

SCIENTIFIC REPORT OF EFSA AND ECDC

The European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne Outbreaks in 2011¹

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ABSTRACT

The European Food Safety Authority and the European Centre for Disease Prevention and Control analysed the information submitted by 27 European Union Member States on the occurrence of zoonoses and food-borne outbreaks in 2011. *Campylobacteriosis* was the most commonly reported zoonosis with 220,209 confirmed human cases. The occurrence of *Campylobacter* continued to be high in broiler meat at EU level. The decreasing trend in confirmed salmonellosis cases in humans continued with a total of 95,548 cases in 2011. Most Member States met their *Salmonella* reduction targets for poultry, and *Salmonella* is declining in these populations. In foodstuffs, *Salmonella* was most often detected in meat and products thereof. The number of confirmed human listeriosis cases decreased to 1,476. *Listeria* was seldom detected above the legal safety limit from ready-to-eat foods. A total of 9,485 confirmed verotoxigenic *Escherichia coli* (VTEC) infections were reported. This represents an increase of 159.4 % compared with 2010 as a result of the large STEC/VTEC outbreak that occurred in 2011 in the EU, primarily in Germany. VTEC was also reported from food and animals. The number of human yersiniosis cases increased to 7,017 cases. *Yersinia enterocolitica* was isolated also from pig meat and pigs; 132 cases of *Mycobacterium bovis* and 330 cases of brucellosis in humans were also reported. The prevalence of bovine tuberculosis in cattle increased, and the prevalence of brucellosis decreased in cattle and sheep and goat populations. Trichinellosis and echinococcosis caused 268 and 781 human cases, respectively and these parasites were mainly detected in wildlife. The numbers of alveolar and of cystic echinococcosis respectively increased and decreased in the last five years. One imported human case of rabies was reported. The number of rabies cases in animals continued to decrease. Most of the 5,648 reported food-borne outbreaks were caused by *Salmonella*, bacterial toxins, *Campylobacter* and viruses, and the main food sources were eggs, mixed foods and fish and fishery products.

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KEY WORDS

Zoonoses, surveillance, monitoring, *Salmonella*, *Campylobacter*, *Listeria*, rabies, parasites, food-borne outbreaks, food-borne diseases

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Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne Outbreaks in 2011

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About EFSA

The European Food Safety Authority (EFSA), located in Parma, Italy, was established and funded by the European Union as an independent agency in 2002 following a series of food scares that prompted the European public to voice concerns about food safety and the ability of regulatory authorities to protect consumers. EFSA provides objective scientific advice on all matters, in close collaboration with national authorities and in open consultation with its stakeholders, with a direct or indirect impact on food and feed safety, including animal health and welfare and plant protection. EFSA is also consulted on nutrition in relation to EU legislation. EFSA's work falls into two areas: risk assessment and risk communication. In particular, EFSA's risk assessments provide risk managers (EU institutions with political accountability, i.e. the European Commission, the European Parliament and the Council) with a sound scientific basis for defining policy-driven legislative or regulatory measures required to ensure a high level of consumer protection with regard to food and feed safety. EFSA communicates to the public in an open and transparent way on all matters within its remit. Collection and analysis of scientific data, identification of emerging risks and scientific support to the Commission, particularly in the case of a food crisis, are also part of EFSA's mandate, as laid down in the founding Regulation (EC) No 178/2002⁴ of 28 January 2002.

About ECDC

The European Centre for Disease Prevention and Control (ECDC), an EU agency based in Stockholm, Sweden, was established in 2005. The objective of ECDC is to strengthen Europe's defences against infectious diseases. According to Article 3 of the founding Regulation (EC) No 851/2004⁵ of 21 April 2004, ECDC's mission is to identify, assess and communicate current and emerging threats to human health posed by infectious diseases. In order to achieve this mission, ECDC works in partnership with national public health bodies across Europe to strengthen and develop EU-wide disease surveillance and early warning systems. By working with experts throughout Europe, ECDC pools Europe's knowledge on health so as to develop authoritative scientific opinions about the risks posed by current and emerging infectious diseases.

About the report

EFSA is responsible for examining the data on zoonoses, antimicrobial resistance and food-borne outbreaks submitted by Member States in accordance with Directive 2003/99/EC⁶ and for preparing the EU Summary Report from the results. Data from 2011 in this EU Summary Report were produced in collaboration with ECDC which provided the information on and analyses of zoonoses cases in humans.

Acknowledgement

EFSA and ECDC wish to thank the members of the Task Force on Zoonoses Data Collection and the Food and Waterborne Diseases and Zoonoses network members who provided the data and reviewed the report. The contributions of the following for the support provided to this scientific output are also gratefully acknowledged: EFSA staff members Pia Mäkelä, Frank Boelaert, Valentina Rizzi, Marios Georgiadis, Elena Mazzolini, Giusi Amore, Francesca Riolo, Kenneth Mulligan; ECDC staff members Therese Westrell, Taina Niskanen, Angela Lahuerta Marin, Joana Gomes Dias and Johanna Takkinen; and reviewer Hein Imberechts.

4 Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31, 01.02.2002, pp. 1–24.

5 Regulation (EC) No 851/2004 of the European Parliament and of the Council of 21 April 2004 establishing a European Centre for Disease Prevention and Control. OJ L 142, 30.04.2004, pp. 1–11.

6 Directive 2003/99/EC of the European Parliament and of the Council of 17 November 2003 on the monitoring of zoonoses and zoonotic agents, amending Council Decision 90/424/EEC and repealing Council Directive 92/117/EEC. OJ L 325, 12.12.2003, pp. 31–40.

Summary

Zoonoses are infections and diseases that are naturally transmissible directly or indirectly, for example via contaminated foodstuffs, between animals and humans. The severity of these diseases in humans varies from mild symptoms to life-threatening conditions. In order to prevent zoonoses from occurring, it is important to identify which animals and foodstuffs are the main sources of infections. For this purpose information aimed at protecting human health is collected and analysed from all European Union Member States.

In 2011, 27 Member States submitted information on the occurrence of zoonoses, zoonotic agents and food-borne outbreaks to the European Commission and the European Food Safety Authority. Furthermore, information on cases of zoonoses reported in humans was provided by the European Centre for Disease Prevention and Control. In addition, three European countries that were not European Union Member States provided information. The European Food Safety Authority and the European Centre for Disease Prevention and Control jointly analysed the data, the results of which are published in this annual European Union Summary Report, which covers 10 zoonoses and food-borne outbreaks.

In 2011, the notification rate and confirmed number of cases of human campylobacteriosis in the European Union increased compared with 2010. Human campylobacteriosis continued to be the most commonly reported zoonosis with 220,209 confirmed cases. The number of confirmed cases of campylobacteriosis in the European Union has followed a significant increasing trend in the last four years, along with a clear seasonal trend. The proportion of *Campylobacter*-positive food and animal samples remained at levels similar to previous years, with the occurrence of *Campylobacter* continuing to be high in broiler meat.

The number of salmonellosis cases in humans decreased by 5.4 % compared with 2010 and by as much as 37.9 % compared with 2007. A statistically significant decreasing trend in the European Union was observed over the period 2008-2011. In total, 95,548 confirmed human cases were reported in 2011. It is assumed that the observed reduction in salmonellosis cases is mainly a result of the successful *Salmonella* control programmes in poultry populations. Most Member States met their *Salmonella* reduction targets for poultry, and *Salmonella* is declining in these animal populations. In foodstuffs, *Salmonella* was most often detected in fresh broiler meat. The food categories with highest proportion of products not complying with the European Union *Salmonella* criteria were minced meat and meat preparations as well as live bivalve molluscs.

The number of listeriosis cases in humans decreased slightly compared with 2010, and 1,476 confirmed human cases were reported in 2011. As in previous years, a high fatality rate (12.7 %) was reported among the cases. *Listeria monocytogenes* was seldom detected above the legal safety limit from ready-to-eat foods at point of retail. Samples exceeding this limit were most often found in fishery products, cheeses and fermented sausages.

A total of 9,485 confirmed verotoxigenic *Escherichia coli* infections were reported in 2011, which was a 2.6-fold increase compared with 2010. Of those cases in which the serogroup was known, most were caused by serogroup O157. As many as 1,064 cases were, however, reported of serogroup O104 (20.1 % of cases with known serogroup) due to a large outbreak primarily in Germany. A large number of the cases, 1,006 cases, were also affected by the severe condition, Haemolytic Uraemic Syndrome, in 2011. This was a 4.5-fold increase compared with 2010, primarily observed in adult cases and attributed to the German outbreak. The number of reported cases of verotoxigenic *Escherichia coli* human cases has been increasing in the EU since 2008. In animals and food most verotoxigenic *Escherichia coli*-positive findings were made in cattle and bovine meat, but the bacteria were also detected in some other animal species and foodstuffs.

A total of 7,017 confirmed cases of yersiniosis were reported in the European Union in 2011, corresponding to an increase by 3.5 % compared with 2010. There was, however, a statistically significant decreasing five-year trend in the European Union in 2007-2011. Among food and animals, *Yersinia enterocolitica* was mainly isolated from pig meat and pigs.

The number of confirmed human cases due to *Mycobacterium bovis* in the European Union in 2011 was 132. This was a decrease compared with 2010, with a few Member States accounting for the majority of the reported cases. The reported prevalence of bovine tuberculosis in cattle increased slightly at European

Union level, although remained at very low level. This slight increase was, however, due to one Member State that reported an increase in prevalence of bovine tuberculosis for the third consecutive year.

The number of confirmed brucellosis cases in humans continued to decline, and 330 confirmed cases were reported in 2011 at European Union level. The number of brucellosis-positive sheep and goat herds continued to decrease. Bovine brucellosis decreased only marginally compared with 2010.

In 2011, two parasitic zoonoses, trichinellosis and echinococcosis, caused 268 and 781 confirmed human cases in the European Union, respectively. Although the number of cases was slightly higher in 2011 compared with 2010, human trichinellosis cases remained at a low level in the European Union compared with 2009 and previous years. In 2011, *Trichinella* was found slightly more often in pigs than it was in 2010. The parasite was more prevalent in wildlife than in farmed animals. The number of confirmed human echinococcosis cases in 2011 increased by 3.3 % compared with 2010, primarily as a result of the increasing number of cases of *Echinococcus multilocularis*, causing alveolar echinococcosis, being reported in 2011, but also on account of an increase over the last five years. *Echinococcus multilocularis* was reported mainly in foxes by several central European reporting countries.

One imported human case of rabies was reported in the European Union in 2011. The general decreasing trend in the numbers of reported rabies cases in animals continued in 2011. Rabies was reported mainly in wildlife animal species and sometimes in farm and pet animals in some Baltic and Eastern and Southern European Member States.

A total of 5,648 food-borne outbreaks were reported in the European Union, resulting in 69,553 human cases, 7,125 hospitalisations and 93 deaths. Most of the reported outbreaks were caused by *Salmonella*, bacterial toxins, *Campylobacter* and viruses; however, the outbreak with most human cases was caused by Shiga toxin-producing *Escherichia coli*/verotoxigenic *Escherichia coli* and associated with sprouted seeds. The most important food sources of the outbreaks were eggs and egg products, followed by mixed food and fish and fish products. Overall, 11 waterborne outbreaks were reported in 2011, caused by *Campylobacter*, calicivirus, *Cryptosporidium hominis* and verotoxigenic *Escherichia coli*.

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1. INTRODUCTION

The European Union (EU) system for the monitoring and collection of information on zoonoses is based on the Zoonoses Directive 2003/99/EC, which obliges EU Member States (MSs) to collect relevant and, where applicable, comparable data on zoonoses, zoonotic agents, antimicrobial resistance and food-borne outbreaks. In addition, MSs shall assess trends and sources of these agents as well as outbreaks in their territory, transmitting an annual report to the European Commission (EC), covering the data collected. The European Food Safety Authority (EFSA) is assigned the tasks of examining these data and publishing the EU Summary Report.

Decision 2119/98/EC⁷ on setting up a network for the epidemiological surveillance and control of communicable diseases in the EU, as complemented by Decision 2000/96/EC⁸ with amendment 2003/542/EC⁹ on the diseases to be progressively covered by the network, established the basis for data collection on human diseases from MSs. The Decisions anticipate that data from the networks shall be used in the EU Summary Report.

Since 2005, the European Centre for Disease Prevention and Control (ECDC) has provided data on zoonotic infections in humans, as well as their analyses, for the EU Summary Report. Starting in 2007, data on human cases have been reported from The European Surveillance System (TESSy), maintained by ECDC.

This EU Summary Report 2011 on zoonoses, zoonotic agents and food-borne outbreaks was prepared in collaboration with ECDC. MSs, other reporting countries, the EC, members of EFSA's scientific panels on Biological Hazards (BIOHAZ) and Animal Health and Welfare (AHAW) and the relevant EU Reference Laboratories were consulted while preparing the report.

The efforts made by MSs, the reporting non-MSs and the EC in the reporting of zoonoses data and in the preparation of this report are gratefully acknowledged.

The data on antimicrobial resistance in zoonotic agents in 2011 is published in a separate EU Summary Report.

In 2011, data were collected on a mandatory basis for the following eight zoonotic agents in animals, food and feed: *Salmonella*, thermophilic *Campylobacter*, *Listeria monocytogenes*, verotoxigenic *Escherichia coli*, *Mycobacterium bovis*, *Brucella*, *Trichinella* and *Echinococcus*. Data on human cases were reported via TESSy by the 27 MSs and two European Economic Area (EEA)/European Free Trade Association (EFTA) countries (Iceland and Norway) for all diseases. Switzerland reported human cases directly to EFSA. Moreover, mandatory reported data included antimicrobial resistance in *Salmonella* and *Campylobacter* isolates, food-borne outbreaks and susceptible animal populations. In addition, based on the epidemiological situations in MSs, data were reported on the following agents and zoonoses: *Yersinia*, rabies, Q fever, *Toxoplasma*, *Cysticerci*, and *Francisella*. Data on *Staphylococcus* and antimicrobial resistance in indicator *E. coli* and enterococci isolates were also submitted. Furthermore, MSs provided data on certain other microbiological contaminants in foodstuffs: histamine, staphylococcal enterotoxins and *Enterobacter sakazakii* (*Cronobacter* spp.), for which food safety criteria are set down in EU legislation.

All 27 MSs submitted national zoonoses reports concerning the year 2011. In addition, zoonoses reports were submitted by three non-MSs (Iceland, Norway and Switzerland). Data on zoonoses cases in humans were also received from all 27 MSs and additionally from three non-MSs: Iceland, Norway and Switzerland.

The 2011 EU Summary Report on zoonoses and food-borne outbreak is a restricted one focusing on the most relevant annual information on zoonoses and food-borne outbreaks. If substantial changes compared with the previous year were observed, these changes have also been covered. In addition, all the reported data are summarized in the Level 3 Tables.

⁷ Decision 2119/98/EC of the European Parliament and of the Council of 24 September 1998 setting up a network for the epidemiological surveillance and control of communicable diseases in the Community. OJ L 268, 3.10.1998, pp.1-7.

⁸ Commission Decision 2000/96/EC of 22 December 1999 on the on the communicable diseases to be progressively covered by the Community network under Decision No 2119/98/EC of the European Parliament and of the Council. OJ L 28, 3.2.2000, pp. 50–53.

⁹ Commission Decision 2003/542/EC of 17 July 2003 amending Decision 2000/96/EC as regards the operation of dedicated surveillance networks. OJ L 185, 24.7.2003, pp. 55–58.

The current report includes a general summary and main findings (Level 1), and EU assessments of the specific zoonoses and items (Level 2). Level 3 of the report consists of an overview of all data submitted by MSs in table format and is available only online.

Monitoring and surveillance schemes for most zoonotic agents covered in this report are not harmonised among MSs, and findings presented in this report must, therefore, be interpreted with care. The data presented may not have necessarily been derived from sampling plans that were statistically designed, and, thus, findings may not accurately represent the national situation regarding zoonoses. Regarding data on human infections, please note that the numbers presented in this report may differ from national zoonoses reports due to differences in case definitions used at EU and national level or because of different dates of data submission and extraction. Results are generally not directly comparable among MSs and sometimes not even between different years in one country.

The national zoonoses reports submitted in accordance with Directive 2003/99/EC are published on the EFSA website together with the EU Summary Report.

2. MAIN FINDINGS

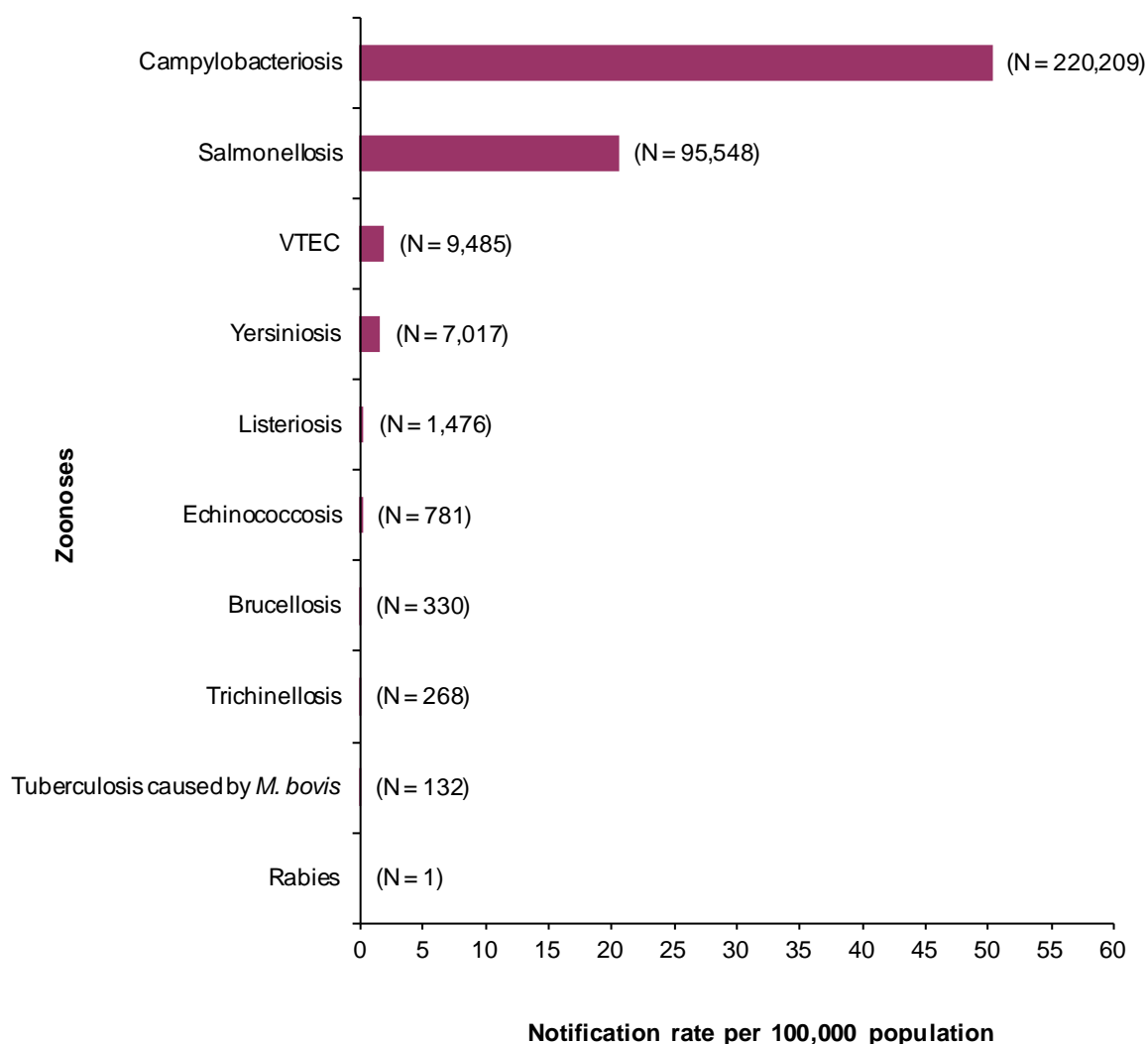
2.1. Main conclusions of the EU Summary Report on zoonoses, zoonotic agents and food-borne outbreaks 2011

- The number of confirmed campylobacteriosis cases in humans has increased in the past five years in the EU, and campylobacteriosis remains the most frequently reported zoonotic disease in humans. The occurrence of *Campylobacter* continued to be high in broiler meat at the EU level.
- The number of human salmonellosis cases reported in the EU decreased and this decline is a continuation of the significant declining trend observed since 2007. It is assumed that the observed reduction in salmonellosis cases is mainly as a result of the successful *Salmonella* control programmes in poultry populations. Most MSs met their *Salmonella* reduction targets for poultry in 2011 and *Salmonella* is declining in these animal populations. *Salmonella* in foodstuffs was mainly detected in meat and products thereof.
- Although a decrease in case numbers of listeriosis was reported in 2011, there was no statistically significant increasing or decreasing trend in the EU between 2008 and 2011. The highest proportions of food samples exceeding the legal safety limit set for *Listeria monocytogenes* (*L. monocytogenes*) in 2011 were observed in ready-to-eat (RTE) fishery products, cheeses and fermented sausages.
- The number of cases of verotoxigenic *Escherichia coli* (VTEC) in humans has been increasing in the EU since 2008. In 2011, there was an increase of 2.6 times in reported case numbers and 4.5 times the number of severe renal complications (haemolytic uremic syndrome) reported, compared with 2010. This was due to a single extensive food-borne outbreak primarily affecting Germany but with linked cases in 14 other MSs and the United States. The outbreak strain STEC/VTEC O104:H4 was particularly virulent with higher proportion of severe cases and fatalities than normally reported. Of cases in which the serogroup was known, serogroup O157 was still the most commonly reported. In animals and food, findings of VTEC and serogroup O157 were most often reported from cattle and bovine meat, but the bacteria were also detected in some other animal species and foodstuffs.
- There was a statistically significant decreasing five-year trend of human yersiniosis cases in the EU over the period 2007-2011. The number cases, however, slightly increased in 2011 for the first time since 2006. *Yersinia enterocolitica* (*Y. enterocolitica*) was mainly isolated from pig meat and pigs.
- The number of human cases due to *Mycobacterium bovis* (*M. bovis*) decreased in 2011 compared with 2010, with three MSs accounting for the majority of the reported cases. The reported prevalence of bovine tuberculosis in cattle increased slightly at the EU level. However, this was due to one MS that reported an increase in the prevalence of bovine tuberculosis for the third consecutive year.
- Concomitantly with the significant decreasing EU trend in human brucellosis cases, the prevalence of both bovine and small ruminant brucellosis has continued to decrease within the EU, with the decline in small ruminant cases being more substantial.
- The number of trichinellosis cases in humans increased in 2011 compared with 2010 but remained at a lower level than in 2007-2009. *Trichinella* was also found slightly more often in pigs in 2011 than in 2010. The parasite was more prevalent in wildlife than in farmed animals.
- Cases of echinococcosis in humans increased slightly in 2011. This was primarily a result of an increasing number of cases of the more severe form of echinococcosis, alveolar echinococcosis caused by *Echinococcus multilocularis* (*E. multilocularis*), being reported in 2011 and over the last five-year period. *E. multilocularis* was reported mainly in foxes by several reporting MSs, while among the MSs that reported data on *Echinococcus* in farm animals, the majority reported no findings or very low levels of *Echinococcus*.
- One human rabies case associated to travel outside of the EU was reported in 2011. The general decreasing trend in the total number of rabies cases in domestic animals and wildlife observed in previous years continued in 2011.
- *Salmonella* was the most frequently reported cause of reported food-borne outbreaks in 2011, although the numbers of *Salmonella* outbreaks continued to decrease. The second most important causative agent group was bacterial toxins, followed by *Campylobacter* and viruses. The main food vehicles in the reported food-borne outbreaks were eggs and egg products, mixed foods and fish and fish products. In terms of most people affected however, the largest outbreak in 2011 was due to STEC/VTEC O104:H4 in sprouted seeds.

2.2. Zoonoses and item-specific summaries

The public health importance of a zoonosis is not dependent on its incidence in the human population alone. The severity of the disease, case fatality, post-infection (chronic) complications and possibilities for prevention are also key factors determining the importance of the disease. For instance, despite the relatively low number of cases caused by *Listeria* and *Lyssavirus* (rabies), compared with the number of human campylobacteriosis and salmonellosis cases (Figure SU1), these infections are considered important because of the severity of the associated illness and the higher case-fatality rate (Table SU1). The case-fatality rates should, however, be interpreted with caution as the final fate of surviving cases is often unknown beyond the initial sampling and, regarding fatal cases, it can be difficult to ascertain that the disease was the primary cause of death.

Figure SU1. Reported notification rates of zoonoses in confirmed human cases in the EU, 2011



Note: Total number of confirmed cases is indicated in parenthesis at the end of each bar.

Table SU1. Reported hospitalisation and case-fatality rates due to zoonoses in confirmed human cases in the EU, 2011

Disease	Number of confirmed human cases	Hospitalisation				Deaths			
		Confirmed cases covered ¹ (%)	Number of reporting MSs ²	Reported hospitalised cases	Hospitalisation rate (%)	Confirmed cases covered ¹ (%)	Number of reporting MSs ²	Reported deaths	Case-fatality rate (%)
Salmonellosis	95,548	10.4	9	4,557	45.7	49.0	14	56	0.12
Campylobacteriosis	220,209	7.7	9	8,137	47.9	52.1	13	43	0.04
Listeriosis	1,476	43.7	16	604	93.6	71.4	19	134	12.7
VTEC infections	9,485	22.5	14	721	33.8	79.0	16	56	0.75
Yersiniosis	7,017	11.0	9	427	55.2	70.1	12	1	0.02
Brucellosis	330	53.9	8	118	66.3	41.2	8	1	0.74
Trichinellosis	268	76.9	9	153	74.3	76.5	12	1	0.49
Echinococcosis	781	18.2	10	96	67.6	28.4	12	2	0.90
Rabies	1	100	27	1	100	100	27	1	100

1. The proportion (%) of confirmed cases for which the information on hospitalisation or death was available.
2. Not all countries observed cases for all diseases.

Campylobacter

Humans

Campylobacteriosis has been the most frequently reported zoonotic disease in humans in the EU since 2005. In 2011, 220,209 confirmed cases of campylobacteriosis were reported by 25 MSs, which represents an increase of 2.2 % compared with 2010. The overall notification rate of human campylobacteriosis was 50.3 per 100,000 population. The number of confirmed cases of campylobacteriosis increased significantly over the last four years (2008-2011), with clear seasonal peaks occurring each summer. Considering the high number of human campylobacteriosis cases, the severity in terms of reported fatalities was low (0.04 %) (Table SU1).

Foodstuffs

For 2011, most of the information on *Campylobacter* in foodstuffs was reported with regard to broiler meat and products thereof. Overall, 31.3 % of fresh broiler meat units were found positive for *Campylobacter* in the reporting MSs. As in previous years, the proportions of positive broiler meat samples varied widely among MSs, with the prevalence ranging from 3.2 % to 84.6 %.

Animals

In 2011, the overall proportion of *Campylobacter*-positive broiler flocks was 17.8 %, ranging from 12.8 % to 80.6 % among the four MSs reporting flock-based data. In the case of broiler slaughter batch-based data, the overall proportion of *Campylobacter*-positive samples was 21.3 %, varying from 0 % to 92.0 % among the six reporting MSs.

Salmonella

Humans

In 2011, a total of 95,548 confirmed cases of human salmonellosis were reported in the EU. This represents a decrease of 5.4 % compared to 2010 and a reduction by 37.9 % compared to 2007, representing 58,304 fewer cases reported in 2011 than in 2007. The EU notification rate for confirmed cases was 20.7 cases per 100,000 population. The case fatality rate of human salmonellosis was 0.12 % in 2011 (Table SU1). As in previous years, *S. Enteritidis* and *S. Typhimurium* were the most frequently reported serovars (44.4 % and 24.9 %, respectively, of all known reported serovars in human cases). As a result of the harmonised reporting and also several large outbreaks, monophasic *S. Typhimurium* 1,4,[5],12:i:- was the third most commonly reported serovar in the EU (4.7 %). The fourth most common serovar in humans was *Salmonella* Infantis (*S. Infantis*), which has been increasing over the last four years. A seasonal peak in the number of cases during the late summer and early autumn was again observed in the EU in 2011.

It is assumed that the observed reduction in salmonellosis cases in humans is mainly the result of successful *Salmonella* control programmes in fowl (*Gallus gallus*) populations that are in place in EU MSs and that have particularly resulted in a lower occurrence of *Salmonella* in eggs, though other control measures might also have contributed to the reduction.

Foodstuffs

Information on *Salmonella* was reported from a wide range of foodstuff categories in 2011, but the majority of data were from various types of meat and products thereof. The highest proportions of *Salmonella*-positive units were reported for fresh broiler meat at an average level of 5.9 %. In fresh pig meat, 0.7 % of tested samples were found positive for *Salmonella* in the group of reporting MSs.

Salmonella was found in a very low proportion of table eggs, at levels of 0.1 % (single samples or batch samples). *Salmonella* was also detected in other foods, including turkey meat, bovine meat, milk and dairy products, fruit and vegetables and fish and fishery products.

Non-compliance with the EU *Salmonella* criteria was, once again, most often observed in food categories of meat origin. Minced meat and meat preparations from poultry intended to be eaten cooked had the highest level of non-compliance (6.8 % of single samples and 2.4 % of batches). A high proportion of non-compliance was also reported for minced meat and meat preparations from animal species other than poultry intended to be eaten cooked (1.1 % of single samples and 1.4 % of batch samples) and meat

products from poultry meat intended to be eaten cooked (1.1 % of single samples). Non-compliance was also observed in live bivalve molluscs and live echinoderms, tunicates and gastropods, where 1.6 % and 0.8 % of single samples and batches were non-compliant, respectively. Of relevance are the *Salmonella* findings in ready-to-eat (RTE) foods, such as minced meat and meat preparations intended to be eaten raw (1.4 % of non-compliant single samples). All samples of egg products and RTE sprouted seeds were compliant with the criteria in 2011.

Animals

In 2011, 20 MSs (as in 2010) met the *Salmonella* reduction target of ≤ 1 % set for breeding flocks of *Gallus gallus* (fowl), which covers five target serovars (*S. Enteritidis*, *S. Typhimurium*, *S. Hadar*, *S. Infantis*, *S. Virchow*). Overall, 0.6 % of breeding flocks of *Gallus gallus* in the EU were positive for the target serovars during the production period, which was less than in 2010 (0.7 %). Together 1.9 % of the breeding flocks of *Gallus gallus* in the EU were positive for *Salmonella* spp., which was similar to the proportion reported in 2010 (2.0 %).

In the case of flocks of laying hens, 22 MSs (compared with 25 MSs in 2010) met their relative *Salmonella* reduction targets, which cover *S. Enteritidis* and *S. Typhimurium*. The EU prevalence was reduced for the two target serovars from 1.9 % in 2010 to 1.5 % in 2011. Overall, during the production period, 4.2 % (5.9 % in 2010) of laying hen flocks in the EU were positive for *Salmonella* spp.

2011 was the third year of implementing the EU reduction target of ≤ 1 % prevalence for *S. Enteritidis* and *S. Typhimurium* in broiler flocks. Altogether 24 MSs (22 in 2010) met this target and a further slight decrease in the EU prevalence for the target serovars was observed, from 0.4 % in 2010 to 0.3 % in 2011. The prevalence of *Salmonella* spp. was also further reduced from 4.1 % in 2010 to 3.2 % in 2011.

2011 was the second year of MSs implementing the *Salmonella* reduction targets for turkey flocks (≤ 1 % for *S. Enteritidis* and *S. Typhimurium*). All the 14 MSs that reported data on turkey breeding flocks met the target, with an EU prevalence of 0.2 % of the two target serovars (0.3 % in 2010). A further 22 MSs met the target for fattening turkey flocks before slaughter, with only one MS not meeting the target. At the EU level 0.5 % of the fattening turkey flocks were infected with the two target serovars, which is similar to 2010 (0.5 %). In total, 3.5 % and 10.1 % of turkey breeding and fattening flocks, respectively, were positive for *Salmonella* spp. in 2011 (6.9 % and 12.1 % in 2010).

Salmonella findings were also reported in other animal species, including ducks, geese, pigs, cattle, sheep and goats.

Serovars in animals and food

S. Infantis and *S. Enteritidis* were the most commonly reported serovars from *Gallus gallus*, eggs and broiler meat at EU level over the period 2004-2011. The number of reported isolations of *S. Enteritidis* have declined over the years, while isolations of *S. Infantis* have increased in the last three years. In pigs and meat thereof *S. Typhimurium* was by far the most commonly reported serovar over the period 2004-2011. Monophasic *S. Typhimurium* has been the third most frequently reported serovar in 2011 in pigs and meat from pigs. In bovines and meat thereof *S. Typhimurium* and *S. Dublin* were the two most frequently reported serovars over the period 2004-2011.

Feedingstuffs

Salmonella was detected most often in feed materials from land animal origin, up to levels of 4.0 %. Some findings were also made in feed materials derived from fish meal, cereals and oil seeds. *Salmonella* was reported in compound feedingstuffs for cattle, pigs and poultry with the proportion of positive samples 0.3 %-0.8 % at the EU level.

Listeria

Humans

In 2011, 26 MSs reported 1,476 confirmed human cases of listeriosis, which represented a 7.8 % decrease compared with 2010. The overall EU notification rate was 0.32 cases per 100,000 population. There was no statistically significant increasing or decreasing trend in confirmed human cases of listeriosis observed at the EU level in 2008-2011. Listeriosis represents the most severe human disease in terms of hospitalisation and fatal cases (12.7 %) (Table SU1), reflecting the focus of the EU listeriosis surveillance on severe, systemic infections.

Foodstuffs

MSs provided information on numerous investigations of *L. monocytogenes* in different categories of RTE food in 2011. In the case of RTE products at point of retail, very low proportions of samples were generally found to be non-compliant with the EU criterion of ≤ 100 cfu/g. The highest proportion of non-compliant samples was reported for RTE fishery products (0.6 % in single samples and 0.2 % in batches), for fermented sausages (0.6 % in single samples), for hard cheeses (0.1 % in single samples and 1.6 % in batches), and for soft and semi-soft cheeses (0.6 % in batches). The highest level of non-compliance in single samples at processing was observed in RTE fishery products (6.7 %), while the percentage of non-compliance for this category at batch-level was 2.3 %.

Verotoxigenic *E. coli*

Humans

In 2011, a total of 9,485 confirmed human VTEC cases were reported by 26 MSs. This represents an increase of 159.4 % compared with 2010 (3,656) as a result of a large STEC/VTEC O104:H4 outbreak that occurred in 2011 in the EU, primarily in Germany. The very high number of haemolytic uraemic syndrome (HUS) cases reported (1,006 in 2011 compared with 222 in 2010) could also be attributed to the outbreak. The overall EU notification rate of VTEC was 1.9 cases per 100,000 population in 2011. There was a statistically significant increasing EU trend in confirmed VTEC cases in 2008-2011. As in previous years, the most commonly identified VTEC serogroup was O157 (41.2 %) followed by O104 (20.1 %); however, serogroup information was missing for 44 % of confirmed cases. The case fatality rate for human VTEC infections in 2011 was 0.75 % compared with 0.39 % in 2010, with 56 deaths reported (Table SU1). Germany accounted for 89 % of the total number of reported deaths.

Foodstuffs

In food, most information was reported on VTEC and the VTEC O157 serogroup, and these bacteria were most often detected in fresh bovine meat, where overall 1.4 % and 0.3 % of the units tested were positive for VTEC and VTEC O157, respectively. In addition, VTEC was occasionally reported in poultry meat, raw cow's milk, cheeses, butter, sprouted seeds and vegetables. The human pathogenic serogroups were detected from bovine meat, poultry meat, milk and dairy products and vegetables.

Animals

VTEC and VTEC O157 were most frequently reported in cattle, at levels of 8.6 % and 1.4 %, respectively. In addition, VTEC was found in sheep, pigs and some other animal species. The human pathogenic serogroups were detected in cattle and sheep.

Yersinia

Humans

In 2011, 7,017 confirmed human yersiniosis cases were reported in the EU, which represents an increase of 3.5 % compared with 2010. The number of yersiniosis cases in the EU has been declining, with a statistically significant five-year trend since 2007. In 2011, yersiniosis was the fourth most frequently reported zoonosis in the EU, with an overall notification rate of 1.63 cases per 100,000 population. The case fatality rate of human yersiniosis was 0.02 % in 2011 (Table SU1). *Y. enterocolitica* was the most common species reported in human cases and was isolated from 98.4 % of the confirmed cases.

Foodstuffs

In food *Y. enterocolitica* and its human pathogenic biotypes and serovars were most often detected in pig meat and products thereof. Some *Yersinia* findings were also reported in meat from other animal species, and in milk, vegetables and fish. There were no reported findings of *Yersinia pseudotuberculosis* (*Y. pseudotuberculosis*) in any food items tested in 2011.

Animals

Y. enterocolitica was most often detected in pigs, but was also sometimes found in cattle, sheep, goats, cats, dogs, domestic solipeds and some other animal species.

Tuberculosis due to *Mycobacterium bovis*

Humans

Human infections due to *M. bovis* are rare in the EU. In 2011, the total number of confirmed human tuberculosis cases due to *M. bovis* was 132, representing a decrease compared with 2010 (165). As in previous years, a few MSs accounted for most of the confirmed cases.

Animals

In 2011, one MS and two provinces in one MS became officially bovine tuberculosis free (Officially Tuberculosis Free, OTF), increasing the number of OTF MSs to 15 plus two non-MSs, as well as Scotland (the United Kingdom) and six regions and 13 provinces in Italy. Five OTF MSs reported infected cattle herds in 2011. Nine non-OTF MSs reported positive or infected herds. In most of these non-OTF MSs the prevalence of bovine tuberculosis remained at a level comparable to 2010 or decreased, except in the United Kingdom which reported an increase in the prevalence of bovine tuberculosis. *M. bovis* was also detected in over 10 animal species other than cattle, including wildlife.

Brucella

Humans

In 2011, a total of 330 confirmed cases of human brucellosis were reported in the EU, representing a decrease of 7.3 % compared with the 356 confirmed cases in 2010. A significant decreasing five-year trend in human brucellosis was noted in the EU. As in previous years, the highest numbers were reported by non-Officially Brucellosis-Free (non-Obf)/non-Officially *Brucella melitensis* (*B. melitensis*)-Free (non-ObmF) MSs. Significant decreasing trends by country were also observed in the two MSs Italy and Spain, which is in accordance with the findings in the animal population in these countries. Two thirds of the human brucellosis cases were hospitalised but only one fatal case was reported in 2011 (Table SU1).

Foodstuffs

In 2011 *Brucella* was not reported in any food samples tested.

Animals

In 2011, 15 MSs were Obf and 19 MSs were ObmF in sheep and goats. In addition, some regions and provinces in Italy, Spain and Portugal as well as Great Britain in the United Kingdom were Obf. Furthermore, a number of departments in France and some regions and provinces in Italy, Portugal and Spain were ObmF.

At the EU level, the prevalence of bovine brucellosis in cattle herds has been steadily decreasing, and in 2011, only 0.05 % of the existing cattle herds remaining test-positive. In the EU non-Obf MSs, the percentage of existing infected/positive herds decreased between 2005 and 2007 but since then has remained stable. The prevalence of brucellosis in sheep and goat herds decreased more substantially both at the EU level and in the non-ObmF MSs, with a statistically significant decreasing trend in EU co-financed non-ObmF MSs since 2005. In 2011, the proportion of existing infected/positive sheep and goat herds infected with *B. melitensis* in the EU was 0.17 %.

Trichinella

Humans

In 2011, confirmed cases of trichinellosis increased by 20.2 %, with 268 cases reported compared with 223 cases in 2010. The EU notification rate was 0.05 cases per 100,000 population and the highest notification rates in 2011 were reported in Latvia followed by Lithuania, Romania, Bulgaria and Slovakia. These five countries accounted for 84.3 % of all confirmed cases reported in 2011. There were major fluctuations in the number of cases reported by country over the years. In general, human cases were most likely to be associated with food-borne outbreaks due to consumption of meat from domestic pigs raised in backyards. One death due to *Trichinella* infection was reported in 2011 (Table SU1).

Animals

All MSs provided data on *Trichinella* in animals. The parasite was very rarely detected in pigs in 2011, with an overall EU prevalence of *Trichinella*-positive pigs of 0.00017 %, which is however a higher prevalence than in 2010. The positive findings reported by eight MSs in 2011 were mainly from pigs from non controlled housing conditions. The parasite was isolated more frequently from farmed and hunted wild boars. *Trichinella* is often reported in wildlife species by some Eastern and Northern European MSs, where the parasite is circulating in wildlife populations.

Echinococcus

Humans

In humans, the number of confirmed echinococcosis cases increased by 3.3 % in 2011 compared with 2010. Among the cases for which species had been determined, *Echinococcus granulosus* (*E. granulosus*) accounted for 85.1% of the cases and *E. multilocularis* for 14.9 %. An increasing number of cases of alveolar echinococcosis was reported (based on reported cases of *E. multilocularis*) over the last five years and a decreasing number of cystic echinococcosis (based on reported cases of *E. granulosus*). In 2011, six MSs reported only cases of *E. granulosus*, two MSs reported only cases of *E. multilocularis* and five MSs reported both parasites in humans. The highest population-based risk was noted in Bulgaria, where the notification rate was 23 times higher than the rate at the EU level. Two deaths due to echinococcosis were reported in 2011, resulting in an EU case-fatality rate of 0.9 % (Table SU1).

Animals

E. multilocularis was reported in foxes by many central European countries, while the Nordic countries, Ireland and the United Kingdom, did not detect the parasite in their investigations of foxes.

Rabies

Humans

In 2011, a fatal case of rabies occurred in a person travelling in a country endemic for rabies. The person did not receive the vaccine directly after exposure and also delayed seeking medical attention on returning to Europe. This again highlights the importance of public information and education about the risk of rabies while travelling to rabies endemic countries or to MSs that are not free of the disease in their animal population.

Animals

In 2011, 512 domestic or wildlife animals, other than bats, were found infected with classical rabies or unspecified *Lyssavirus* in seven MSs and one non-MS situated in the eastern part of the EU. Reported cases decreased compared with 2010 continuing the overall decreasing trend. The majority of the rabies cases were reported from wildlife. A further six MSs reported rabies cases in bats.

Food-borne outbreaks

A total of 5,648 food-borne outbreaks, including waterborne outbreaks, were reported in the EU. Overall, 69,553 human cases, 7,125 hospitalisations and 93 deaths were recorded. The evidence supporting the link between human cases and food vehicles was strong in 701 outbreaks.

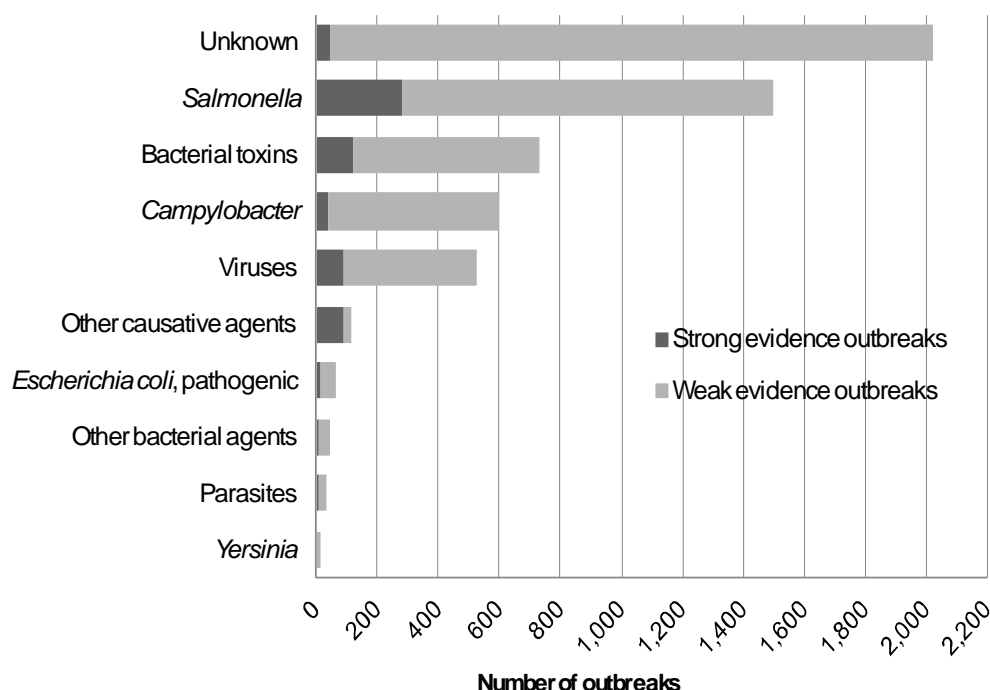
The largest number of reported food-borne outbreaks was caused by *Salmonella* (26.6 % of all outbreaks), followed by bacterial toxins (12.9 %), *Campylobacter* (10.6 %) and viruses (9.3 %). The numbers of reported *Salmonella* and virus outbreaks declined compared to previous years. The most important food vehicles in the strong evidence outbreaks were eggs and egg products (in 21.4 % of outbreaks), mixed foods (13.7 %) fish and fish products (10.1 %), crustaceans, shellfish, molluscs and products thereof (6.0 %), and vegetables, juices and products thereof (5.3 %).

In 2011, 11 waterborne outbreaks were reported in the EU, and the main causative agents were *Campylobacter*, calicivirus, *Cryptosporidium hominis* (*C. hominis*) and VTEC.

The largest food-borne outbreaks in terms of human cases in 2011 were a STEC/VTEC O104 outbreak in Germany, France and some other MSs, and a waterborne *Cryptosporidium* outbreak in Sweden.

The revised food-borne outbreak reporting specifications were implemented for the second time in 2011. The two new evidence categories to support the reporting of a detailed dataset (descriptive epidemiological evidence and detection of the causative agent in the food chain) were used in approximately one third of the strong evidence outbreaks in 2011.

Figure SU2. Distribution of food-borne outbreaks per causative agent in the EU, 2011



Note: Food-borne viruses include calicivirus, hepatitis A virus and other unspecified food-borne viruses. Bacterial toxins include toxins produced by *Bacillus*, *Clostridium* and *Staphylococcus*. Other causative agents include mushroom toxins, marine biotoxins, histamine, mycotoxins, escolar fish (wax esters) and other unspecified agents. Parasites include primarily *Trichinella*, but also *Giardia*, *Cryptosporidium* and *Anisakis*. Other bacterial agents include *Listeria*, *Shigella* and *Brucella*.