac Conkey agar was used. Identification of suspicious colonies was carried out by MALDI TOF MS. For detection of EBSL- or AmpC producing E. coli a pre-enrichment step, followed by inoculation on Mac Conkey agar containing 1 µg/ml Cefotaxime according to the protocol of the European reference laboratory of the EU-RL for Antimicrobial Resistance, The National Food Institute, Lyngby, Denmark was performed. Suspected E. coli colonies were identified by MALDI TOF MS. Confirmation of the isolated E. coli by beta-lactamase type was carried out phenotypically by MIC determination on an EUVSEC2 plate. For detection of carbapenemase producing E. coli a pre-enrichment step, followed by inoculation on ChromID Carba and ChromID Oxa-48 agar according to the protocol of the European reference laboratory of the EU-RL for Antimicrobial Resistance, The National Food Institute, Lyngby, Denmark was performed. Suspected E. coli colonies were identified by MALDI TOF MS. Confirmation of the isolated E. coli was carried out phenotypically by MIC determination on an EUVSEC2 plate.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

A micro-dilution method (Sensititre®-System, MCS-Diagnostics) was used for susceptibility testing. All E.coli isolates (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 resistant to cefotaxime, ceftazidime or meropenem, were further tested with the following panel of antimicrobials: cefepime, cefotaxime, cefoxitin, ceftazidime, ertapenem, imipenem, meropenem, temocillin, cefotaxime/clavulanic acid (1:4), cefoxitin / clavulanic acid (1:4)

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.

Additional information

Further information to the usage of antibiotics and occurence of antibitoic resistance in bacteria from humans and animals in Switzerland can be found in the Swiss Antibiotic Resistance Report (published every other year) and in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2017) 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 Gallus gallus (fowl)

Description of sampling designs

Stratified random sampling in the framework of an active monitoring programme on antimicrobial resistance in Swiss food-producing animals and meat thereof.

Stratification procedures per animal populations and food categories

The slaughterhouses included in the monitoring program produce over 95% of slaughterd broilers in Switzerland. The number of samples for each slaughterhouse has been determined in proportion to the number of animals slaughtered per year. The samples were taken by the competent authority.

Randomisation procedures per animal populations and food categories

A random sample of 496 broiler flocks was investigated at slaughter. A random sample of five broilers of each flock were pooled. Day and number of samples per day were defined in a sampling plan. Each herd should be sampled only once a year. 349 of these samples were tested for Enterococci.

Sampling strategy used in monitoring

Frequency of the sampling

The samples were evenly collected throughout the year.

Type of specimen taken

Ceacal samples.

Methods of sampling (description of sampling techniques)

From each sampled animal, the whole intestine was taken at slaughter line without impairing the caecum. The samples were sent to the laboratory within 24h. The ceacal content of each sample was taken under sterile conditions in the laboratory. 5 samples per flock were pooled.

Procedures for the selection of isolates for antimicrobial testing

From each pooled 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

For direct detection of Enterococcus spp. Slanetz-Bartley agar was used. Identification of suspicious colonies was carried out by MALDI TOF MS.

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, and 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).

Additional information

Further information to the usage of antibiotics and occurence of antibitoic resistance in bacteria from humans and animals in Switzerland can be found in the Swiss Antibiotic Resistance Report (published every other year) and in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2017) on the FSVO website www.blv.admin.ch

4.5 STAPHYLOCOCCUS AUREUS METICILLIN RESISTANT (MRSA) INFECTION

4.5.1 Staphylococcus in foodstuffs

4.5.1.1 Antimicrobial resistance in S. aureus, meticillin resistant (MRSA) Meat from broilers (Gallus gallus)

Description of sampling designs

Stratified random sampling in the framework of an active monitoring programme on antimicrobial resistance in Swiss food-producing animals and meat thereof.

Stratification procedures per animal populations and food categories

Samples were gathered in all Swiss cantons throughout the year. The applied sampling scheme considered each canton's population density and market shares of retailers. Approximately 43% of the chicken meat consumed in Switzerland is imported. Therefore, two third of domestic and one third of imported meat samples were collected.

Randomisation procedures per animal populations and food categories

A random sample of 302 packages of fresh chicken meat was collected from the competent authority. Number of samples per week per canton and per retailer were defined in a sampling plan. 205 meat samples were from domestic and 97 from foreign production. All samples were tested for MRSA.

Sampling strategy used in monitoring

Frequency of the sampling

Samples were collected weekly per canton according to a sampling plan.

Type of specimen taken

Meat samples (at least 50 g) of fresh, skinless, chilled and untreated packed chicken meat.

Methods of sampling (description of sampling techniques)

Not applicable

Procedures for the selection of isolates for antimicrobial testing

From each positive meat sample one MRSA isolate was submitted to susceptibility testing.

Methods used for collecting data

The purchased meat packages were immediately sent to the Laboratory (Centre for Zoonoses, Bacterial Animal Diseases and Antibiotic Resistance, University of Bern, Switzerland) in a cooling transport box.

Laboratory methodology used for identification of the microbial isolates

Samples were tested for MRSA using a two-step enrichment followed by a cultivation on chromogenic agar, selective for MRSA (method defined by the European reference laboratory (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 (Stegger et al. 2011). 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, fusidic acid, gentamicin, kanamycin, linezolid, mupirocin, penicillin, quinupristin/dalfopristin, 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).

Additional information

Further information to the usage of antibiotics and occurence of antibitoic resistance in bacteria from humans and animals in Switzerland can be found in the Swiss Antibiotic Resistance Report (published every other year) and in the annual report on the sale of antibiotics for veterinary use and antibiotic resistance monitoring of livestock in Switzerland (Arch-Vet 2017) 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 December 1 2015. Under this scheme, data provided for each notification depend on its supplier: (i) laboratories report diagnostic confirmations (subtype, method, material) while for selected diseases (ii) physicians additionally cover the subsidiaries of clinical diagnosis, exposition, development and measures. Besides the case-oriented reporting, physicians also have to report observations of unexpected clusters of any communicable disease. At the FOPH, the combined notifications of laboratories and physicians are analyzed and published in the weekly Bulletin. The surveillance of food-borne infectious agents follows the mandatory system. The laboratories are required to report identifications of Salmonella causing gastroenteritis, Salmonella Typhi, Salmonella Paratyphi, Campylobacter spp., Shigella spp., verotoxin-positive Escherichia coli, Listeria monocytogenes, Clostridium botulinum and hepatitis A virus. A complementary notification by physicians is required for typhoid/paratyphoid fever, diseases associated with verotoxin-positive Escherichia coli, botulism and hepatitis A. Following a modification of the Ordinance on Disease Notification, laboratories are additionally required to report identifications of Trichinella spp. since 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 on food-borne outbreaks in accordance with Directive 2003/99/EC.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

In 2016, 11 outbreaks were recorded which is close but slightly higher than the mean value of the outbreaks in the last years. 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 1980ies and now soundly remains on a low level. 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 investigations in this field are not in the main focus of the competent authorities.

Descriptions of single outbreaks of special interest

Of special interest was the largest reported outbreak that affected 150 persons during a wedding meal prepared by a catering company. This was an Afghan wedding and as it seemed that most guests were lactose intolerant, it was suggested that the milk-based dessert caused the gastrointestinal symptoms. In this type of outbreak, it is very common that no sample is still available to perform the relevant analyzes, and conclusions can only be based on clinical symptoms. As vomiting and diarrhea started about 8 hours after the meal, it can be assumed that a toxin producer is involved. An outbreak related to enteropathogenic Escherichia coli (ECEP) has been reported. It occurred, in an institution for the elderly, because of a food contamination by a kitchen employee excreting the germ. Usually, ECEP occurs in Third World countries in poor hygiene conditions, but it is very rare to find this pathogen in Switzerland and responsible for foodborne illness.

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)	36,131	1,555,396	626,113
Gallus gallus (fowl)	Gallus gallus (fowl) - breeding flocks, unspecified	1,702	197,347	
	Gallus gallus (fowl) - broilers	1,008	6,884,592	69,172,222
	Gallus gallus (fowl) - laying hens	18,120	3,893,271	
Goats	Goats	6,350	75,351	36,197
Pigs	Pigs	6,634	1,453,602	2,683,807
Sheep	Sheep	8,364	338,922	207,114
Solipeds, domestic	Solipeds, domestic - horses	8,461	55,662	2,603
Turkeys	Turkeys - fattening flocks	302	71,565	

DISEASE STATUS TABLES

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

Region	Number of animals serologically tested under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of animals positive to BST under investigations of suspect cases	Number of animals positive in microbiological testing under investigations of suspect cases	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds	Number of infected herds tested under surveillance	Number of herds tested under surveillance by bulk milk	Number of animals or pools tested under surveillance by bulk milk	Number of infected herds tested under surveillance by bulk milk	Number of notified abortions whatever cause	Number of isolations of Brucella infections	Number of abortions due to Brucella abortus	Number of animals tested by microbiology under investigations of suspect cases
SWITZERLAND	4,766	0	0	0	0	36,131	0	1,555,396	0	0	36,131	0	0	0	0	4,766	0	0	0

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

Region	Number of animals serologically tested under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of animals positive in microbiological testing under investigations of suspect cases	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds	Number of infected herds tested under surveillance	Number of animals tested by microbiology under investigations of suspect cases
SWITZERLAND	159	0	0	0	14,714	0	414,273	1,231	13,977	14,714	0	0

DISEASE STATUS TABLES

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

Region	Number of herds with status officially free	Number of infected herds	Total number of animals	Interval between routine tuberculin tests	Number of animals tested with tuberculin routine testing	Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination	Total number of herds
SWITZERLAND	36,131	0	1,555,396	0	0	0	13	0	36,131

PREVALENCE TABLES

Table BRUCELLA in animal

Area of Sampling	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
SWITZERLAND	Antelopes - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Brucella	0
	Pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	25	0	Brucella	0

Table CAMPYLOBACTER in animal

Area of Sampling	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
SWITZERLAND	Alpacas - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	3	0	Campylobacter	0
	Antelopes - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	4	0	Campylobacter	0
	Bears - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter	0
	Birds - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0
	Bison - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter	0
	Budgerigars - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	7	0	Campylobacter	0
	Camels - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	6	1	Campylobacter, unspecified sp.	1
	Capybaras - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter	0
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	519	29	Campylobacter fetus	1
					Campylobacter jejuni	7
					Campylobacter upsaliensis	2
					Campylobacter, unspecified sp.	19
	Cattle (bovine animals) - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	83	26	Campylobacter coli	7
					Campylobacter fetus	5
					Campylobacter hyointestinalis	2
					Campylobacter jejuni	4
					Campylobacter, unspecified sp.	8
	Chinchillas - pet animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1002	122	Campylobacter jejuni	14
					Campylobacter lari	1
					Campylobacter upsaliensis	6
					Campylobacter, unspecified sp.	101
	Ducks - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0
	Elephants - zoo animals - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter	0
	Ferrets - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	6	0	Campylobacter	0
	Gallus gallus (fowl) - broilers - before slaughter - Slaughterhouse - Switzerland - animal sample - caecum - Monitoring - Official sampling - Objective sampling	herd/flock	496	170	Campylobacter	0
					Campylobacter coli	30
					Campylobacter jejuni	140
	Geese - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0
	Giraffes - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0
	Goats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	9	4	Campylobacter jejuni	1
					Campylobacter, unspecified sp.	3
	Guinea pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	11	0	Campylobacter	0
	Hedgehogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	5	0	Campylobacter	0
	Kangaroos - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter	0
	Lamas - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter	0
	Monkeys - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	51	6	Campylobacter coli	1
					Campylobacter jejuni	2
					Campylobacter, unspecified sp.	3
	Other animals - unspecified - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0
	Other carnivores - zoo animals - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0
			3	0	Campylobacter	0
	Otter - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	4	0	Campylobacter	0

Area of Sampling	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
SWITZERLAND	Owls - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	2	Campylobacter jejuni	1
					Campylobacter, unspecified sp.	1
	Parrots - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	8	0	Campylobacter	0
	Penguin - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0
	Pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	23	3	Campylobacter, unspecified sp.	3
	Quails - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Campylobacter	0
	Rabbits - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	13	0	Campylobacter	0
	Reptiles - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	8	0	Campylobacter	0
	Sheep - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	17	3	Campylobacter coli	2
					Campylobacter, unspecified sp.	1
	Snakes - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	9	0	Campylobacter	0
	Solipeds, domestic - horses - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	92	0	Campylobacter	0
	Squirrels - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0
	Turtles - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	6	0	Campylobacter	0
	Wild boars - farmed - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Campylobacter	0

Table CAMPYLOBACTER in food

Area of Sampling	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
SWITZERLAND	Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	10	Gram	132	66	Campylobacter	66
		single (food/feed)	10	Gram	23	21	Campylobacter	0
							Campylobacter coli	5
							Campylobacter jejuni	16
			25	Gram	182	102	Campylobacter	72
							Campylobacter coli	10
							Campylobacter jejuni	20
	Meat from broilers (Gallus gallus) - fresh - skinned - Cutting plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	88	37	Campylobacter	37
	Meat from broilers (Gallus gallus) - fresh - skinned - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	4	0	Campylobacter	0
		single (food/feed)	10	Gram	119	50	Campylobacter	35
							Campylobacter coli	4
							Campylobacter jejuni	11
	Meat from broilers (Gallus gallus) - fresh - with skin - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	17	4	Campylobacter	4
		single (food/feed)	10	Gram	58	16	Campylobacter	16
	Meat from broilers (Gallus gallus) - meat preparation - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	26	2	Campylobacter	2
	Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	454	0	Campylobacter	0
	Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	1	0	Campylobacter	0
		single (food/feed)	10	Gram	40	7	Campylobacter	7
	Meat from broilers (Gallus gallus) - minced meat - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	2	1	Campylobacter	1
	Meat from turkey - carcase - Slaughterhouse - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	10	Gram	28	21	Campylobacter	0
							Campylobacter coli	8
							Campylobacter jejuni	13
	Meat from turkey - fresh - skinned - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	10	Gram	20	6	Campylobacter	0
							Campylobacter coli	2
							Campylobacter jejuni	4

Table COXIELLA in animal

Area of Sampling	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
SWITZERLAND	Antelopes - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0		Coxiella	0
	Camels - farmed - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0		Coxiella	0
	Cattle (bovine animals) - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2978	23		Coxiella burnetii	23
	Cattle (bovine animals) - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	115	22		Coxiella burnetii	22
	Deer - farmed - roe deer - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0		Coxiella	0
	Giraffes - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0		Coxiella	0
	Goats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	141	11		Coxiella burnetii	11
	Goats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	14	2		Coxiella burnetii	2
	Pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	5	0		Coxiella	0
	Sheep - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	201	3		Coxiella burnetii	3
	Sheep - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	17	3		Coxiella burnetii	3

Table ECHINOCOCCUS in animal

Area of Sampling	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
SWITZERLAND	Beavers - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	1	Echinococcus multilocularis	1
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Echinococcus	0
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	22	1	Echinococcus multilocularis	1
	Foxes - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	9	0	Echinococcus	0
	Foxes - wild - Unspecified - Switzerland - animal sample - Unspecified - Not applicable - Not specified	animal	79	20	Echinococcus multilocularis	20
	Monkeys - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	1	Echinococcus multilocularis	1
	Monkeys - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	6	4	Echinococcus multilocularis	4
	Pigs - Unspecified - Switzerland - animal sample - Unspecified - Not applicable - Not specified	animal	58	42	Echinococcus multilocularis	42

Table ESCHERICHIA COLI in food

Area of Sampling	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
SWITZERLAND	Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - Packing centre - Switzerland - food sample - Monitoring - Industry sampling - Selective sampling	single (food/feed)	25	Gram	75	0	Verocytotoxigenic E. coli (VTEC)	0

Table FLAVIVIRUS in animal

Area of Sampling	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
SWITZERLAND	Birds - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	No	5	0		Flavivirus	0
	Birds - wild - Unspecified - Switzerland - animal sample - Unspecified - Not applicable - Not specified	animal	No	130	0		Flavivirus	0
	Gallus gallus (fowl) - laying hens - Unspecified - Switzerland - animal sample - blood - Unspecified - Not applicable - Not specified	animal	No	111	0		Flavivirus	0
	Solipeds, domestic - horses - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	No	4	0		Flavivirus	0

Table FRANCISELLA in animal

Area of Sampling	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
SWITZERLAND	Beavers - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Francisella	0
	Hares - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	3	1	Francisella tularensis	1
	Hares - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	7	5	Francisella tularensis	5
	Hares - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Francisella	0

Table LISTERIA in animal

Area of Sampling	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
SWITZERLAND	Bats - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Listeria	0
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Listeria	0
	Cattle (bovine animals) - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Listeria	0
	Cattle (bovine animals) - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	6	1	Listeria monocytogenes	1
	Cattle (bovine animals) - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	2	Listeria monocytogenes	2
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Listeria	0
	Foxes - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Listeria	0
	Goats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	1	Listeria monocytogenes	1
	Goats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	5	5	Listeria monocytogenes	5
	Pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	14	0	Listeria	0
	Sheep - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	7	7	Listeria monocytogenes	7
	Solipeds, domestic - horses - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	4	0	Listeria	0

Table LISTERIA in food

Area of Sampling	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
SWITZERLAND	Cheeses made from cows' milk - hard - made from raw or low heat-treated milk - Processing plant - Switzerland - food sample - Monitoring - Industry sampling - Selective sampling	single (food/feed)	25	Gram	556	6	detection	Listeria monocytogenes	556	6
	Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - Packing centre - Switzerland - food sample - Monitoring - Industry sampling - Selective sampling	single (food/feed)	25	Gram	75	0	detection	Listeria monocytogenes	75	0
	Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - Processing plant - Switzerland - food sample - Monitoring - Industry sampling - Selective sampling	single (food/feed)	25	Gram	1035	0	detection	Listeria monocytogenes	1,035	0

Table LYSSAVIRUS in animal

Area of Sampling	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
SWITZERLAND	Badgers - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Lyssavirus	0
	Bats - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	13	0	Lyssavirus	0
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	18	0	Lyssavirus	0
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	68	0	Lyssavirus	0
	Foxes - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	8	0	Lyssavirus	0
	Jackals - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Lyssavirus	0
	Marten - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Lyssavirus	0

Table MYCOBACTERIUM in animal

Area of Sampling	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
SWITZERLAND	Alpacas - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Mycobacterium	0
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	3	1	Mycobacterium spp., unspecified	1
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	5	2	Mycobacterium microti	1
					Mycobacterium spp., unspecified	0
					Mycobacterium tuberculosis complex (MTC)	1
	Deer - wild - red deer - Unspecified - Switzerland - animal sample - Unspecified - Not applicable - Not specified	animal	137	0	Mycobacterium	0
	Deer - wild - red deer - Unspecified - Switzerland - animal sample - Unspecified - Not applicable - Not specified	animal	29	0	Mycobacterium	0
	Deer - wild - roe deer - Unspecified - Switzerland - animal sample - Unspecified - Not applicable - Not specified	animal	5	0	Mycobacterium	0
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium	0
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium	0
	Elephants - zoo animals - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	17	0	Mycobacterium	0
	Hares - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium	0
	Other animals - unspecified - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium	0
	Owls - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium	0
	Pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	3	0	Mycobacterium	0
	Pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Mycobacterium	0
	Rats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium	0
	Sheep - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium	0
	Solipeds, domestic - horses - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Mycobacterium	0
	Steinbock - wild - Unspecified - Switzerland - animal sample - Unspecified - Not applicable - Not specified	animal	1	0	Mycobacterium	0

Table SALMONELLA in animal

Area of Sampling	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
SWITZERLAND	Alpacas - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Alpine chamois - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Antelopes - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	5	0	Salmonella	0
	Bats - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	2	0	Salmonella	0
	Bears - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	2	0	Salmonella	0
	Birds - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	2	0	Salmonella	0
					7	0	Salmonella	0
	Bison - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	2	0	Salmonella	0
	Budgerigars - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	9	0	Salmonella	0
	Camels - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Camels - zoo animals - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Capybaras - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	2	0	Salmonella	0
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	548	30	Salmonella enterica subsp. enterica rough	6
							Salmonella Enteritidis	1
							Salmonella Reading	1
							Salmonella spp., unspecified	19
							Salmonella Typhimurium	2
							Salmonella Typhimurium, monophasic	1
	Cattle (bovine animals) - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	4779	780	Salmonella Brandenburg	1
							Salmonella enterica subsp. enterica rough	53
							Salmonella enterica, subspecies arizonae	2
							Salmonella Enteritidis	6
							Salmonella Reading	5
							Salmonella spp., unspecified	618
							Salmonella Typhimurium	73
							Salmonella Typhimurium, monophasic	22
	Chinchillas - pet animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Deer - farmed - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Deer - wild - roe deer - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	983	39	Salmonella enterica subsp. enterica rough	3
							Salmonella Enteritidis	5

Area of Sampling	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
SWITZERLAND	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	983	39	Salmonella Indiana	1
							Salmonella Infantis	1
							Salmonella Isangi	1
							Salmonella Lexington	1
							Salmonella Oranienburg	1
							Salmonella Senftenberg	1
							Salmonella spp., unspecified	20
							Salmonella Tennessee	1
							Salmonella Typhimurium	3
							Salmonella Typhimurium, monophasic	1
	Ducks - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	10	1	Salmonella enterica subsp. enterica rough	1
	Elephants - zoo animals - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	2	0	Salmonella	0
	Ferrets - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	7	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Switzerland - animal sample - organ/tissue - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock	2957	N	2	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	2957	N	422	8	Salmonella	0
							Salmonella 4,[5],12:i:-	1
							Salmonella Chester	2
							Salmonella Cubana	1
							Salmonella enterica, subspecies diarizonae	1
							Salmonella Enteritidis	1
							Salmonella Livingstone	1
							Salmonella Rissen	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	2957	Y	442	0	Salmonella	0
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	2957	N	20	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - adult - Farm - Switzerland - animal sample - organ/tissue - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock	898	N	10	6	Salmonella	0
							Salmonella Enteritidis	6
	Gallus gallus (fowl) - laying hens - adult - Farm - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	898	Y	494	6	Salmonella	0
							Salmonella Enteritidis	6
				N	494	11	Salmonella	0
							Salmonella Agona	1
							Salmonella Amsterdam	1
							Salmonella Bareilly	1
							Salmonella Mbandaka	1
							Salmonella Oranienburg	1
							Salmonella Senftenberg	1
							Salmonella Tennessee	1
							Salmonella Typhimurium	4
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - adult - Farm - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	75	Y	37	0	Salmonella	0

Area of Sampling	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
SWITZERLAND	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	150	Y	72	0	Salmonella	0
	Geese - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	4	0	Salmonella	0
	Giraffes - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Goats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	72	2	Salmonella enterica subsp. enterica rough	2
	Guinea pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	12	0	Salmonella	0
	Gulls - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Hares - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	4	0	Salmonella	0
	Hedgehogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	6	0	Salmonella	0
	Kangaroos - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Lamas - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Mice - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Monkeys - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	48	1	Salmonella enterica subsp. enterica rough	1
	Oscine birds - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Ostriches - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Other animals - unspecified - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	10	0	Salmonella	0
	Other carnivores - zoo animals - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
					6	1	Salmonella Newport	1
	Other ruminants - farmed - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Otter - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	5	0	Salmonella	0
	Owls - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	2	0	Salmonella	0
	Parrots - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	10	0	Salmonella	0
	Partridges - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Passeriformes, unspecified - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	2	1	Salmonella Reading	1
	Penguin - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	5	0	Salmonella	0
	Pigeons - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	19	5	Salmonella enterica subsp. enterica rough	2
							Salmonella Typhimurium	3
	Pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	146	2	Salmonella Brandenburg	1
							Salmonella Enteritidis	1
	Quails - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	8	1	Salmonella Typhimurium	1
	Rabbits - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	18	0	Salmonella	0
	Reptiles - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	46	25	Salmonella enterica subsp. enterica rough	5
							Salmonella enterica, subsp. houtenae	5
							Salmonella enterica, subspecies diarizonae	5

Area of Sampling	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
SWITZERLAND	Reptiles - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	46	25	Salmonella Manhattan	1
							Salmonella spp., unspecified	8
							Salmonella Tennessee	1
	Rodents - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	1	Salmonella Enteritidis	1
	Seals - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Sheep - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	96	12	Salmonella Abortusovis	2
							Salmonella enterica, subspecies diarizonae	9
							Salmonella spp., unspecified	1
	Snakes - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	32	19	Salmonella enterica subsp. enterica rough	1
							Salmonella enterica, subsp. houtenae	4
							Salmonella enterica, subspecies arizonae	1
							Salmonella enterica, subspecies diarizonae	7
							Salmonella Enteritidis	2
							Salmonella spp., unspecified	4
	Solipeds, domestic - donkeys - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	4	0	Salmonella	0
	Solipeds, domestic - horses - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	338	19	Salmonella enterica subsp. enterica rough	3
							Salmonella Enteritidis	1
							Salmonella Newport	6
							Salmonella spp., unspecified	5
							Salmonella Typhimurium	3
							Salmonella Typhimurium, monophasic	1
	Squirrels - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Steinbock - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	63	N	45	1	Salmonella	0
							Salmonella Albany	1
	Turkeys - fattening flocks - before slaughter - Farm - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	63	Y	50	0	Salmonella	0
	Turkeys - fattening flocks - before slaughter - Farm - Switzerland - environmental sample - boot swabs - Control and eradication programmes - Official sampling - Census	herd/flock	63	N	5	0	Salmonella	0
	Turtles - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	13	0	Salmonella	0
	Wild boars - farmed - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	3	0	Salmonella	0
	Zoo animals, all - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal		N_A	1	0	Salmonella	0

Table SALMONELLA in food

Area of Sampling	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
SWITZERLAND	Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - Packing centre - Switzerland - food sample - Monitoring - Industry sampling - Selective sampling	single (food/feed)	25	Gram	104	0	Salmonella	0
	Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	254	3	Salmonella	0
							Salmonella Agona	1
							Salmonella Chester	1
							Salmonella Typhimurium	1
		single (food/feed)	25	Gram	372	5	Salmonella	0
							Salmonella 4,12:i:-	5
	Meat from broilers (Gallus gallus) - fresh - skinned - Cutting plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	98	0	Salmonella	0
	Meat from broilers (Gallus gallus) - fresh - skinned - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	4	0	Salmonella	0
		single (food/feed)	25	Gram	264	2	Salmonella	0
							Salmonella Chester	1
							Salmonella Rissen	1
	Meat from broilers (Gallus gallus) - fresh - with skin - Cutting plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	98	0	Salmonella	0
	Meat from broilers (Gallus gallus) - fresh - with skin - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	16	0	Salmonella	0
		single (food/feed)	25	Gram	145	1	Salmonella	0
							Salmonella Welikade	1
	Meat from broilers (Gallus gallus) - meat preparation - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	366	0	Salmonella	0
		single (food/feed)	25	Gram	44	0	Salmonella	0
	Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	454	0	Salmonella	0
		single (food/feed)	25	Gram	1	0	Salmonella	0
	Meat from broilers (Gallus gallus) - meat products - raw but intended to be eaten cooked - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	125	0	Salmonella	0
	Meat from broilers (Gallus gallus) - mechanically separated meat (MSM) - Cutting plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	10	Gram	95	0	Salmonella	0
			25	Gram	245	1	Salmonella	0
							Salmonella Agona	1
	Meat from broilers (Gallus gallus) - minced meat - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	batch (food/feed)	25	Gram	245	0	Salmonella	0

Area of Sampling	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
SWITZERLAND	Meat from broilers (Gallus gallus) - minced meat - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	267	0	Salmonella	0
	Meat from turkey - carcase - Slaughterhouse - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	150	4	Salmonella	0
							Salmonella Albany	1
							Salmonella Typhimurium	3
	Meat from turkey - fresh - skinned - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	158	4	Salmonella	0
							Salmonella Albany	4
	Meat from turkey - meat preparation - Processing plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	25	Gram	60	0	Salmonella	0
	Meat from turkey - mechanically separated meat (MSM) - Cutting plant - Switzerland - food sample - Monitoring - HACCP and own check - Objective sampling	single (food/feed)	10	Gram	50	0	Salmonella	0

Table SALMONELLA in feed

Area of Sampling	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
SWITZERLAND	Compound feedingstuffs for cattle - final product - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	3	0	Salmonella	0
	Compound feedingstuffs for cattle - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	169	0	Salmonella	0
	Compound feedingstuffs for fish - final product - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	4	0	Salmonella	0
	Compound feedingstuffs for fish - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	3	0	Salmonella	0
	Compound feedingstuffs for horses - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	11	0	Salmonella	0
	Compound feedingstuffs for poultry (non specified) - final product - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	2	0	Salmonella	0
	Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	41	0	Salmonella	0
	Compound feedingstuffs, not specified - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	2	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Feed mill - Non European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	10	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Feed mill - Unknown - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of cereal grain origin - wheat derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	3	0	Salmonella	0
	Feed material of land animal origin - dairy products - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	8	0	Salmonella	0
	Feed material of marine animal origin - fish meal - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0

Area of Sampling	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
SWITZERLAND	Feed material of oil seed or fruit origin - other oil seeds derived - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	7	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	7	1	Salmonella spp., unspecified	1
	Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	6	1	Salmonella spp., unspecified	1
	Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Non European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	38	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	4	0	Salmonella	0
	Feed material of oil seed or fruit origin - sunflower seed derived - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Other feed material - tubers, roots and similar products - Feed mill - European Union - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Premixtures - final product - Feed mill - Switzerland - feed sample - Monitoring - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0

Table STAPHYLOCOCCAL ENTEROTOXINS in food

Area of Sampling	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
SWITZERLAND	Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - Packing centre - Switzerland - food sample - Monitoring - Industry sampling - Selective sampling	single (food/feed)	25	Gram	75	0	Staphylococcal enterotoxins	0

Table STAPHYLOCOCCUS AUREUS METICILLIN RESISTANT (MRSA) in food

Area of Sampling	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
SWITZERLAND	Meat from broilers (Gallus gallus) - fresh - Retail - Argentina - food sample - meat - Monitoring - Official sampling - Objective sampling	single (food/feed)	50	Gram	1	0	Methicillin resistant Staphylococcus aureus (MRSA)	0
	Meat from broilers (Gallus gallus) - fresh - Retail - Austria - food sample - meat - Monitoring - Official sampling - Objective sampling	single (food/feed)	50	Gram	17	0	Methicillin resistant Staphylococcus aureus (MRSA)	0
	Meat from broilers (Gallus gallus) - fresh - Retail - France - food sample - meat - Monitoring - Official sampling - Objective sampling	single (food/feed)	50	Gram	4	0	Methicillin resistant Staphylococcus aureus (MRSA)	0
	Meat from broilers (Gallus gallus) - fresh - Retail - Germany - food sample - meat - Monitoring - Official sampling - Objective sampling	single (food/feed)	50	Gram	28	8	Methicillin resistant Staphylococcus aureus (MRSA)	8
	Meat from broilers (Gallus gallus) - fresh - Retail - Hungary - food sample - meat - Monitoring - Official sampling - Objective sampling	single (food/feed)	50	Gram	27	1	Methicillin resistant Staphylococcus aureus (MRSA)	1
	Meat from broilers (Gallus gallus) - fresh - Retail - Italy - food sample - meat - Monitoring - Official sampling - Objective sampling	single (food/feed)	50	Gram	6	0	Methicillin resistant Staphylococcus aureus (MRSA)	0
	Meat from broilers (Gallus gallus) - fresh - Retail - Slovenia - food sample - meat - Monitoring - Official sampling - Objective sampling	single (food/feed)	50	Gram	14	0	Methicillin resistant Staphylococcus aureus (MRSA)	0
	Meat from broilers (Gallus gallus) - fresh - Retail - Switzerland - food sample - meat - Monitoring - Official sampling - Objective sampling	single (food/feed)	50	Gram	205	0	Methicillin resistant Staphylococcus aureus (MRSA)	0

Table TOXOPLASMA in animal

Area of Sampling	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
SWITZERLAND	Antelopes - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Toxoplasma	0
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	125	125	Toxoplasma gondii	125
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	2	Toxoplasma gondii	2
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	58	29	Toxoplasma gondii	29
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	3	0	Toxoplasma	0
	Goats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	1	Toxoplasma gondii	1
	Goats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	8	2	Toxoplasma gondii	2
	Guinea pigs - pet animals - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Toxoplasma	0
	Monkeys - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Toxoplasma	0
	Penguin - zoo animals - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Toxoplasma	0
	Rabbits - pet animals - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	1	Toxoplasma gondii	1
	Sheep - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	32	32	Toxoplasma gondii	32
	Sheep - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	17	2	Toxoplasma gondii	2
	Zoo animals, all - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	2	Toxoplasma gondii	2

Table TRICHINELLA in animal

Area of Sampling	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
SWITZERLAND	Bears - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Trichinella	0
	Foxes - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Trichinella	0
	Jackals - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Trichinella	0
	Lynx - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	21	3	Trichinella britovi	3
					Trichinella, unspecified sp.	0
	Pigs - breeding animals - not raised under controlled housing conditions - Slaughterhouse - Switzerland - animal sample - Surveillance - Official sampling - Census	animal	32760	0	Trichinella	0
	Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Switzerland - animal sample - Surveillance - Official sampling - Census	animal	2487220	0	Trichinella	0
	Solipeds, domestic - horses - Slaughterhouse - Switzerland - animal sample - Surveillance - Official sampling - Census	animal	2317	0	Trichinella	0
	Wild boars - wild - Hunting - Switzerland - animal sample - Unspecified - Not applicable - Census	animal	4142	0	Trichinella	0
	Wolves - wild - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	3	0	Trichinella	0

Table YERSINIA in animal

Area of Sampling	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
SWITZERLAND	Alpacas - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	3	0	Yersinia	0
	Antelopes - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	4	0	Yersinia	0
	Bats - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	4	2	Yersinia pseudotuberculosis	2
	Bears - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia	0
	Birds - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia	0
	Bison - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia	0
	Budgerigars - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	7	0	Yersinia	0
	Camels - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	4	0	Yersinia	0
	Capybaras - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia	0
	Cats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	441	2	Yersinia, unspecified sp.	2
	Cattle (bovine animals) - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	27	0	Yersinia	0
	Chinchillas - pet animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia	0
	Deer - farmed - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	1	Yersinia pseudotuberculosis	1
	Dogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	816	9	Yersinia enterocolitica - biotype 1A (not pathogenic)	1
					Yersinia, unspecified sp.	8
	Ducks - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia	0
	Elephants - zoo animals - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia	0
	Ferrets - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	6	0	Yersinia	0
	Giraffes - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia	0
	Goats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	8	0	Yersinia	0
	Guinea pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	13	0	Yersinia	0
	Hares - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	3	2	Yersinia pseudotuberculosis	2
	Hedgehogs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	5	1	Yersinia, unspecified sp.	1
	Kangaroos - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia	0
	Lamas - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia	0
	Monkeys - zoo animal - Zoo - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	47	0	Yersinia	0
	Other animals - unspecified - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia	0
	Other carnivores - zoo animals - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia	0
			3	0	Yersinia	0
	Otter - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	4	0	Yersinia	0
	Owls - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia	0
	Parrots - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	8	0	Yersinia	0
	Penguin - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	1	Yersinia pseudotuberculosis	1
	Pigeons - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	1	Yersinia pseudotuberculosis	1
	Pigs - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	25	2	Yersinia enterocolitica - biotype 3	1
					Yersinia enterocolitica - biotype 4	1
					Yersinia, unspecified sp.	0
	Quails - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia	0
	Rabbits - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	14	0	Yersinia	0
	Rats - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia	0
	Reptiles - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	8	0	Yersinia	0

Area of Sampling	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
SWITZERLAND	Sheep - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	12	0	Yersinia	0
	Snakes - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	9	0	Yersinia	0
	Solipeds, domestic - horses - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	94	1	Yersinia, unspecified sp.	1
	Squirrels - zoo animal - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	2	0	Yersinia	0
	Turtles - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	6	0	Yersinia	0
	Wild boars - farmed - Unspecified - Switzerland - animal sample - Clinical investigations - Not applicable - Not specified	animal	1	0	Yersinia	0

FOODBORNE OUTBREAKS TABLES

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 cereus	Meat and meat products					1	11	0	0
Clostridium perfringens	Cereal products including rice and seeds/pulses (nuts, almonds)	1	50	0	0				
	Meat and meat products					1	19	0	0
Enteropathogenic E. coli (EPEC)	Mixed food	1	33	1	0				
Listeria monocytogenes	Meat and meat products	1	6	3	0				
Norovirus	Meat and meat products					1	5	1	0
Salmonella Bovismorbificans	Unknown					1	10	1	0
Staphylococcus aureus	Cheese	2	9	5	0				
	Other foods	1	13	0	0				
Unknown	Unknown					1	150	0	0

Strong Foodborne Outbreaks: detailed data

Causative agent	Other 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
Clostridium perfringens	Bacillus - B. cereus	N_A	General	Cereal products including rice and seeds/pulses (nuts, almonds)	Lentils and rice	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	unk	Not Available	Storage time/temperature abuse	N_A	1	50	0	0
Enteropathogenic E. coli (EPEC)	unk	N_A	General	Mixed food	N_A	Descriptive epidemiological evidence	Hospital or medical care facility	unk	Not Available	Infected food handler	N_A	1	33	1	0
Listeria monocytogenes	unk	N_A	Household / domestic kitchen	Meat and meat products	Meat pâté	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Household	unk	Not Available	Inadequate chilling	N_A	1	6	3	0
Staphylococcus aureus	Bacillus - B. cereus	N_A	General	Other foods	Tortellinis	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	School or kindergarten	unk	Not Available	Inadequate chilling	N_A	1	13	0	0

Causative agent	Other 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
Staphylococcus aureus	unk	N_A	General	Cheese	Soft cheese made from goat milk	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	unk	Not Available	Inadequate heat treatment	N_A	1	5	4	0
			Household / domestic kitchen	Cheese	Semi-soft cheese made from raw milk	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Household	unk	Not Available	Other contributory factor	N_A	1	4	1	0

Weak Foodborne Outbreaks: detailed data

Causative agent	Other 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 cereus	unk	N_A	General	Meat and meat products	cold cooked beef meat	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	unk	Not Available	Unknown	N_A	1	11	0	0
Clostridium perfringens	unk	N_A	General	Meat and meat products	cooked minced meat	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Take-away or fast-food outlet	unk	Not Available	Unknown	N_A	1	19	0	0
Norovirus	unk	N_A	General	Meat and meat products	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	unk	Not Available	Infected food handler	N_A	1	5	1	0
Salmonella Bovismorbificans	unk	N_A	General	Unknown	N_A	Descriptive epidemiological evidence	Camp or picnic	unk	Not Available	Unknown	N_A	1	10	1	0
Unknown	unk	N_A	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	unk	Not Available	Unknown	N_A	1	150	0	0

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling details: MHK EUCAMP2

	AM substance	Ciprofloxacin	Erythromycin (Erythromycin A)	Gentamicin	Nalidixic acid	Streptomycin	Tetracycline
	ECOFF	**0.5**	**8**	**2**	**16**	**4**	**2**
	Lowest limit	**0.12**	**1**	**0.12**	**1**	**0.25**	**0.5**
	Highest limit	**16**	**128**	**16**	**64**	**16**	**64**
	N of tested isolates	**30**	**30**	**30**	**30**	**30**	**30**
MIC	**N of resistant isolates**	**20**	**3**	**0**	**20**	**19**	**12**
<=0.12		7		3			
0.25		3		9			
<=0.5							13
0.5				14			
<=1			13				
1				4		4	2
2		1	10			4	3
4			3		4	3	1
8		7	1		5	1	1
16		9			1	5	
>16		3				13	
32							1
64					6		5
>64					14		4
>128			3				

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling details: MHK EUCAMP2

	AM substance	Ciprofloxacin	Erythromycin (Erythromycin A)	Gentamicin	Nalidixic acid	Streptomycin	Tetracycline
	ECOFF	**0.5**	**4**	**2**	**16**	**4**	**1**
	Lowest limit	**0.12**	**1**	**0.12**	**1**	**0.25**	**0.5**
	Highest limit	**16**	**128**	**16**	**64**	**16**	**64**
	N of tested isolates	**140**	**140**	**140**	**140**	**140**	**140**
MIC	**N of resistant isolates**	**72**	**4**	**2**	**72**	**10**	**56**
<=0.12		56		58			
<=0.25						5	
0.25		11		54			
<=0.5							77
0.5		1		25		48	
<=1			122				
1				1		69	7
2			8		24	8	1
4		2	6		35		
8		46			8	6	1
16		16	1		1	1	3
>16		8		2		3	
32							5
64					11		8
>64					61		38
128			1				
>128			2				

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella Enteritidis in Rodents - zoo animal

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**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**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1										1	
<=0.5					1				1						
0.5															1
<=1		1													
<=2													1		
<=4											1				
4			1					1							
<=8						1									
128												1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis in Cats

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**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					
0.03							1								
<=0.25				1										1	
<=0.5					1				1						
0.5															1
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
128												1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis in Cattle (bovine animals) - unspecified

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**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**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										7					
0.03							6								
<=0.25				7										7	4
<=0.5					7				7						
0.5															3
<=1		1						5							
<=2													7		
2		6						2							
<=4											7				
4			4												
<=8						7									
8			3												
32												1			
64												5			
128												1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis in Dogs

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										5					
0.03							5								
<=0.25				5										4	5
<=0.5					5				5						
0.5														1	
<=1								3							
<=2													5		
2		5						2							
<=4											5				
4			2												
<=8						5									
8			3												
32												2			
64												3			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis in Snakes

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**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**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										2					
0.03							1								
<=0.25				2										1	2
<=0.5					2				1						
0.5														1	
<=1		2						2							
1									1						
<=2													2		
<=4											2				
4			2												
<=8						2									
128												2			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis in Solipeds, domestic - horses

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**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					
0.03							1								
<=0.25				1										1	1
<=0.5					1				1						
<=1								1							
<=2													1		
2		1													
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis in Gallus gallus (fowl) - unspecified

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							2								
<=0.03										22					
0.03							19								
0.064							1								
<=0.25				22										18	15
<=0.5					22				22						
0.5														4	7
<=1		3						16							
<=2													22		
2		19						5							
<=4											22				
4			15												
<=8						22						1			
8			7					1							
16												1			
32												6			
64												12			
128												2			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Pigeons

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	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**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							2								
<=0.03										2					
0.03							1								
0.064										1					
<=0.25				3										3	3
<=0.5					3				3						
<=1		3						3							
<=2			1										3		
<=4											3				
4			2												
<=8						3						1			
16												1			
64												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Quails

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**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								
0.064										1					
<=0.25				1										1	1
<=0.5					1				1						
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
256												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Cats

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	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**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										3					
0.03							2								
0.064							1								
<=0.25				3										2	3
<=0.5					3				3						
0.5														1	
<=1		2						3							
<=2													3		
2		1													
<=4											3				
4			3												
<=8						3									
32												1			
64												1			
128												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Cattle (bovine animals) - unspecified

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**	**37**
MIC	**N of resistant isolates**	**6**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**8**	**6**	**0**	**0**
<=0.015							11								
<=0.03										33					
0.03							25								
0.064							1			4					
<=0.25				37										30	32
<=0.5					37				35						
0.5														7	5
<=1		21						32							
1									2						
<=2													31		
2		10						5							
<=4											33				
4			34												
<=8						36									
8			3								4				
32												10			
64												12	1		
>64		6											5		
128												7			
>128						1									
>1024												8			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Dogs

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.015							1								
<=0.03										3					
0.03							2								
<=0.25				3										1	3
<=0.5					3				3						
0.5														2	
<=1		2						3							
<=2													2		
<=4											3				
4			2												
<=8						3									
8			1												
64												2			
>64		1											1		
>1024												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Turkeys - unspecified

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**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							
1									1						
<=2													1		
<=4											1				
4			1												
<=8						1									
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Solipeds, domestic - horses

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.015							1								
<=0.03										2					
0.03							2								
0.064										1					
<=0.25				3										2	2
<=0.5					3				3						
0.5														1	1
<=1	1							2							
<=2													2		
2	1														
<=4											3				
4		3						1							
<=8						2									
64												1			
>64	1												1		
>128						1									
256												1			
>1024												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium in Gallus gallus (fowl) - unspecified

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**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**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							1								
<=0.03										4					
0.03							5								
0.064										2					
<=0.25				6										4	5
<=0.5					6				6						
0.5														2	1
<=1		3						3							
<=2													6		
2		3						2							
<=4											6				
4			5					1							
<=8						6									
8			1												
32												1			
64												2			
128												2			
256												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium, monophasic in Cats

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1				1						
0.5														1	
<=1								1							
<=4											1				
4			1												
<=8						1									
>64		1											1		
>1024												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium, monophasic in Cattle (bovine animals) - unspecified

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
MIC	**N of resistant isolates**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**8**	**0**	**0**
<=0.015							3								
<=0.03										8					
0.03							5								
0.064							1			1					
<=0.25				9										7	8
<=0.5					9				8						
0.5														2	1
<=1								9							
1									1						
<=2													1		
<=4											8				
4			8												
<=8						9									
8			1								1				
>64		9											8		
>1024												9			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium, monophasic in Dogs

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1										1	1
<=0.5					1				1						
<=1								1							
<=4											1				
4			1												
<=8						1									
>64		1											1		
>1024												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium, monophasic in Solipeds, domestic - horses

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1										1	1
<=0.5					1				1						
<=1								1							
<=4											1				
4			1												
<=8						1									
>64		1											1		
>1024												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium, monophasic in Gallus gallus (fowl) - unspecified

Sampling Stage: Unspecified

Sampling Type: animal sample

Sampling Context: Unspecified

Sampler: Not applicable

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25															1
<=0.5					1				1						
0.5				1										1	
<=1								1							
<=4											1				
4			1												
<=8						1									
>64		1											1		
>1024												1			

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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

Sampling Details: MHK EUVSEC2

AM substance		Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	8	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.5	0.25	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	128	128	2	16	16	64
	N of tested isolates	3	3	3	3	3	3	3	3	3	3
MIC	N of resistant isolates	3	3	0	0	3	0	0	0	0	0
<=0.015								3			
<=0.03										3	
<=0.064				3							
<=0.12							2		3		
0.25							1				
0.5		1									
2			1			1					
4		1			1	1					3
8		1			2						
32			2			1					

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**3**	**0**	**3**	**3**	**1**	**2**	**0**	**1**	**0**	**2**	**2**	**1**	**0**	**1**
<=0.015							1								
<=0.03										3					
0.12							1								
<=0.25														3	1
<=0.5									2						
<=1								3							
1					1										1
<=2													2		
2				1											
<=4											1				
4			2												
>4				2											
<=8						2									
8			1		1										
>8					1		1								
32						1			1			1			
>32															1
64											1		1		
>64		3													
>128											1				
>1024												2			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: Argentina

Sampling Details: MHK EUVSEC2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Not Available**	**Not Available**	**Positive/Present**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	Ceftazidime synergy test	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Positive/Present**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**64**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
<=0.015								1			
<=0.03										1	
<=0.064				1							
<=0.12							1		1		
4		1			1	1					1
32			1								

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: Argentina

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**1**	**1**	**1**	**1**	**0**	**1**	**0**	**1**	**1**	**1**	**0**	**0**
<=0.03										1					
<=0.25														1	1
0.25							1								
<=1								1							
1					1										
4									1						
>4				1											
8			1												
64													1		
>64		1													
128						1					1				
>1024												1			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: Austria

Sampling Details: MHK EUVSEC2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	12	12	12	12	12	12	12	12	12	12	12	12
MIC	N of resistant isolates	10	11	5	5	5	11	5	5	0	0	0	0
<=0.015										7			
<=0.03												12	
0.03										3			
<=0.064				6									
0.064										2			
<=0.12								6	1		2		
0.12		2			1								
<=0.25			1				1						
0.25		7									10		
0.5		2											
1			2				1						
2		1	3										
4					1	6							7
8			4		4	1	6		3				5

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**		**Not Available**	**Not Available**	**Not Available**	**Not Available**
	Ceftazidime synergy test	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.064**	**0.5**	**0.25**	**0.12**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**64**	**128**	**128**	**128**	**2**	**16**	**16**	**64**
	N of tested isolates	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**
MIC	**N of resistant isolates**	**10**	**11**	**5**	**5**	**5**	**11**	**5**	**5**	**0**	**0**	**0**	**0**
16			2				3		2				
32							1						
64						3							
>64						2							

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: Austria

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**
MIC	**N of resistant isolates**	**12**	**0**	**11**	**11**	**1**	**9**	**0**	**3**	**0**	**6**	**7**	**4**	**0**	**2**
<=0.015							2								
<=0.03										12					
0.03							1								
<=0.25				1										12	5
0.25							3								
<=0.5					1				5						
0.5							3								4
<=1								12							
1				2	1		1		3						1
<=2													8		
2				3			1		1						
<=4											3				
4			10												
>4				6											
<=8						11									
8			2		7		1				3				
>8					3										
16									2			2			
32						1			1			3			
>32															2
64											1		3		

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**	**12**
MIC	**N of resistant isolates**	**12**	**0**	**11**	**11**	**1**	**9**	**0**	**3**	**0**	**6**	**7**	**4**	**0**	**2**
>64		12											1		
128											4	1			
>128											1				
>1024												6			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: Slovenia

Sampling Details: MHK EUVSEC2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	9	9	9	9	9	9	9	9	9	9	9	9
MIC	N of resistant isolates	8	9	4	4	4	9	4	4	0	0	0	0
<=0.015										6			
<=0.03												8	
0.03										2			
<=0.064				5									
0.064										1		1	
<=0.12								4			4		
0.12	1												
0.25	5							1			5		
0.5	2												
1			2										1
2						1	1						1
4	1	2		3	3	2		1					6
8		4		1	1	3		3					
16		1				3							1

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	9	9	9	9	9	9	9	9	9	9	9	9
MIC	N of resistant isolates	8	9	4	4	4	9	4	4	0	0	0	0
64						3							
>64						1							

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
MIC	**N of resistant isolates**	**9**	**0**	**9**	**9**	**1**	**9**	**0**	**2**	**0**	**7**	**6**	**3**	**0**	**2**
<=0.03										9					
<=0.25														7	6
0.25							5								
<=0.5									6						
0.5														2	1
<=1								9							
1				2			2		1						
<=2			1										5		
2				1	1		1								
<=4											2				
4			7	1									1		
>4				5											
<=8						8						1			
8			1		5		1								
>8					3										
16									1			1	1		
32												1			
>32									1						2
64						1					1		1		
>64		9											1		
128											2				

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
	N of resistant isolates	**9**	**0**	**9**	**9**	**1**	**9**	**0**	**2**	**0**	**7**	**6**	**3**	**0**	**2**
MIC															
>128											4				
>1024												6			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: Switzerland

Sampling Details: MHK EUVSEC2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	86	86	86	86	86	86	86	86	86	86	86	86
MIC	N of resistant isolates	65	86	47	47	48	80	47	47	0	0	0	0
<=0.015										44			
<=0.03												84	
0.03										36			
<=0.064		5		34									
0.064										6		2	
<=0.12								25	6		53		
0.12		16		5									
<=0.25							3						
0.25		28						7	1		32		
0.5		3	4				3				1		
1		4	3				13		2				
2		4	5	1	9	8	16		9				10
4		17	10	1	23	21	14		27				47
8		8	34		12	9	29		8				28

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**		**Not Available**	**Not Available**	**Not Available**	**Not Available**
	Ceftazidime synergy test	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.064**	**0.5**	**0.25**	**0.12**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**64**	**128**	**128**	**128**	**2**	**16**	**16**	**64**
	N of tested isolates	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**
MIC	**N of resistant isolates**	**65**	**86**	**47**	**47**	**48**	**80**	**47**	**47**	**0**	**0**	**0**	**0**
16		1	17			6	7						1
32			11		1	10	1		1				
64			2			27							
>64						5							

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**
MIC	**N of resistant isolates**	**86**	**0**	**86**	**80**	**5**	**42**	**0**	**10**	**0**	**41**	**48**	**36**	**0**	**18**
<=0.015							37								
<=0.03										86					
0.03							6								
0.064							1								
0.12							7								
<=0.25														81	42
0.25							22								
<=0.5					6				59						
0.5				2			3							5	20
<=1								86							
1				4	20		2		17						6
<=2			16										49		
2				5	12		1								
<=4											42				
4			59	15	8				1				1		
>4				60											
<=8						81						5			
8			11		29		4								
>8					11		3								
16									5		3	9	1		
32		2				2			2		5	15	2		

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**	**86**
MIC	**N of resistant isolates**	**86**	**0**	**86**	**80**	**5**	**42**	**0**	**10**	**0**	**41**	**48**	**36**	**0**	**18**
>32									2						18
64		5									5	9	15		
>64		79											18		
128											16	5			
>128						3					15				
1024												2			
>1024												41			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: Germany

Sampling Details: MHK EUVSEC2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	15	15	15	15	15	15	15	15	15	15	15	15
MIC	N of resistant isolates	10	13	4	4	5	12	4	4	0	0	0	0
<=0.015										12			
<=0.03												15	
0.03										2			
<=0.064		1		8									
0.064										1			
<=0.12								5	3		7		
0.12		4		1	2								
<=0.25			2				2						
0.25		5						2	1		7		
0.5		2	1				1				1		
1		1	3				2						
2						1	1						2
4		1	4		2	3	3		3				6
8		1	2		2	6	3		1				7

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	15	15	15	15	15	15	15	15	15	15	15	15
MIC	N of resistant isolates	10	13	4	4	5	12	4	4	0	0	0	0
16			2			1	1						
32						2	1						
64			1			1	1						
>64						1							

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**
MIC	**N of resistant isolates**	**15**	**1**	**13**	**12**	**4**	**10**	**0**	**2**	**0**	**9**	**8**	**8**	**0**	**8**
<=0.015							5								
<=0.03										15					
0.12							1								
<=0.25				2										13	4
0.25							2								
<=0.5					3				10						
0.5				1										2	2
<=1								15							
1				3					2						1
<=2			1										6		
2					2				1						
<=4											5				
4			8	4	3		1						1		
>4				5											
<=8						10									
8			5		4		4				1				
>8					3		2								
16						1						2			
32						3			2			2			
>32															8
64						1					1	3	4		

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**
MIC	**N of resistant isolates**	**15**	**1**	**13**	**12**	**4**	**10**	**0**	**2**	**0**	**9**	**8**	**8**	**0**	**8**
>64		15	1										4		
128											1				
>128											7				
>1024												8			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: France

Sampling Details: MHK EUVSEC2

AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
Cefotaxime synergy test	**Not Available**	**Not Available**	**Positive/Present**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
Ceftazidime synergy test	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Positive/Present**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
ECOFF	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**64**
N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC **N of resistant isolates**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
<=0.015							1			
<=0.03									1	
<=0.064			1							
<=0.12						1				
0.25								1		
1					1					
2	1			1						
4										1
16		1								

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: France

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**1**	**0**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**1**	**0**	**1**
<=0.03										1					
0.12							1								
<=0.25														1	
<=0.5									1						
<=1								1							
1					1										
4			1												
>4				1											
32													1		
>32															1
>64		1													
128						1					1				
>1024												1			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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: Hungary

Sampling Details: MHK EUVSEC2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	22	22	22	22	22	22	22	22	22	22	22	22
MIC	N of resistant isolates	15	22	17	17	18	22	17	17	0	0	0	0
<=0.015										12			
<=0.03												21	
0.03										6			
<=0.064				3									
0.064										4		1	
<=0.12								3			9		
0.12		7		2									
0.25		9						2			13		
0.5		3											
1		1					1						
2			2		2		1		1				1
4		1	3		8	3	4		6				9
8		1	11	1	5	1	8		9				10
16			4		1		7		1				2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**		**Not Available**	**Not Available**	**Not Available**	**Not Available**
	Ceftazidime synergy test	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Not Available**	**Positive/Present**	**Negative/Absent**	**Not Available**	**Not Available**	**Not Available**	**Not Available**
	ECOFF	**0.125**	**0.25**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.064**	**0.5**	**0.25**	**0.12**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**64**	**128**	**128**	**128**	**2**	**16**	**16**	**64**
	N of tested isolates	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**
MIC	**N of resistant isolates**	**15**	**22**	**17**	**17**	**18**	**22**	**17**	**17**	**0**	**0**	**0**	**0**
32			1			4	1						
64			1			11							
>64						3							

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

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

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**
MIC	**N of resistant isolates**	**22**	**0**	**22**	**22**	**2**	**20**	**0**	**2**	**0**	**18**	**18**	**13**	**0**	**11**
<=0.015							2								
<=0.03										22					
<=0.25														21	8
0.25							4								
<=0.5									13						
0.5							3							1	3
<=1								22							
1					1				7						
<=2			1										8		
2				2	1										
<=4											2				
4			14	2	1		1						1		
>4				18											
<=8						20						1			
8			5		10		8				2				
>8					9		4								
16			2												
32						1			2			2			
>32															11
64						1					2	1	6		
>64		22											7		

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**
MIC	**N of resistant isolates**	**22**	**0**	**22**	**22**	**2**	**20**	**0**	**2**	**0**	**18**	**18**	**13**	**0**	**11**
128											4				
>128											12				
1024												2			
>1024												16			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**
MIC	**N of resistant isolates**	**47**	**0**	**0**	**0**	**2**	**72**	**0**	**3**	**0**	**75**	**51**	**25**	**0**	**24**
<=0.015							101								
<=0.03										188					
0.03							12								
0.064							5			2					
0.12							23								
<=0.25				190										183	82
0.25							42								
<=0.5					190				139						
0.5							4							7	67
<=1	9							190							
1							1		44						12
<=2		7											151		
2	78								4						5
<=4											112				
4	49	79											14		
<=8						178						26			
8	7	95					1				3				
>8							1								
16		9				10			3			25			
32											5	56	2		
>32															24

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**	**190**
MIC	**N of resistant isolates**	**47**	**0**	**0**	**0**	**2**	**72**	**0**	**3**	**0**	**75**	**51**	**25**	**0**	**24**
64											29	32	10		
>64		47											13		
128						1					30	6			
>128						1					11				
256												2			
512												1			
1024												5			
>1024												37			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC2

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	160	160	160	160	160	160	160	160	160	160	160	160
MIC	N of resistant isolates	133	151	77	77	85	140	77	77	6	0	0	0
<=0.015										88			
<=0.03												153	
0.03										57			
<=0.064		10		61	3								
0.064										9		7	
<=0.12								46	16		97		
0.12		17		12	5					6			
<=0.25			9				12						
0.25		68			2			16	4		62		
0.5		7	3		1		8	1			1		
1		2	8		1	1	24		2				
2		14	5		6	13	28		8				12
4		22	13		38	44	17		42				77
8		18	69		31	17	64		25				68

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid		Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid		Ertapenem	Imipenem	Meropenem	Temocillin
	Cefotaxime synergy test	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available		Not Available	Not Available	Not Available	Not Available
	Ceftazidime synergy test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Positive/Present	Negative/Absent	Not Available	Not Available	Not Available	Not Available
	ECOFF	0.125	0.25	0.25	0.25	8	0.5	0.5	0.5	0.06	0.5	0.125	32
	Lowest limit	0.064	0.25	0.064	0.064	0.5	0.25	0.12	0.12	0.015	0.12	0.03	0.5
	Highest limit	32	64	64	64	64	128	128	128	2	16	16	64
	N of tested isolates	160	160	160	160	160	160	160	160	160	160	160	160
MIC	N of resistant isolates	133	151	77	77	85	140	77	77	6	0	0	0
16		2	25			6	7						3
32			22			16							
64			6			52							
>64						11							

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin: Switzerland

Sampling Details: MHK EUVSEC

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**
MIC	**N of resistant isolates**	**157**	**0**	**150**	**137**	**13**	**78**	**0**	**9**	**0**	**73**	**84**	**53**	**0**	**40**
<=0.015							67								
<=0.03										155					
0.03							12								
0.064							3			5					
0.12							13								
<=0.25				10										145	46
0.25							34								
<=0.5					23				115						
0.5				2			9							14	65
<=1								160							
1				7	35		4		34					1	9
<=2			12										104		
2	2			7	17		1		2						
<=4											78				
4		108	13	10		1		1					2		
>4			121												
<=8						144						3			
8	1	38		52		7				7			1		
>8				23		9									
16		2			3			3		2	18				
32	2				2			4		11	24	1			

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**	**160**
MIC	**N of resistant isolates**	**157**	**0**	**150**	**137**	**13**	**78**	**0**	**9**	**0**	**73**	**84**	**53**	**0**	**40**
>32									1						40
64		2									8	31	28		
>64		153											24		
128						1					22	8			
>128						10					32				
256												1			
1024												4			
>1024												71			

OTHER ANTIMICROBIAL RESISTANCE TABLES

Table Antimicrobial susceptibility testing of Enterococcus, non-pathogenic - E. faecalis in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:Switzerland

Sampling Details:MHK EUVENC

	AM substance	Ampicillin	Chloramphenicol	Ciprofloxacin	Daptomycin	Erythromycin (Erythromycin A)	Gentamicin	Linezolid	Quinupristin/Dalfopristin	Teicoplanin	Tetracycline	Tigecycline	Vancomycin
	ECOFF	**4**	**32**	**4**	**4**	**4**	**32**	**4**	**0.5**	**2**	**4**	**0.25**	**4**
	Lowest limit	**0.5**	**4**	**0.12**	**0.25**	**1**	**8**	**0.5**	**0.5**	**0.5**	**1**	**0.03**	**1**
MIC	**Highest limit**	**64**	**128**	**16**	**32**	**128**	**1024**	**64**	**64**	**64**	**128**	**4**	**128**
0.064												9	
0.12												17	
0.25				1								5	
<=0.5		2								31			
0.5				3	1								
<=1						12					10		18
1		23		20	11			3					
2		6		6	15	4		26			1		10
<=4			3										
4					4	4		2					2
<=8							10						
8			26						27				
16			1			2	21		3				
>16				1									
32						1			1		1		
64			1								7		
128											12		
>128						8							1

Table Antimicrobial susceptibility testing of Enterococcus, non-pathogenic - E. faecium in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:Switzerland

Sampling Details:MHK EUVENC

	AM substance	Ampicillin	Chloramphenicol	Ciprofloxacin	Daptomycin	Erythromycin (Erythromycin A)	Gentamicin	Linezolid	Quinupristin/Dalfopristin	Teicoplanin	Tetracycline	Tigecycline	Vancomycin
	ECOFF	**4**	**32**	**4**	**4**	**4**	**32**	**4**	**1**	**2**	**4**	**0.25**	**4**
	Lowest limit	**0.5**	**4**	**0.12**	**0.25**	**1**	**8**	**0.5**	**0.5**	**0.5**	**1**	**0.03**	**1**
MIC	**Highest limit**	**64**	**128**	**16**	**32**	**128**	**1024**	**64**	**64**	**64**	**128**	**4**	**128**
<=0.03												34	
0.064												125	
0.12												70	
<=0.25					6								
0.25				1								15	
<=0.5	90							1	45	246			
0.5				4	4							3	
<=1						117					185		221
1	57			50	18			11	61	1			
2	56			87	90	58		188	42		3		24
<=4		66											
4	34			98	113	19		47	95		3		2
<=8							155						
8	8	178	7	16	7			3		6			
16	1	3			4	87		1		2			
32					2	5				1			
64					1					26			
>64	1												
128					1					21			
>128					38								

Table Antimicrobial susceptibility testing of Methicillin resistant Staphylococcus aureus (MRSA) in Meat from broilers (Gallus gallus) - fresh

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:Germany

Sampling Details:MHK EUST

	AM Substance	Cefoxitin	Chloramphenicol	Ciprofloxacin	Clindamycin	Erythromycin (Erythromycin A)	Fusidic acid	Gentamicin	Kanamycin	Linezolid	Mupirocin	Penicillin	Quinupristin/Dalfopristin	Rifampicin	Streptomycin
	Performed CC MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
	Performed MLST MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
	ECOFF	4	16	1	0.25	1	0.5	2	8	4	1	0.12	1	0.03	16
	Lowest limit	0.5	4	0.25	0.12	0.25	0.5	1	4	1	0.5	0.12	0.5	0.016	4
MIC	Highest limit	16	64	8	4	8	4	16	64	8	256	2	4	0.5	32
<=0.016														8	
<=0.25				3											
<=0.5							8				8		1		
0.5				2		1									
<=1								8		1					
1													2		
2										7			3		
>2												8			
<=4									8						6
4													2		
>4					8										
8			6												2
>8				3		7									
16		7	2												
>16		1													

Table Antimicrobial susceptibility testing of Methicillin resistant Staphylococcus aureus (MRSA) in Meat from broilers (Gallus gallus) - fresh - CONTINUED

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

	AM substance	Sulfamethoxazole	Tetracycline	Tiamulin	Trimethoprim	Vancomycin
	Performed CC MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available
	Performed MLST MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available
	ECOFF	128	1	2	2	2
	Lowest limit	64	0.5	0.5	2	1
MIC	Highest limit	512	16	4	32	16
<=0.5			3	3		
<=1						8
<=2					3	
>4				5		
>16			5			
>32					5	
<=64		8				

Table Antimicrobial susceptibility testing of Methicillin resistant Staphylococcus aureus (MRSA) in Meat from broilers (Gallus gallus) - fresh

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country Of Origin:Hungary

Sampling Details:MHK EUST

	AM Substance	Cefoxitin	Chloramphenicol	Ciprofloxacin	Clindamycin	Erythromycin (Erythromycin A)	Fusidic acid	Gentamicin	Kanamycin	Linezolid	Mupirocin	Penicillin	Quinupristin/Dalfopristin	Rifampicin	Streptomycin
	Performed CC MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
	Performed MLST MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
	ECOFF	4	16	1	0.25	1	0.5	2	8	4	1	0.12	1	0.03	16
	Lowest limit	0.5	4	0.25	0.12	0.25	0.5	1	4	1	0.5	0.12	0.5	0.016	4
MIC	Highest limit	16	64	8	4	8	4	16	64	8	256	2	4	0.5	32
<=0.016														1	
<=0.12					1										
<=0.25				1		1									
<=0.5							1				1		1		
<=1								1		1					
>2												1			
<=4			1						1						
8		1													1

Table Antimicrobial susceptibility testing of Methicillin resistant Staphylococcus aureus (MRSA) in Meat from broilers (Gallus gallus) - fresh - CONTINUED

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Hungary

	AM substance	Sulfamethoxazole	Tetracycline	Tiamulin	Trimethoprim	Vancomycin
	Performed CC MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available
	Performed MLST MRSA characterisation	Not Available	Not Available	Not Available	Not Available	Not Available
	ECOFF	128	1	2	2	2
	Lowest limit	64	0.5	0.5	2	1
MIC	Highest limit	512	16	4	32	16
<=0.5			1	1		
<=1						1
<=2					1	
<=64		1				

Specific monitoring of ESBL-/AmpC-/carbapenemase-producing bacteria and specific monitoring of carbapenemase-producing bacteria, in the absence of isolate detected

Programme Code	Matrix Detailed	Zoonotic Agent Detailed	Sampling Strategy	Sampling Stage	Sampling Details	Sampling Context	Sampler	Sample Type	Sampling Unit Type	Sample Origin	Comment	Total Units Tested	Total Units Positive
CARBA MON	Gallus gallus (fowl) - broilers	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Slaughterhouse	N_A	Monitoring - EFSA specifications	Official sampling	animal sample - caecum	herd/flock	Switzerland	ChromID Carba and ChromID Oxa-48 agar	307	0
	Meat from broilers (Gallus gallus) - fresh	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	single (food/feed)	Argentina	ChromID Carba and ChromID Oxa-48 agar	1	0
										Austria	ChromID Carba and ChromID Oxa-48 agar	17	0
										France	ChromID Carba and ChromID Oxa-48 agar	4	0
										Germany	ChromID Carba and ChromID Oxa-48 agar	28	0
										Hungary	ChromID Carba and ChromID Oxa-48 agar	27	0
										Italy	ChromID Carba and ChromID Oxa-48 agar	6	0
										Slovenia	ChromID Carba and ChromID Oxa-48 agar	14	0
										Switzerland	ChromID Carba and ChromID Oxa-48	205	0

European Food Safety Authority

Latest Transmission set

Table Name	Last submitted dataset transmission date
Antimicrobial Resistance	19-Jan-2018
Animal Population	07-Jul-2017
Disease Status	07-Jul-2017
Food Borne Outbreaks	07-Jul-2017
Prevalence	07-Jul-2017
Text Forms	31-May-2017