THE COMMUNITY SUMMARY REPORT ON TRENDS AND SOURCES OF ZOONOSES AND ZOONOTIC AGENTS AND FOOD-BORNE OUTBREAKS IN THE EUROPEAN UNION IN 2008

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About EFSA

The European Food Safety Authority (EFSA), located in Parma, Italy, was established and funded by the European Community as an independent agency in 2002 following a series of food scares that caused 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 Community legislation.

EFSA's work falls into two areas: risk assessment and risk communication. In particular, EFSA's risk assessments provide risk managers (European Union (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 178/2002 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 851/2004 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 in 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/EC and for preparing the Community Summary Report from the results. Data from 2008, in this Community Summary Report, was produced in collaboration with ECDC that provided the information on zoonoses cases in humans. The Zoonoses Collaboration Centre (ZCC - contracted by EFSA) in the National Food Institute, the Technical University of Denmark assisted EFSA and ECDC in this task.

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EXECUTIVE 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 2008, 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. Further, information on zoonoses cases in humans was acquired from the European Centre for Disease Prevention and Control. In addition, four countries that were not European Union Member States provided information. Assisted by its Zoonoses Collaboration Centre, the European Food Safety Authority and the European Centre for Disease Prevention and Control jointly analysed all data, the results of which are published in this annual Community Summary Report, which covers 15 diseases.

In 2008, salmonellosis was again the second most often reported zoonotic disease in humans accounting for 131,468 confirmed human cases. The statistically significant decreasing trend in the notification rate of the salmonellosis cases continued in the European Union for the fifth consecutive year. In particular, the human cases caused by *S*. Enteritidis decreased markedly in 2008, while an increase in *S*. Typhimurium cases was observed.

In foodstuffs, *Salmonella* was most often detected in fresh broiler, turkey and pig meat, on average at levels of 5.1%, 5.6% and 0.7%, respectively. *Salmonella* was rarely detected in other foodstuffs, such as dairy products, fruit and vegetables. However, in sprouts, herbs and spices some higher levels of contamination were reported. Products in non-compliance with the Community *Salmonella* criteria were mainly observed in minced meat and meat preparations.

An important decline in the prevalence of *S*. Enteritidis and *S*. Typhimurium in laying hens was observed in 2008 which was the first year when Member States implemented new control programmes in this animal population. The improved situation in laying hen flocks may have been reflected in the decrease of *S*. Enteritidis cases reported in humans, since eggs are an important source for these infections.

Already 20 Member States met their relative *Salmonella* reduction target set for 2008 in laying hens. Further, 19 Member States reported *Salmonella* prevalence lower than the 1% target set for breeding flocks of fowl and to be met by the end of 2009. No major changes in *Salmonella* prevalence in broiler, turkey or pig populations were apparent at Community level.

In 2008, campylobacteriosis continued to be the most commonly reported gastrointestinal bacterial pathogen in humans in the European Union with 190,566 confirmed cases, even though the number of notified cases decreased by 5.0% compared with 2007. In foodstuffs, the highest proportion of *Campylobacter* positive samples was once again reported for fresh poultry meat where on average 30.1% of samples were positive. *Campylobacter* was also commonly detected from live poultry, pigs and cattle.

The number of listeriosis cases in humans decreased by 11.1% compared to 2007, with 1,381 confirmed cases recorded in 2008. A high fatality rate of 20.5% was reported among the cases. *Listeria* bacteria were seldom detected above the legal safety limit from ready-to-eat foods and findings over this limit were most often reported from fishery products, cheeses, meat products and sandwiches at levels of 0.2-0.5% in the European Union.

Q fever cases in humans were analysed for the first time at European Union level and a total of 585 confirmed cases were reported in 2007 with the number of cases increasing to 1,594 in 2008. Q fever was also recorded in cattle, goats and sheep, most frequently in goats.

A total of 3,159 confirmed verotoxigenic *E. coli* (VTEC) infections and 8,346 confirmed yersiniosis cases in humans were recorded in the European Union. Among animals and foodstuffs, human pathogenic VTEC bacteria were most often reported in cattle and bovine meat, and only occasionally from other food and animal species. *Yersinia* bacteria were mostly recorded from pigs and pig meat.

In 2008, 619 confirmed brucellosis cases were reported in the European Union. While the occurrence of tuberculosis and brucellosis in cattle remained largely unchanged compared to 2007, the occurrence of brucellosis in sheep/goats seemed to decrease slightly.

Two parasitic zoonoses, trichinellosis and echinococcosis, caused 670 and 891 confirmed human cases in the European Union, respectively. Uninspected wild boar and pig meat are the most important source of human trichinellosis cases. Both parasite species were mainly detected in wildlife.

A total of 5,332 food-borne outbreaks were reported in the European Union, causing 45,622 human cases, 6,230 hospitalisations and 32 deaths. Most of the reported outbreaks were caused by *Salmonella (*35.4%), viruses (13.1%) and bacterial toxins (9.8%). The most important food sources were eggs and egg products (23.1%), pig meat and products thereof (10.2%) and mixed or buffet meals (9.2%). In addition, 12 waterborne outbreaks were reported in 2008 related to the contamination of private and public water sources.

Four cases of rabies were reported in humans in 2008 with one of them being acquired in mainland Europe and one in a French overseas department. Rabies was still reported from domestic and wildlife animals in the Baltic and some Eastern European MSs, mostly in foxes and raccoon dogs. Four rabies cases in imported dogs were reported as well as one secondary case in dog linked to one imported rabies dog.

Some data were also reported on *Toxoplasma*, *Cysticerci*, *Francisella* and *Leptospira* with findings in domestic and wild animals.

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CD-ROM

Electronic version of the report & overview of all data submitted by Member States (Level 3 files)

1. INTRODUCTION

The framework of reporting

The Community system for the monitoring and collection of information on zoonoses is based on the Zoonoses Directive 2003/99/EC[1], which obligates the European Union (EU) Member States (MSs) to collect relevant and, where applicable, comparable data of 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, covering the data collected. The European Food Safety Authority (EFSA) is assigned the tasks of examining these data and publishing the Community Summary Report.

The Decision 2119/98/EC[2] on setting up a network for the epidemiological surveillance and control of communicable diseases in the Community, as complemented by Decision 2000/96/EC with amendment 2003/542/EC on the diseases to be progressively covered by the network, established the basis for data collection on human communicable diseases from MSs. The Decisions foresee that data from the networks shall be used in the Community Summary Report.

In this report the data related to the occurrence of zoonotic agents in animals, foodstuffs and feedingstuffs as well as to antimicrobial resistance in these agents are collected in the framework of Directive 2003/99/EC. This applies also to the information on food-borne outbreaks. The information concerning zoonoses cases in humans and related antimicrobial resistance is derived from the networks under Decision 2119/98/EC.

Since 2005, the European Centre for Disease Prevention and Control (ECDC) has provided the data on zoonotic infections in humans, as well as their analyses, for the Community Summary Report. Data analysed from 2008 and 2007, derived from The European Surveillance System (TESSy), has been implemented and is maintained by ECDC.

This Community Summary Report 2008 was prepared in collaboration with ECDC and assisted by EFSA's Zoonoses Collaboration Centre (ZCC, in the National Food Institute of the Technical University of Denmark). MSs, other reporting countries, the European Commission and the relevant Community Reference Laboratories were consulted while preparing the report.

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

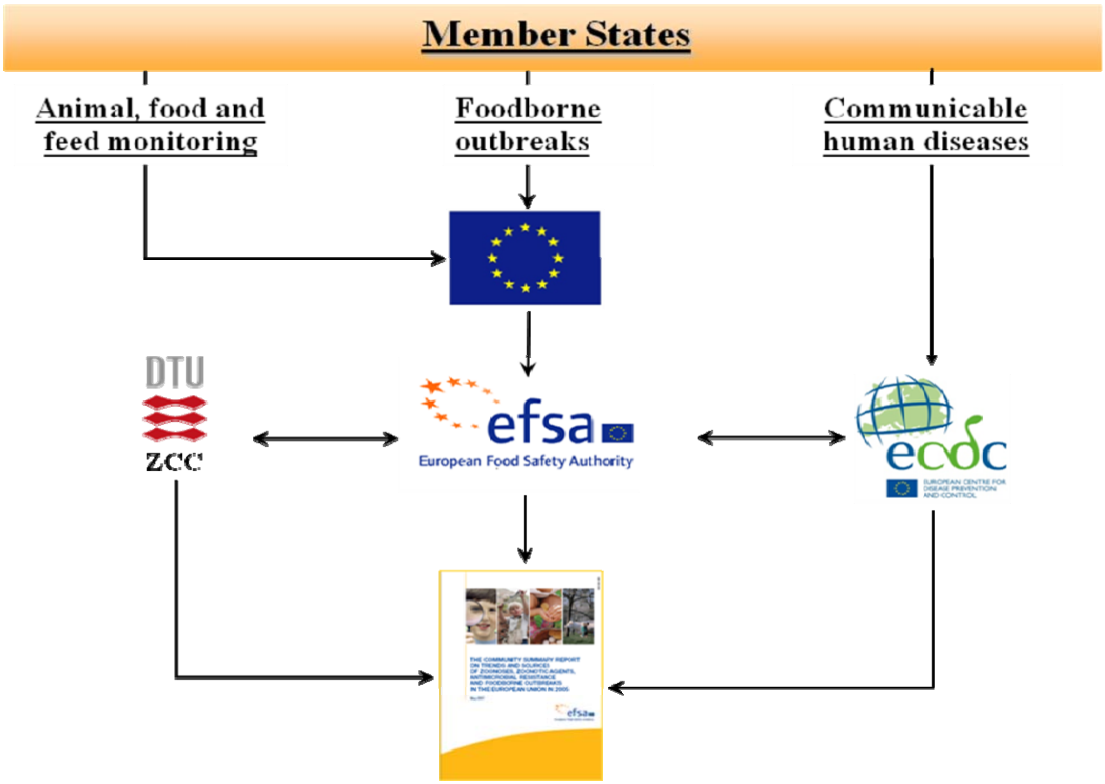
The data flow for the 2008 Community Summary Report is shown in Figure IN1.

[1] 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 p. 31)

[2] 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, p.1)

1. INTRODUCTION

Figure IN1. Scheme of the data flow for the Community Summary Report, 2008



Note: Human data is collected by ECDC through The European Surveillance System (TESSy)

Data received for 2008

In 2008, data were collected on a mandatory basis for the following eight zoonotic agents: *Salmonella*, thermophilic *Campylobacter*, *Listeria monocytogenes*, verotoxigenic *E. coli*, *Mycobacterium bovis*, *Brucella*, *Trichinella* and *Echinococcus*. Data on human cases were reported via The European Surveillance System (TESSy) by the 27 Member States and three EEA/EFTA countries (Iceland, Lichtenstein 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. Additionally, based on the epidemiological situations in MSs, data were reported on the following agents and zoonoses: *Yersinia*, rabies, Q fever, *Toxoplasma, Cysticerci, Francisella, Leptospira* and *Clostridium botulinum*. Data on 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 Community legislation.

All 27 MSs submitted national zoonoses reports concerning the year 2008. In addition, zoonoses reports were submitted by two non-MSs (Norway and Switzerland). Data on zoonoses cases in humans were also received from all 27 MSs and additionally from four non-MSs: Iceland, Liechtenstein, Norway and Switzerland. The deadline for data submission was 5 June 2009.

The draft Community Summary Report was sent to MSs for consultation on 23 October 2009 and comments were collected by 16 November 2009. The utmost effort was made to incorporate comments and data amendments within the available time frame. The final report was finalised by 23 December 2009 and published online by EFSA and ECDC on 28 January 2010.

1. INTRODUCTION

The structure of the report

The information received from 2008 is published in two Community Summary Reports. The first one, the current report, covers the reported information on zoonoses, zoonotic agents and food-borne outbreaks. The second report will cover the data reported on antimicrobial resistance.

The current report is divided into three levels. Level 1 consists of the executive summary, an introduction to reporting, general conclusions and zoonoses or item specific summaries. Level 2 of the report presents a Community assessment of the specific zoonoses and zoonotic agents and a description of materials and methods, as well as an overview of notification and monitoring programmes implemented in the Community (Appendix 2). Levels 1 and 2 of the report are available in print and are disseminated to all European Community stakeholders. Level 3 of the report consists of an overview of all data submitted by MSs in table format and is only available online and in the CD ROM inserted in the published report.

In the current report, the information on the most common and important zoonoses and zoonotic agents (*Salmonella*, *Campylobacter*, verotoxigenic *E. coli* and *Listeria monocytogenes)* are analysed in-depth. Typically, these are the agents where a substantial amount of data is available each year and where there is the need to follow trends to verify the progress made in control/eradication programmes/measures. For the other important but less common zoonoses (tuberculosis due to *M. bovis*, brucellosis and rabies) a lighter overview of the situation in the European Union is presented. However, these zoonoses will be thoroughly analysed on regular intervals in the Community Summary Report where data covering several reporting years will then be used.

For the other zoonoses (*Yersinia*, *Trichinella, Echinococcus, Toxoplasma, Cysticerci*, *Francisella*, *Leptospira* and rabies) where less data is available or where no major annual developments in the Community are expected to take place in the short term, a lighter overview of the situation in the European Union is presented. However, these zoonoses will be thoroughly analysed on regular intervals in the Community Summary Report where data covering several reporting years will then be used. In the current report, a thorough analysis of available data on Q fever from 2007 and 2008 is presented.

As regards the information reported on a voluntary basis on some microbiological contaminants, *Enterobacter sakazakii*, histamine, and staphylococcal enterotoxins will be the subject of future Summary Reports.

Monitoring and surveillance schemes for most zoonotic agents covered in this report are not harmonised between MSs, and findings presented in this report must, therefore, be interpreted with care. The data presented may not necessarily derive from sampling plans that are statistically designed, and may not accurately represent the national situation regarding zoonoses. Results are generally not directly comparable between MSs and sometimes not even between different years in one country.

Data presented in this report were chosen such that trends could be identified whenever possible. As a general rule, and as described, for food, feed and animal samples, a minimum number of 25 tested samples were required for the data to be selected for analysis. Furthermore, as a general rule, data from at least five MSs should be available to warrant presentation, leading to a table or a figure. However, for some zoonoses or zoonotic agents fewer data have been accepted for analysis. Historical data and trends are presented, whenever possible.

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

2. SUMMARY

2.1 Main conclusions on the Community Summary Report on Zoonoses 2008

- The decreasing trend in the notification rate of salmonellosis cases in humans continued in 2008 for a fifth consecutive year, though salmonellosis still remained the second most commonly reported zoonotic disease in the EU. Human cases caused by *S*. Enteritidis decreased markedly in 2008, while an increase in *S*. Typhimurium cases was observed.

- 2008 was the first year when MSs implemented the new *Salmonella* control programmes in laying hens, and 20 MSs have already met their relative *Salmonella* reduction target set for this year. The improved *Salmonella* status of the laying hen flocks may have been reflected in the lower levels of *S*. Enteritidis cases reported in humans. In addition, 19 MSs reported a lower *Salmonella* prevalence than the target set for breeding flocks of *Gallus gallus*, even though the target has to be met only by the end of 2009. No major changes in *Salmonella* prevalence in broiler, turkey or pig populations were apparent at Community level.

- *Salmonella* was once again the most frequently reported cause of food-borne outbreaks in EU, with eggs and products made with raw eggs being the most important food vehicles in these outbreaks, followed by pig meat. Apart from fresh poultry and pig meat, *Salmonella* was rarely detected in other foodstuffs, such as dairy products and fruit and vegetables. Products not in compliance with Community *Salmonella* criteria were mainly observed in minced meat and meat preparations.

- Campylobacteriosis remained by far the most frequently reported zoonotic disease in humans in 2008. No clear trend in the notification rates at Community level was apparent during 2004 to 2008. The occurrence of *Campylobacter* was high in broiler meat and broiler flocks throughout the production chain in many MSs. Broiler meat and raw milk were reported as the most important food vehicles in food-borne *Campylobacter* outbreaks in 2008.

- The number of listeriosis cases in humans decreased for a second consecutive year in the EU. Elderly persons were especially affected by the disease and overall, a high case fatality rate of 20.5% was recorded among those cases where information was available. In ready-to-eat food, the occurrence of *L. monocytogenes* in quantities exceeding the Community *Listeria* criteria (100 cfu/g) remained at low levels in 2008.

- There has recently been an increased interest in Q fever among MSs. In 2008, 1,594 confirmed human cases were recorded in the EU, compared to 585 in 2007. Two MSs accounted mainly for this increase in the human cases. In total, 18 and 17 MSs provided data on Q fever in animals in 2007 and 2008, respectively, and positive cases were reported in cattle, sheep and goats, the proportion of positive cases being highest in goats.

- Notification rates of verotoxigenic *E. coli* (VTEC) infections in humans varied between MSs. Generally, the notification rate was highest in young children. This group also accounted for 64.6% of the 144 haemolytic uremic syndrome (HUS) cases with information on age. The HUS cases were, mainly associated with serogroup VTEC O157. In animals, VTEC O157 bacteria are mostly reported from cattle and bovine meat.

- Notification of yersiniosis in humans has decreased since 2004, even though the disease remained the third most frequently reported zoonosis in the EU. In animals, *Y. enterocolitica* is mainly found from pigs and pig meat.

- Information received on verified food-borne outbreaks improved compared to 2007 and the total number of reported outbreaks remained approximately at the same level. Following *Salmonella*, the most important known causative agents in reported food-borne outbreaks were viruses, bacterial toxins and *Campylobacter*. The main food vehicles in the outbreaks were eggs and egg products, pig meat, mixed or buffet meals and bakery products.

- There has been an overall significant decreasing trend in the notification of brucellosis cases in humans over the past five years, even though in 2008 a slight increase was observed compared to 2007. The Community prevalence of bovine brucellosis remained largely unchanged and at a very low level within cattle herds, whereas the prevalence of brucellosis in sheep and goats seemed to be decreasing and was at a low level.

2. SUMMARY

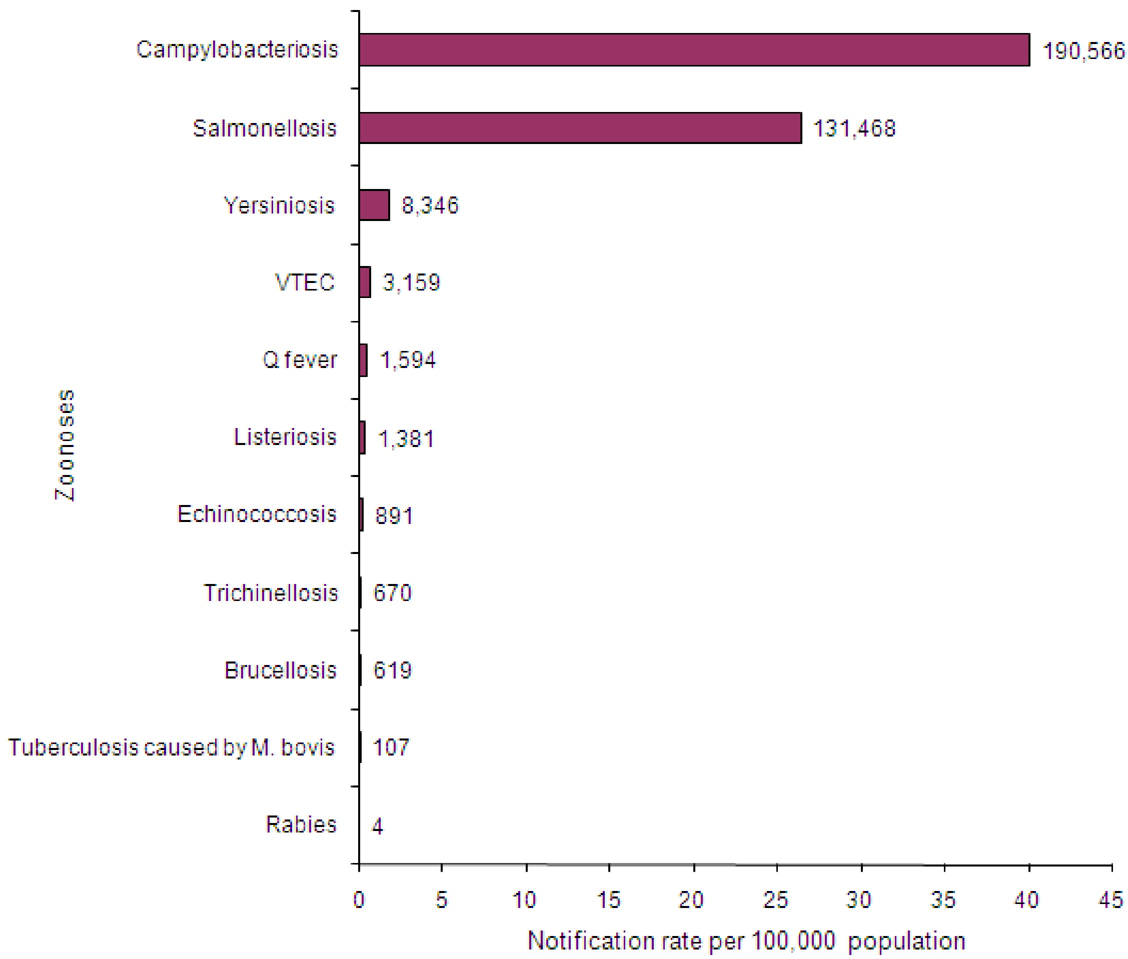
- At Community level the prevalence of bovine tuberculosis within cattle herds remained at the same level as in 2007. A significant slightly decreasing trend in prevalence was observed in the Community co-financed non-free MSs over the past five years, while in two non co-financed non-free MSs an increase was reported in 2008. Reported human cases of tuberculosis due to *M*. *bovis* decreased compared to previous levels in the Community.
- The situation for trichinellosis and echinococcosis in humans in the EU remained similar to last year. The main sources of human trichinellosis are uninspected wild boar and pig meat. Foxes are the main reservoir of *Echinococcus multilocularis* and dogs and other canids are the main reservoir of *E. granulosus*.
- Four cases of rabies in humans were reported in 2008 with one of them being acquired in mainland Europe and one in a French overseas department. Rabies was still found in domestic animals and wildlife in the Baltic and some MSs in the eastern part of Europe. The Baltic MSs have reported a marked decrease in animal cases as a result of vaccination programmes. Illegally imported pets are another relevant risk related to rabies.

2. SUMMARY

2.2 Zoonoses and item specific summaries

The importance of a zoonosis as a human infection is not dependent on incidence in the population alone. The severity of the disease and case fatality are also important factors affecting the relevance of the disease. For instance, despite the relatively low number of cases caused by VTEC, *Listeria, Echinococcus, Trichinella* and *Lyssavirus* (rabies), compared to the number of human campylobacteriosis and salmonellosis cases, these infections are considered important due to the severity of the illness and higher case fatality rate.

Figure SU1. Reported notification zoonoses rates in confirmed human cases in the EU, 2008



Note: Total number of confirmed cases is indicated at the end each column

2. SUMMARY

Salmonella

Humans

In 2008, a total of 131,468 confirmed cases of human salmonellosis (TESSy) were reported in the EU. This represents a decrease of 13.5% over the last year. The EU notification rate was 26.4 cases per 100,000 population, ranging from 2.9 in Romania to 126.8 confirmed cases per 100,000 population in Slovakia. Germany, the United Kingdom and the Czech Republic accounted for half of all confirmed cases (49.5%) in 2008. The decreasing trend of salmonellosis over the past five years is significant. As in previous years, *S.* Enteritidis and *S*. Typhimurium were the most frequently reported serovars (79.9% of all known serovars in human cases).

The highest notification rate for human cases was for age groups 0 to 4 years and 5 to 14 years. A seasonal peak in the number of cases during the late summer and autumn was generally observed in many MSs and *S*. Enteritidis demonstrates a much more prominent peak than other serovars. In 2008, the proportion of cases reported as imported remained at the same level, 7.8%, as in 2007 (7.9%), although for some countries imported cases represent the majority of all salmonellosis cases.

Foodstuffs

A wide range of foodstuffs was tested for *Salmonella* by MSs, but the majority of samples was from various types of meat and products thereof. The highest proportion of *Salmonella* positive units was reported for fresh broiler meat, turkey meat and pig meat, on average at levels of 5.1%, 5.6% and 0.7%, respectively.

Substantial numbers of dairy products, including cheeses, were tested by MSs in 2008, and *Salmonella* was very rarely found (mostly <0.1%) in these products. A lower number of samples from different types of fruit, vegetables and herbs was investigated in 2008 compared to 2007 and the proportion of *Salmonella* positive samples increased to 0.7% mainly due to two investigations with a rather high proportion of positive isolates in sprouted seeds, and herbs and spices. In fish and fishery products, MSs generally reported findings of *Salmonella* at very low levels (<1%).

Foodstuffs not in compliance with the EU *Salmonella* criteria were most often observed in minced meat and meat preparations; at average levels of 2.2-6.7% in single samples. In the case of meat products intended to be eaten raw, *Salmonella* was detected in 1.0-2.2% of the single units tested, which indicates a presence of a direct risk for consumers. The proportion of egg products not in compliance with the *Salmonella* criteria increased compared to previous years (to 2.8%). In other food categories the proportion of units in non-compliance with the criteria was very low.

Animals

Salmonella findings were reported by 26 MSs in various animal species, including farm animals, pets, zoo animals and wildlife. The data received from the mandatory *Salmonella* control programmes in breeding flocks of *Gallus gallus* and laying hen flocks were promising. For breeding flocks, 19 MSs have already reported a lower prevalence than the EU reduction target of 1% that has to be met by the end of 2009. This target covers the five serovars of *S.* Enteritidis, *S.* Typhimurium, *S.* Hadar, *S.* Infantis, and *S.* Virchow. Overall, 0.9% of breeding flocks in the EU were positive for the five target serovars during the production period. Six MSs reported a prevalence above 1% for the five targeted serovars, however at low levels.

Similarly, 20 MSs met their relative reduction target for *S.* Enteritidis and *S.* Typhimurium in laying hen flocks set for 2008 and many MSs reported a marked decrease in the prevalence compared to the results of the EU-wide *Salmonella* baseline survey in 2004 to 2005. Overall, during the production period 5.9% and 3.5% of laying hen flocks in the EU were positive for *Salmonella* (all serovars) and *S.* Enteritidis/*S.* Typhimurium, respectively.

At EU level, the proportion of *Salmonella* positive broiler flocks was 2.8%. For turkey flocks, 6.5% of the flocks were positive. Only few MSs had a control or monitoring programme for *Salmonella* in pigs and cattle.

2. SUMMARY

Source attribution

Data from food-borne outbreaks and serovar/phage type distribution in human cases, food and animals can provide initial information as to the significance of different sources of human infections.

In the reported food-borne *Salmonella* outbreaks in 2008, eggs and egg products as well as products containing raw eggs, continued to be the most important food vehicles. These outbreaks are mostly caused by *S.* Enteritidis. This serovar was also the most frequent cause of human salmonellosis cases at Community level. In most MSs, *S.* Enteritidis was the most frequently isolated serovar in table eggs and also frequently found from poultry meat. It can therefore be assumed that the decrease observed in the number of *S.* Enteritidis cases in humans may be related to the decrease of this serovar in laying hen flocks reported for 2008.

Pig meat was the third most important food vehicle in *Salmonella* outbreaks and was particularly related to *S*. Typhimurium outbreaks. *S.* Typhimurium was the most frequently isolated serovar in pigs (and cattle) and meat thereof and it was also among the top ten serovars isolated from broilers and table eggs. The increase in *S.* Typhimurium human cases observed in 2008 appears to be related to food-borne outbreaks, especially to a very large outbreak of *S.* Typhimurium U292 in Denmark where the source is still unknown.

Special attention should be given on specific serovars in some countries e.g. a high proportion of *S.* Infantis positive flocks of *Gallus gallus* in Hungary, which was also reflected in broiler meat, whereas the most frequently occurring infection in flocks of *Gallus gallus* in the Netherland is *S.* Paratyphi B var. Java.

Feedingstuffs

On average less than 1% of the compound feedingstuffs units tested was reported positive for *Salmonella*. Fish meal and oil seeds and products thereof were the feed materials most often reported *Salmonella* positive, and 2.1% and 1.8% of the tested units for the feed material categories tested positive, respectively.

Campylobacter

Humans

In total, 190,566 confirmed cases of campylobacteriosis were reported by 25 MSs, which was a 5.0% decrease compared to 2007. A marked decrease in the number of cases in the Czech Republic, Germany and the United Kingdom in 2008, accounted for 65% of the reduction. Children under the age of five had the highest notification rate (105 cases per 100,000 population). Other age groups varied between circa 30 to 47 cases per 100,000 population.

Foodstuffs

Broiler meat was the most frequently sampled food category in 2008, even though the number of reporting MSs was lower than in previous years, when the results from the EU-wide baseline survey are excluded. Due to fewer reporting MSs no trend analysis was performed on *Campylobacter*. The reported occurrence of *Campylobacter* was generally at the same high level as in previous years in broiler meat, on average 30.1% of fresh broiler meat units tested positive for *Campylobacter*. In fresh turkey meat and meat from other poultry species, the average positive findings were at similar levels as in previous years; 10.1% and 21.9%, respectively. In samples of fresh pig meat and bovine meat, *Campylobacter* was detected less frequently, at levels of 0.5% and 0.3%, respectively. In other foodstuffs *Campylobacter* was detected only occasionally.

Animals

In 2008, similar to previous years, the majority of data on *Campylobacter* in animals was from investigations of broilers, but data from pigs and cattle were also reported. The average prevalence of *Campylobacter* positive broiler flocks was 24.7% ranging from 6.5% to 79.0% in MSs. The lowest prevalence in broiler flocks was reported by Finland and Sweden. For pig and cattle herds only three MSs provided data, however the prevalence in reporting MSs was generally high for pig herds (37.3-67.8%) and cattle herds (0-61.3%), which is similar to findings in previous years. The contamination of *Campylobacter* in pig and bovine meat typically decreased sharply following slaughter and remained low in meat at slaughterhouses and at retail.

2. SUMMARY

Listeria

Humans

A total of 1,381 confirmed cases of listeriosis were reported from 25 MSs in 2008. The EU notification rate was 0.3 per 100,000 population. The highest notification rates were observed in Denmark, Finland and Sweden. The number of confirmed cases of listeriosis decreased slightly in comparison to 2007. Listeriosis mainly occurred among elderly people, with 55.2% of cases occurring in individuals over the age of 65 (notification rate of 1.0 per 100,000 population). The second highest notification rate was in children under the age of five (0.4 cases per 100,000 population). The case fatality rate for human listeriosis was 20.5% for those cases where this information was available and it was highest among the elderly.

Foodstuffs

In 2008, numerous investigations on *L. monocytogenes* in different categories of ready-to-eat (RTE) food were reported. Similar to previous years, RTE fishery products, particularly smoked fish, proved to be the food category with the highest proportion of units exceeding the Community microbiological criterion of 100 cfu/g. The prevalence of fishery product units in non-compliance with the criterion was 0.4%, which was lower than in previous years, but may be due to variation in the MSs reporting each year. The EU proportion of units exceeding the 100 cfu/g limit was at the same level (0.2%) in cheeses, RTE meat products and other RTE products.

Animals

In 2008, 18 MSs reported data on *L. monocytogenes* in various animal species, demonstrating that animals (especially ruminants) may act as a reservoir of *Listeria* bacteria although they rarely serve as a direct source of human infections.

VTEC

Humans

In 2008, a total of 3,159 confirmed human VTEC cases were reported from 25 MSs which is slightly higher than in 2007. The EU notification rate was 0.7 per 100,000 population. The most commonly identified VTEC serogroup was O157 (53.0%). The notification rate was highest in 0 to 4 year old children and this group also accounted for almost (64.6%) of the 144 Haemolytic Uremic Syndrome (HUS) cases with information on age; these cases were mainly associated with VTEC O157 infections.

Foodstuffs and animals

Data from food and animals are concentrated on the VTEC O157 serogroup. Overall, 0.3% and 0.1% of the fresh bovine meat units were positive with VTEC and VTEC O157, respectively. In 2008, VTEC O157 was also occasionally reported from vegetables, cheeses made from cow's and goat's milk, sheep meat, game meat and pig meat. In animals, VTEC and VTEC O157 were mostly reported from cattle, at levels of 2.2% and 0.5%, respectively. Some VTEC O157 findings were also made from sheep, dogs, pigs, poultry and water buffalo.

Tuberculosis due to *Mycobacterium bovis*

Humans

No information on *Mycobacterium bovis* cases in 2008 was available, thus the 2007 data were included. As in previous years, human infections were rare in the EU. The total number of human cases reported in 2007 in the EU reached 107 confirmed cases, decreasing by 10.8% compared to 2006. The highest proportions of confirmed cases occurred in Germany and the United Kingdom (60.7% of cases), with the highest notification rate occurring in those aged 65 or older.

Animals

In 2008, eleven MSs, two non-MSs as well as four regions and 16 provinces in Italy were officially bovine tuberculosis free (OTF) in 2008. Out of these, four MSs reported very few positive cattle herds in 2008. Seven out of 16 non-OTF MSs reported no infected herds in 2008. Of the nine non-OTF MSs, who reported positive herds, Ireland and the United Kingdom accounted for the highest prevalence in their herds and two

MSs reported an increase in their proportion of infected herds. A significant decreasing trend in the prevalence of infected herds in the Community co-financed non-OTF MSs was observed. Also, the percentage of OTF herds in the co-financed MSs increased from 45% in 2007 to 49% in 2008.

Brucella

Humans

In 2008, a total of 619 confirmed human brucellosis cases were reported in the EU. The EU notification rate was 0.1 case per 100,000 population. The highest notification rates were reported by Greece, Portugal and Spain, which are MSs not officially free of bovine and/or ovine and caprine brucellosis. In the EU, the highest notification rate of brucellosis was noted for people in the 45 to 64 year old age group. A peak in reported cases was observed in late spring followed by a smaller peak of cases occurring in mid-summer. Available data on the mode of transmission, although limited, indicate that contact with farm animals as well as consumption of cheese were the main vehicles for infection.

Foodstuffs

Data on the occurrence of *Brucella* in milk and cheese were provided by six MSs. Positive findings were only made in raw, unspecified milk (4.1%) and unspecified dairy products (0.4%). Additionally, one brucellosis outbreak caused by contaminated cheese was recorded in 2008.

Animals

Infected herds of both bovine and ovine/caprine brucellosis are geographically concentrated in southern European MSs and for bovine brucellosis in Ireland as well. In 2008, 12 MSs were officially free of brucellosis in cattle (OBF) and 16 MSs were officially free of brucellosis in sheep and goats (ObmF). Furthermore, eight regions and 13 provinces in Italy as well as four Azores islands in Portugal and Great Britain in the United Kingdom were OBF. In addition, 64 departments in France, nine regions and seven provinces in Italy, all the Azores islands in Portugal and two provinces of the Canaries in Spain were ObmF.

At EU level, the proportion of existing cattle herds positive for *B. abortus* or herds infected with bovine brucellosis remained at the same level as in 2007. In the Community co-financed non-OBF MSs, the proportion of positive tested herds decreased compared to 2007, whereas the proportion of positive existing herds remained stable. In the case of small ruminant brucellosis, the proportion of positive tested herds in Community co-financed non-ObmF MSs has decreased from 2004 to 2008 but the trend is not statistically significant.

Rabies

Humans

In 2008, four human rabies cases were reported in the EU. All cases but one became infected outside Europe. One domestic human case was reported from Romania and another one from a French overseas department.

Animals

Twelve MSs reported the classical rabies virus in various animal species in 2008 and three of these MSs only reported cases in imported dogs. The majority of rabies cases in domestic and wildlife animals was recorded by the Baltic MSs and some eastern European MSs. Slovenia was the only MS to report an increase in positive cases in 2008 and for the first time after many years, Italy found some rabies cases in wildlife. Three MSs reported rabies cases in imported dogs. Five MSs reported findings of European bat *Lyssavirus* in bats and one MS reported unspecified *Lyssavirus* in bats.

2. SUMMARY

Yersinia

Humans

In 2008, 8,346 confirmed human cases of yersiniosis were reported in the EU. *Yersinia enterocolitica* was the most common species reported in human cases and was isolated from 91.9% of all confirmed cases.

Foodstuffs and animals

Findings of *Y. enterocolitica* were mainly reported from pigs and pig meat. On average 1.8% of pig meat units and 1.8% of tested pigs were found positive for *Y. enterocolitica* in the EU.

Trichinella

Humans

A total of 670 confirmed human trichinellosis cases were reported in the EU in 2008.

Animals

In slaughter animals, *Trichinella* was very rarely detected in the EU, and most of the findings in pigs came from Romania. For the first time in many years, one positive finding was reported from horses. Most *Trichinella* findings in MSs were reported in hunted wild boar and other wildlife.

Echinococcus

Humans

In 2008, MSs reported 891 confirmed human cases of echinococcosis, of which 71.7% were due to infections caused by *E. granulosus* and 5.6% were due to infections caused by *E. multilocularis.*

Animals

In 2008, during meat inspections at slaughterhouses, *Echinococcus* spp. was most often detected in goats (on average a 3.5% prevalence in the EU), sheep (0.9%) and cattle (0.8%). In foxes, an average of 20.3% of animals tested were positive with *E. multilocularis* or *Echinococcus* spp. in the six reporting MSs.

Q fever

Humans

In 2008, a total of 1,594 confirmed cases of Q fever were reported in the EU. This figure represents a 172.5% increase compared with the number of confirmed cases reported in 2007 (585). The Netherlands and Germany accounted for the majority of the overall increase in cases in 2008 in the EU.

Animals

In total, 17 and 14 MSs provided data on Q fever in cattle, sheep and goats for 2008 and 2007, respectively. In cattle, the proportion of reported positive cases increased from 7.4% to 10.0% in 2008. The highest proportion of positive cases was reported for goats: 15.7% and 9.7% in 2008 and 2007, respectively. In particular, the Netherlands reported a three-fold increase in 2008 from 9.5% to 31.9%. The proportion of positive cases in sheep was 6.3% in 2008 and 7.9% in 2007.

Other zoonoses

Animals

In 2008, 17 MSs provided information on *Toxoplasma* in animals. The highest proportions of positive samples were reported in sheep and goats (54.5%), and in wild boar (29.8%). Two MSs reported data on *Cysticerci* and had no or very few findings in farm animals. One MS reported findings of *Francisella* in hares and one MS reported findings of *Leptospira* in cattle.

2. SUMMARY

Food-borne outbreaks

A total of 5,332 outbreaks was reported in EU, which is a decrease of 7.0% compared to 2007. Overall, 45,622 human cases, 6,230 hospitalisations and 32 deaths were recorded in the outbreaks. The total number of verified outbreaks (N=890) decreased also and the variation between the MSs in the numbers of reported verified outbreaks remained large. Four MSs did not report any verified outbreaks, whereas France, Poland and Spain provided detailed data on a large number of verified outbreaks.

The largest number of reported food-borne outbreaks was caused by *Salmonella (*35.4% of all outbreaks), followed by viruses (13.1%), bacterial toxins (9.8%) and *Campylobacter* (9.2%). The most important food vehicles in the outbreaks were eggs and egg products (23.1%), pig meat and products thereof (10.2%) and mixed or buffet meals (9.2%). Eggs and egg products, and bakery products were mostly associated with *S.* Enteritidis outbreaks, whereas pig meat was linked to *Trichinella* and *Salmonella* outbreaks. The virus outbreaks were mainly caused by crustaceans, shellfish and molluscs followed by mixed or buffet meals.

In 2008, 12 waterborne outbreaks were reported in the EU, and the main causative agents were *Campylobacter*, *E. coli*, caliciviruses and *Salmonella.* The majority of the outbreaks were caused by contamination of private wells or water sources, and only two outbreaks were caused by contamination of public water sources.

3. INFORMATION ON SPECIFIC ZOONOSES

3.1 *Salmonella*

Salmonella has long been recognised as an important zoonotic pathogen of economic significance in animals and humans. The genus *Salmonella* is currently divided into two species: *S.* enterica and *S.* bongori. *S.* enterica is further divided into six sub-species and most *Salmonella* belong to the subspecies *S.* enterica subsp. enterica. Members of this subspecies have usually been named based on where the serovar or serotype was first isolated. In the following text, the organisms are identified by genus followed by serovar, e.g. *S.* Typhimurium. More than 2,500 serovars of zoonotic *Salmonella* exist and the prevalence of the different serovars changes over time.

Human salmonellosis is usually characterised by the acute onset of fever, abdominal pain, nausea, and sometimes vomiting. Symptoms are often mild and most infections are self-limiting, lasting a few days. However, in some patients, the infection may be more serious and the associated dehydration can be life threatening. In these cases, as well as when *Salmonella* causes bloodstream infection, effective antimicrobials are essential for treatment. Salmonellosis has also been associated with long-term and sometimes chronic sequelae e.g. reactive arthritis.

The common reservoir of *Salmonella* is the intestinal tract of a wide range of domestic and wild animals which result in a variety of foodstuffs covering both food of animal and plant origin as sources of infections. Transmission often occurs when organisms are introduced in food preparation areas and are allowed to multiply in food, e.g. due to inadequate storage temperatures, inadequate cooking or cross contamination of ready-to-eat (RTE) food. The organism may also be transmitted through direct contact with infected animals or humans or faecally contaminated environments.

Overall, in the EU, *S.* Enteritidis and *S.* Typhimurium are the serovars most frequently associated with human illness. Human *S.* Enteritidis cases are most commonly associated with the consumption of contaminated eggs and poultry meat, while *S.* Typhimurium cases are mostly associated with the consumption of contaminated pig, poultry and bovine meat.

In animals, sub-clinical infections are common. The organism may easily spread between animals in a herd or flock without detection and animals may become intermittent or persistent carriers. Infected cows may succumb to fever, diarrhoea and abortion. Within calf herds, *Salmonella* may cause outbreaks of diarrhoea with high mortality. Fever and diarrhoea are less common in pigs than in cattle and sheep; goats and poultry usually show no signs of infection.

Table SA1 presents the countries reporting data for 2008.

Table SA1. Overview of countries reporting data for* Salmonella*, 2008

Data	Total number of MSs reporting	Countries
Human	27	**All MSs**
		Non-MSs: CH, IS, LI, NO
Food	26	**All MSs** except CY
		Non-MSs: NO, CH
Animal	26	**All MSs** except MT
		Non-MSs: NO, CH
Feed	25	**All MSs** except CY and MT
		Non-MSs: CH, NO
Serovars (food and animals)	23	**All MSs** except BG, CY, FR, MT
		Non-MS: NO

Note: In the following chapter on food and animals, only countries reporting 25 samples or more have been included for analyses.

3.1 *SALMONELLA*

3.1.1 Salmonellosis in humans

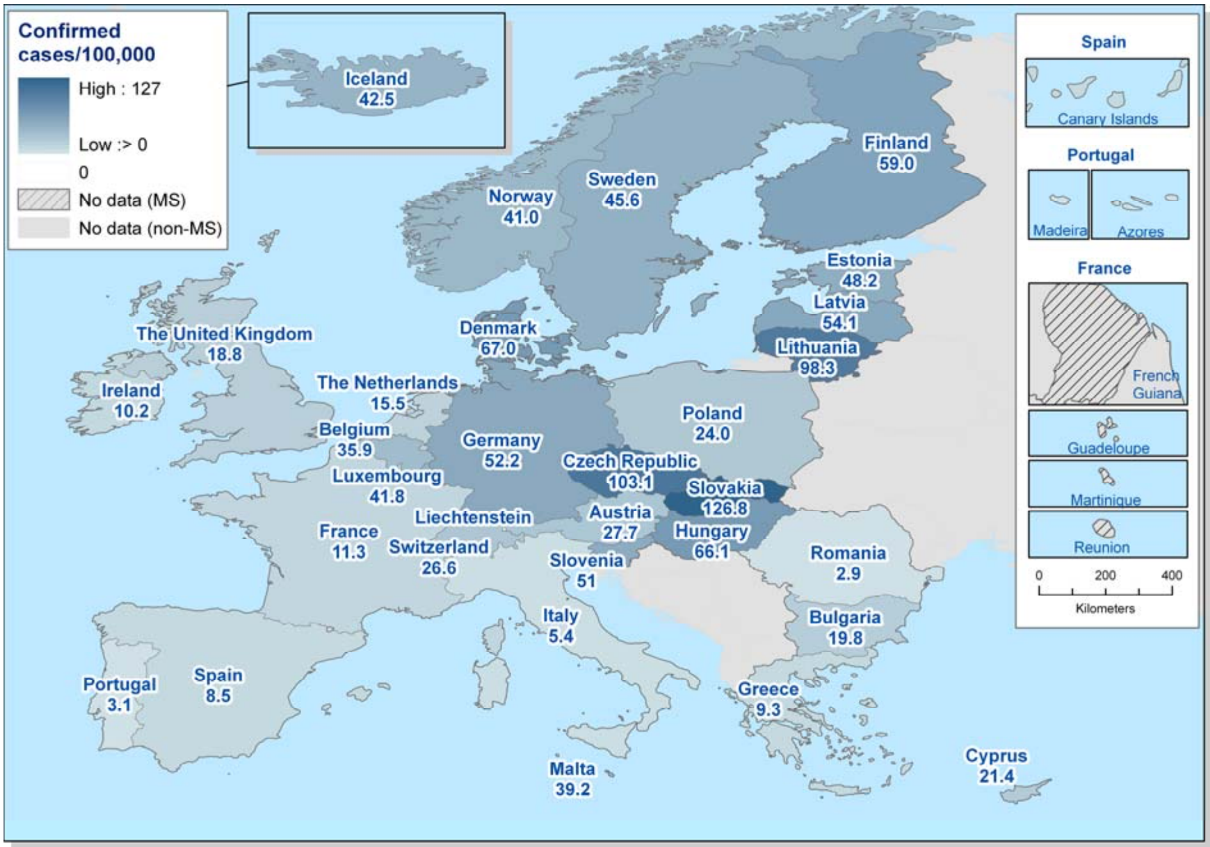
In 2008, a total of 131,468 confirmed cases of human salmonellosis (notification rate 26.4 per 100,000 population) were reported from 27 countries (Table SA2). The total number of reported human salmonellosis cases in the EU has decreased steadily by several thousand cases annually since 2004, from 195,947 cases in 2004 to 133,258 cases in 2008. The reporting of confirmed human salmonellosis cases in 2008 represents a 13.5% decrease from 2007 in MSs. The decreasing Community five-year trend was statistically significant (Figure SA2a). A total of 10 countries showed a significant decreasing trend whereas seven countries showed a still significant increasing trend, highlighting the need to continue the prevention and control efforts against human salmonellosis at Community level (Figure SA2b). Within the five-year period, the greatest average decline of 24% in case numbers per year were detected in Austria and Slovenia whereas the highest average rise in case numbers per year were detected in Estonia (35%) and in Cyprus (24%).

A total of 10 out of 27 MSs reported a decrease in the notification rates compared to the previous year. Germany and Czech Republic reported remarkably fewer confirmed cases in 2008 than in 2007; a reduction of 12,491 and 6,948 cases, respectively. Despite 17 MSs reporting an increase in the number of confirmed cases, the total number of confirmed cases decreased by 20,530 cases in 2008 compared to 2007 due to the decrease in reported confirmed cases by Germany and the Czech Republic. Nine MSs and Iceland experienced an increase of over 30% in the number of reported confirmed cases. One of the most affected countries was Denmark, where the number of reported confirmed cases more than doubled from 1,662 cases in 2007 to 3,669 cases in 2008. This is largely due to the ongoing national *S.* Typhimurium outbreak, which was detected early in 2008. Germany, the United Kingdom and the Czech Republic accounted for half of the confirmed cases (49.5%) in 2008 (Table SA2).

Figure SA1 illustrates the geographical distribution of reported notification rates in the EU. The different sensitivities of MS reporting systems may have influenced these figures; consequently, comparison between countries should be made with caution. Comparison between years within a country is, in general, more valid. Also, the differences between countries in proportion to imported versus domestically acquired cases should be noted, see Table SA3.

3.1 *SALMONELLA*

Figure SA1. Salmonellosis notification rates in humans (cases per 100,000 population) in the EU, 2008



Note: A graduate colour ramp with class interval of 0.1 was used for the map symbology.

3.1 *SALMONELLA*

Table SA2. Reported salmonellosis cases in humans 2004-2008[1], and notification rate (per 100,000 population) in 2008.

Country	2008				2007	2006	2005	2004
	Report Type[2]	Cases	Confirmed Cases	Cases/ 100,000				
Austria	C	2,312	2,310	27.7	3,375	4,787	5,164	7,286
Belgium	C	3,831	3,831	35.9	3,973	3,693	4,916	9,545
Bulgaria[3]	A	1,622	1,516	19.8	1,136			
Cyprus	C	169	169	21.4	158	99	59	89
Czech Republic	C	10,872	10,707	103.1	17,655	24,186	32,860	30,724
Denmark	C	3,669	3,669	67.0	1,662	1,662	1,798	1,538
Estonia	C	647	647	48.2	430	453	312	135
Finland	C	3,126	3,126	59.0	2,737	2,574	2,478	2,248
France	C	7,186	7,186	11.3	5,510	6,008	5,877	6,352
Germany	C	42,909	42,909	52.2	55,400	52,575	52,245	59,947
Greece	C	1,064	1,039	9.3	706	825	1,234	1,438
Hungary	C	7,166	6,637	66.1	6,575	9,389	7,820	7,557
Ireland	C	447	447	10.2	440	420	348	416
Italy	C	3,232	3,232	5.4	4,499	5,164	5,004	6,696
Latvia	C	1,229	1,229	54.1	619	781	615	480
Lithuania	C	3,308	3,308	98.3	2,270	3,479	2,348	1,854
Luxembourg	C	202	202	41.8	163	308	211	
Malta	C	161	161	39.2	85	63	66	79
Netherlands[4]	C	1,627	1,627	15.5	1,245	1,667	1,388	1,520
Poland	A	9,609	9,149	24.0	11,155	12,502	15,048	15,958
Portugal	C	348	332	3.1	482	387	468	691
Romania[3]	A	624	624	2.9	620			
Slovakia	C	7,336	6,849	126.8	8,367	8,242	10,766	12,667
Slovenia	C	1,033	1,033	51.0	1,346	1,519	1,519	3,247
Spain	C	3,833	3,833	8.5	3,658	5,117	6,048	7,109
Sweden	C	4,185	4,185	45.6	3,930	4,056	3,168	3,562
United Kingdom	C	11,511	11,511	18.8	13,802	14,055	12,784	14,809
EU Total		**133,258**	**131,468**	**26.4**	**151,998**	**164,011**	**174,544**	**195,947**
Iceland	C	134	134	42.5	93	116	86	
Liechtenstein	C	2	0	0.0	1	14		
Norway	C	1,941	1,941	41.0	1,649	1,813	1,482	1,567
Switzerland	C	2,051	2,051	26.6	1,802	1,786	1,877	1,910

1. Number of confirmed cases for 2005-2008 and number of total cases for 2004.

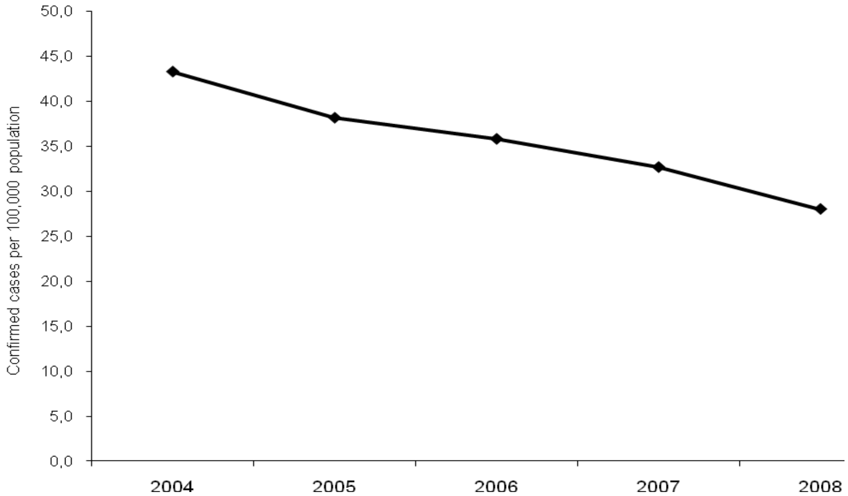
2. A: aggregated data report; C: case-based report; —: No report; 0:0 cases reported.

3. EU membership began in 2007.

4. Sentinel system; notification rates calculated on estimated coverage 64%.

3.1 *SALMONELLA*

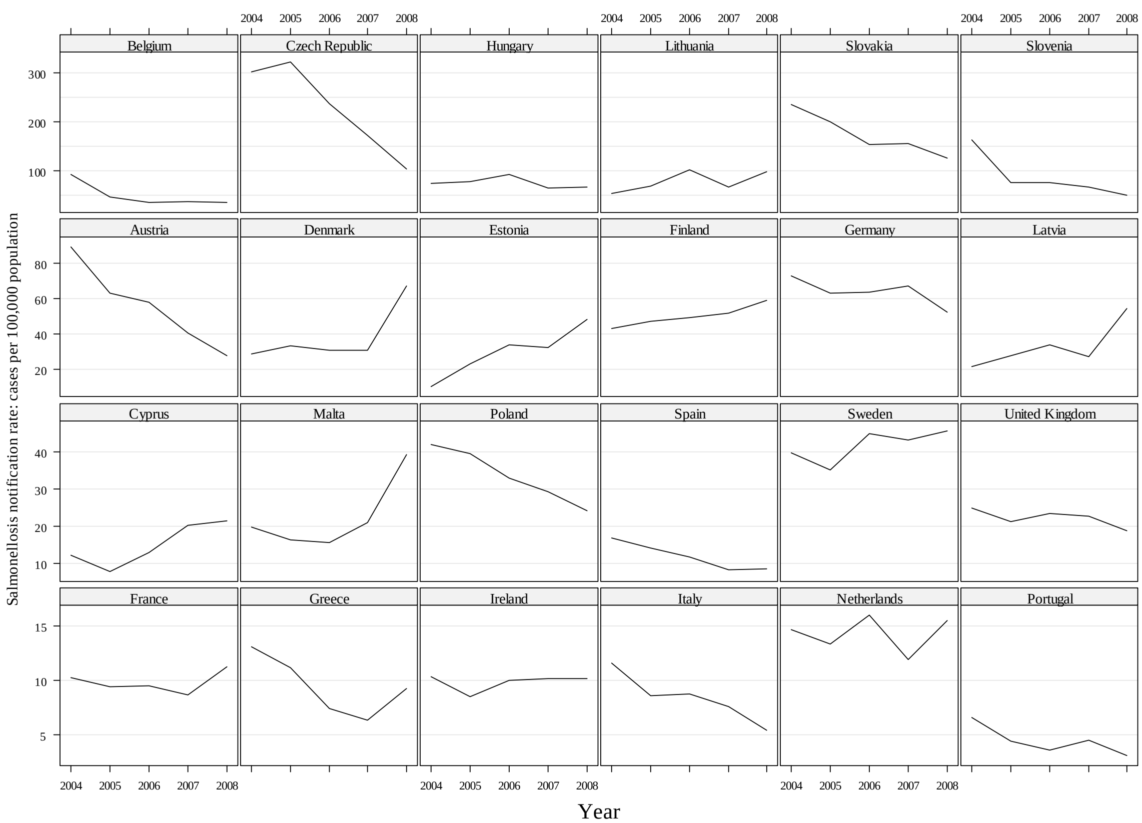
Figure SA2a. Notification rate of reported confirmed cases of human salmonellosis in the EU, 2004-2008[1]



Source for EU trend: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

1. Includes total cases for 2004 and confirmed cases for 2005-2008.

Figure SA2b. Salmonellosis notification rates in humans (cases per 100,000 population) in MSs, 2004-2008

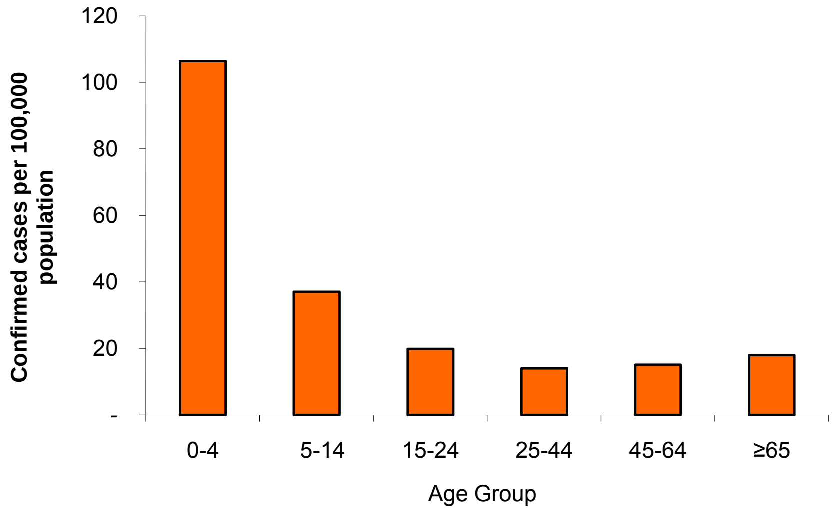


Note: MSs have been ranked according to the maximum value of the notification rate. A unique scale is used for MSs shown in the same row but scales differ among rows.

3.1 *SALMONELLA*

The age distribution of *Salmonella* cases in 2008 closely parallels that seen in previous years. Of 131,468 reported confirmed cases, age data were available for 85.5% of cases. The highest notification rate for 0 to 4 year olds reduced slightly from 125.4 per 100,000 population in 2007 to 118.8 per 100,000 population in 2008, although this group still have the three times higher notification rate than 5 to 14 year olds and six to nine times higher rate than those aged 15 and over (Figure SA3).

Figure SA3. Age-specific distribution of reported confirmed cases of human salmonellosis, TESSy data for reporting MSs, 2008

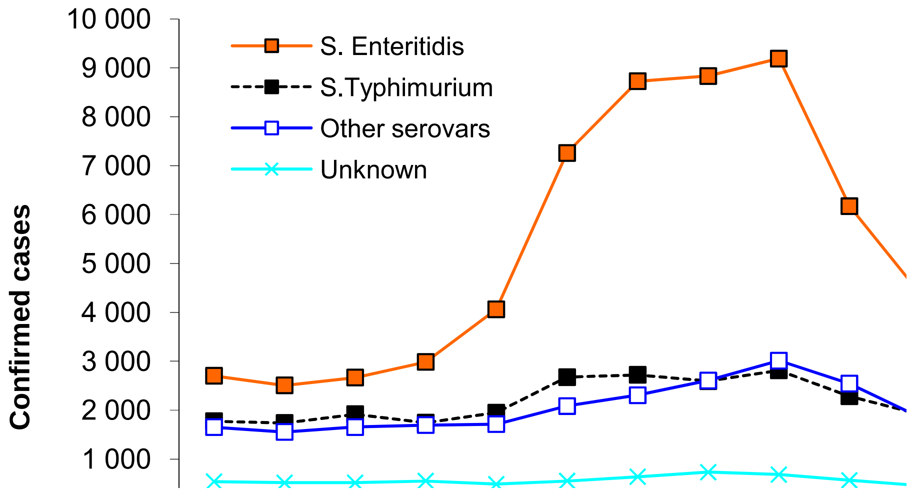


Source: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia, Spain, Sweden and United Kingdom (N=112,367).

A peak in the number of reported *Salmonella* cases occurs in the summer and autumn, with a rapid decline in winter months (Figure SA4). This pattern supports the influence of temperature and behaviour (i.e. food consumption habits such as barbequed food) on *Salmonella* notification rates. This seasonal variability is similar to previous years. However, when analysing further the two most common serovar case counts per month, *S.* Enteritidis demonstrates a much more prominent summer/autumn peak than *S.* Typhimurium and other serovars.

3.1 *SALMONELLA*

Figure SA4. Number of reported confirmed salmonellosis cases in humans by month and serovar, TESSy data for reporting MSs, 2008



Source: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom (N=119,092).

The proportion of *Salmonella* cases that were reported as domestically acquired in MSs and EEA/EFTA countries remained approximately the same in 2008 as in 2007 (63.6% versus 65.1%) (Table SA3). The same observation was made for the proportion of imported cases or those acquired while travelling abroad, which in 2008 was 7.8% compared to 7.9% in 2007. While many MSs report a clear dominance of domestically acquired *Salmonella* infections, three of the four Nordic countries: Sweden, Finland and Norway, reported the highest proportions of imported cases of salmonellosis (82.1%, 83.2% and 83.6% respectively). As in previous years, Ireland and the United Kingdom showed ratios close to 1:1 between domestically and imported cases, which was not seen in other reporting countries (Table SA3). The proportion with an unknown location of origin still represented 28.6% of confirmed cases (Table SA3). Although data on domestic/imported cases are often incomplete and may not provide a true picture of the distribution between domestic and imported cases the contintual repititive results may indicate common cultural features in some geographical areas

Table SA3. Distribution of confirmed salmonellosis cases in humans by reporting countries and origin of case (domestic/imported), TESSy data for reporting MSs, 2008

Country	Domestic (%)	Imported (%)	Unknown (%)	Total (N)
Austria	80.6	19.4	0	2,310
Belgium	0	0	100	3,831
Bulgaria	0	0	100	1,516
Cyprus	96.4	3.6	0	169
Czech Republic	97.8	2.2	0	10,707
Denmark	40.9	19.0	40.1	3,669
Estonia	93.5	6.5	0	647
Finland	12.0	83.2	4.8	3,126
France	0	0	100	7,186
Germany	89.1	5.8	5,1	42,909
Greece	69.1	1.6	29.3	1,039
Hungary	99.8	0.2	0	6,637
Ireland	24.8	28.4	46.8	447
Italy	5.8	0.5	93.7	3,232
Latvia	98.4	1.6	0	1,229
Lithuania	0	0	100	3,308
Luxembourg	70.3	5.4	24.3	202
Malta	98.8	0	1.2	161
Netherlands	89.4	10.6	0	1,627
Poland	0	0	100	9,149
Portugal	0	0	100	332
Romania	0	0	100	624
Slovakia	99.0	1.0	0	6,849
Slovenia	0	0	100	1,033
Spain	100	0	0	3,833
Sweden	16.3	82.1	1.6	4,185
United Kingdom	22.7	26.6	50.7	11,511
EU Total	**63.6**	**7.8**	**28.6**	**131,468**
Iceland	2.2	10.5	87.3	134
Liechtenstein	0	0	0	0
Norway	13.3	83.6	3.1	1,941

3.1.2 *Salmonella* in food

Most MSs and non-MSs provided data on *Salmonella* in various foodstuffs (Table SA4). In the report, only results based on 25 or more units tested are reported. Results from industry own-check programmes and Hazard Analysis and Critical Control Point (HACCP) sampling have been excluded due to difficulties in interpretation of data. However, these data are presented in the Level 3 tables, whereas the details on the monitoring schemes applied in MSs are summarised in Appendix tables SA7 (broiler and other poultry meat), SA10 (turkey meat), SA16 (pig meat) and SA17 (bovine meat).

Table SA4. Overview of countries reporting data for* Salmonella *in food, 2008

Data	Total number of MSs reporting	Countries
Broiler meat	25	**All MSs** except CY, UK
		Non-MSs: CH, NO
Turkey meat	17	**MSs:** AT, CZ, DE, EE, ES, FI, GR, HU, IE, IT, LU, MT, PL, PT, RO, SI, SK
		Non-MS: CH
Table eggs	19	**MSs:** AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SK
Pig meat	23	**All MSs** except CY, LT, MT, SE
		Non-MSs: CH, NO
Bovine meat	23	**All MSs** except CY, FR, LT, MT
		Non-MS: NO
Milk and dairy products	19	**MSs:** AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SI, SK
		Non-MS: CH
Fruits and vegetables	12	**MSs:** AT, CZ, EE, ES, HU, IE, IT, NL, PT, RO, SI, SK
Fish and other fishery products[1]	20	**All MSs** except CY, DK, FI, FR, LU, MT, SI
		Non-MS: NO

Note: In the following chapter, only countries reporting ≥25 samples have been included for analyses except for the analysis on compliance with the microbiological criteria, where all data are included.

1. Includes fish, fishery products, crustaceans, live bivalve molluscs, molluscan shellfish and live echinodermis, tunicates and gastropods.

Compliance with microbiological criteria

The *Salmonella* criteria laid down by Regulations (EC) No 2073/2005 and No 1441/2007 were applied from 1 January 2006. The Regulations prescribe rules for sampling and testing, and set limits for the presence of *Salmonella* in specific food categories and in samples from food processing. The food safety *Salmonella* criteria apply to products placed on the market during their shelf life. According to the criteria, *Salmonella* must be absent in the food categories mentioned in Table SA5. Absence is defined by five samples of 25g per batch, except for minced meat and meat preparations intended to be eaten cooked, meat products made from poultry meat intended to be eaten cooked, and mechanically separated meat where a sample size of 10 g applies. In official controls, often only single samples are taken to verify compliance with the criteria.

In 2008, as in 2007, the highest levels of non-compliance with *Salmonella* criteria occurred in foods of meat origin containing raw meat (Figure SA5). Mechanically separated meat and meat products from poultry intended to be eaten cooked had the highest levels of non-compliance at batch level (2.7% and 2.3%, respectively). Of particular risk for human health are the *Salmonella* findings from meat categories intended to be eaten raw (food categories 1.4 and 1.8 in Table SA5), from which a mean of 1.6% of both the batches and the single samples contained *Salmonella*. The proportion of non-compliant samples from egg products is still relatively high (2.8% in single samples and 0.3% in batches). In the other food categories, the level of non-compliance was generally low. However, gelatine and collagen, ready-to-eat (RTE) foods containing raw eggs, and cooked crustaceans and molluscan shellfish at batch level, had more than 1% non-compliance, but relatively few samples were taken from these food categories by MSs. In general, the level of non-compliance in 2008 was comparable to the findings in 2007 (Figure SA5). MSs did not always use the sample sizes (e.g. 10g or 25g) indicated in Regulations (EC) No 2073/2005 and No 1441/2007 for testing, which partly hampered analyses of the data.

Table SA5. Compliance with the food safety* Salmonella *criteria laid down by EU Regulation 2073/2005, 2008

Food categories[1]		Total single samples			Total batches		
		Sample weight	N	% non-compliant	Sample weight	N	% non-compliant
1.4	Minced meat and meat preparations to be eaten raw	25g	3,139	2.2	25g or not stated	212	0
1.5	Minced meat and meat preparations from poultry to be eaten cooked	10g or 25g or not stated	1,400	6.7	10g or 25g	10,545	1.7
1.6	Minced meat and meat preparations from other species than poultry to be eaten cooked	10g or 25g or not stated	6,173	2.1	10g or 25g or not stated	41,086	0.6
1.7	Mechanically separated meat	25g or not stated	250	1.6	10g or 25g or not stated	2,661	2.7
1.8	Meat products intended to be eaten raw	25g	2,345	1.0	25g	1,540	1.8
1.9	Meat products from poultry meat intended to be eaten cooked	10g or 25g or not stated	4,476	1.9	10g or 25g or not stated	4,038	2.3
1.10	Gelatine and collagen	25g	19	0	25g or not stated	61	1.6
1.11	Cheeses, butter and cream made from raw or low heat-treated milk	25g	930	0.2	25g or not stated	2,875	0.1
1.12	Milk- and whey powder	25g	319	<0.1	25g or not stated	10,088	0
1.13	Ice-cream	25g or not stated	12,933	0	25g or not stated	4,059	<0.1
1.14	Egg products	25g or not stated	1,578	2.8	25g or 25 ml, 5*25g or 5*25 ml	5,323	0.3
1.15	RTE foods containing raw egg	-	-	-	25g	50	2.0
1.16	Cooked crustaceans and molluscan shellfish	25g	118	0	25g or not stated	97	2.1
1.17	Live bivalve molluscs and live echinoderms, tunicates and gastropods	25g	330	0.9	25g	5	0
1.18	Sprouted seeds (RTE)	25g	51	0	25g	30	0
1.19	Pre-cut fruit and vegetables (RTE)	25g	4,686	<0.1	25g	2,047	0
1.20	Unpasteurised fruits, vegetables and juices (RTE)	25g	52	0	25g	153	0
1.22-23	Dried infant formulae, and dried dietary foods for medical purposes[2] and dried follow-on formulae	25g or not stated	1,363	0	25g or not stated	354	0

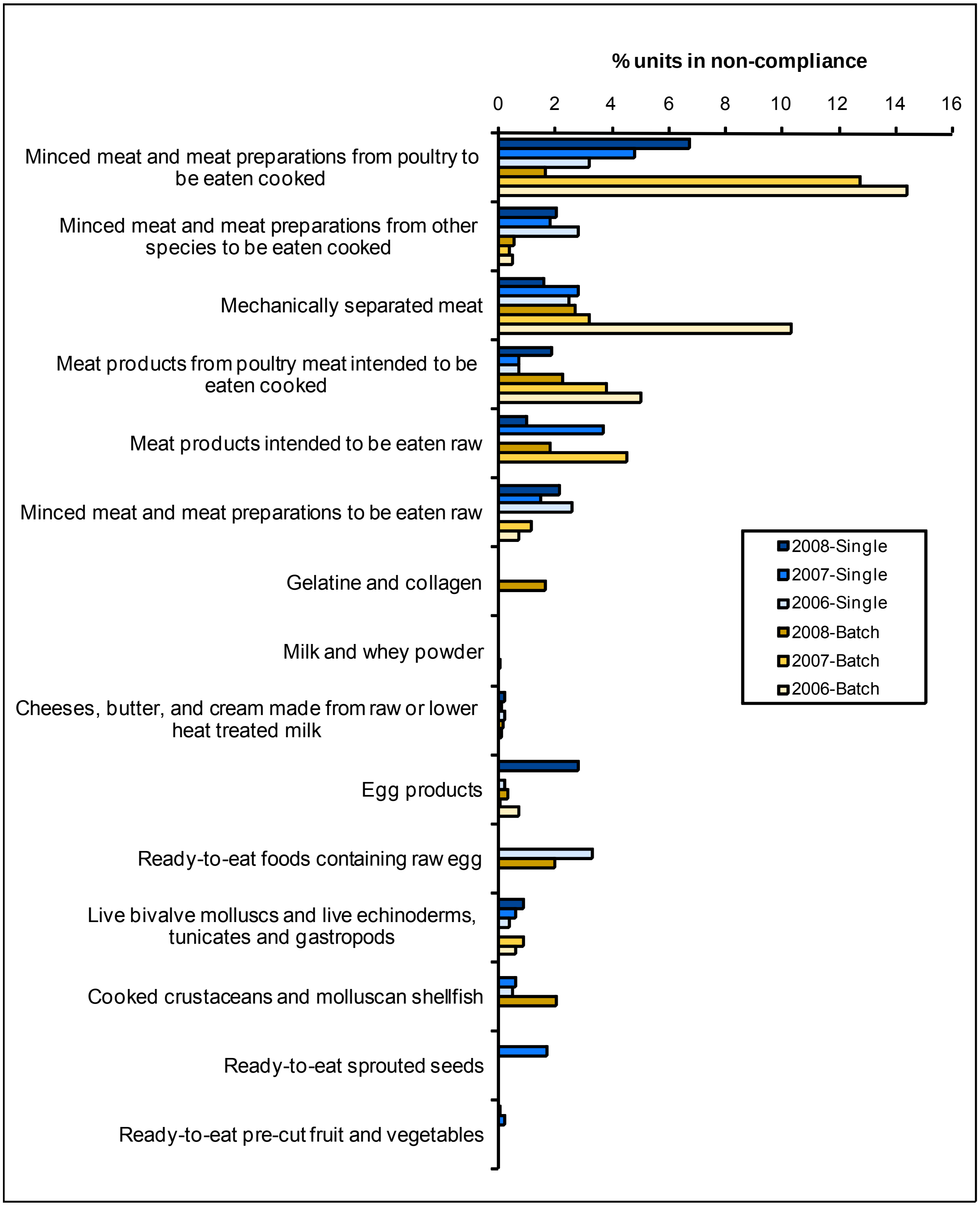
Note: RTE: ready to eat products.

1. Numbers before food categories refer to Annex 1, chapter 1 of Regulations (EC) No 2073/2005 and No 1441/2007. See these for full description of food categories.

2. Intended for infants below six months of age.

3.1 *SALMONELLA*

Figure SA5. Proportion of samples[1] in non-compliance with the EU Salmonella criteria, 2006-2008



1. Excluding HACCP and own check samples.

3.1 *SALMONELLA*

Broiler meat and products thereof

The occurrence of *Salmonella* in fresh broiler meat at different levels of the production chain is presented in Table SA6. Overall, 5.1% of the tested units were positive for *Salmonella* in the EU, a slight decrease compared to the proportion reported in 2007 (5.6%). However, these figures may not be directly comparable, e.g. due to the variation in reporting MSs and in the meat categories covered over the years.

Salmonella was detected in most of the reported investigations. Eight out of 20 MSs reported less than one percent positive samples in one or more investigations at some stage during the production. The highest levels of contamination (>20%) were reported from Hungary, Belgium and Latvia (Table SA6).

At slaughter, the reported proportion of positive samples varied among MSs from 0% to 23.4%, and at processing *Salmonella* was detected in 0% to 15.6% of the samples; four MSs reported more than 15% positive samples at slaughter and at processing. At retail level, the range was from 0% to 16.2%. There was no consistent trend among MSs that reported investigations at different sampling stages regarding the most contaminated sampling stage. Only 1.4% of the tested units were without a designated level of sampling (Table SA6). This is a decrease compared to 2007 and a positive development.

Denmark, Finland, Ireland, Sweden and Norway have had programmes for the control of *Salmonella* in live broilers for a number of years. The monitoring data from Sweden included all poultry meat, not only broiler meat (although most samples were from broiler meat), and the results are therefore not included in Tables SA6 and SA7. However, the proportion of positive poultry meat samples in Sweden has been very low for the last five years. In 2008, Sweden did not detect *Salmonella* in the samples.

MS specific trends in *Salmonella* in fresh broiler meat over the last five years are presented in Figure SA6a. MS trends were not tested for statistical significance, but there appears to be a decreasing trend in the proportion of positive samples for *Salmonella* in Belgium. In Finland, the reported proportion of positive samples has been very low throughout the years. In Greece, the proportion of positive samples increased markedly in 2007. Ireland reported a slight increase in the proportion of *Salmonella* positive samples in 2007, while in 2008 no positive samples were reported based on data including only 22 samples.

The weighted mean proportions of *Salmonella* positive samples in the group of MSs that reported consistently over the last four or five years is presented in Figure SA6b. In this analysis, MS specific results were weighted by national production figures. Since no data were reported in 2008 by Estonia and Italy, the 2008 results were not considered comparable with those of previous years and the trend over the years was not tested. See section 4.2 in the Materials and Methods chapter and notes to Figure SA6b for descriptions of statistics and weighting.

In 2008, 14 MSs reported *Salmonella* findings in non-ready-to-eat (non-RTE) broiler meat products (meat products, meat preparations and minced meat), and the proportion of *Salmonella* positive samples varied between 0% and 47.8% but on average only 2.0% of the units were positive (Table SA7a). The highest contamination level was reported by Hungary and Slovakia in non-RTE meat preparations (47.8% and 21.9% of batches, respectively). The data reported by MSs in the investigations of single sample non-RTE products are presented in Figure SA7.

Eleven MSs reported data for RTE broiler meat products and most MSs reported no positive samples; Spain and Austria were significant exceptions with 3.7% and 5.6% of samples being positive at retail (Table SA7b).

3.1 *SALMONELLA*

Table SA6. Salmonella in fresh broiler meat (unless otherwise stated) at slaughter, processing/cutting level and retail, 2006-2008

Country	Sample unit	Sample weight	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
At slaughter								
Belgium[1]	Single	1g/25g	157	7.0	58	10.3	-	-
	Single	1g	128	23.4	-	-	69	1.4
Czech Republic	Batch	25g	1,367	4.2	1,697	1.8	-	-
Denmark[2]	Batch	25g/ 50g/60g	518	0.6	828	1.2	775	1.9
Estonia	Batch	25g	-	-	-	-	52	3.8
Germany	Single	25g	55	12.7	-	-	-	-
Greece	Single	25g	76	6.6	-	-	-	-
Hungary	Single	25g	-	-	232	43.5	-	-
Latvia[3]	Single	25g	50	22.0	100	15.0	-	-
	Batch	25g	-	-	-	-	1,081	6.9
Poland	Single	25g	-	-	1,340	7.5	-	-
Romania	Single	25g	-	-	7,698	1.0	-	-
	Batch	25g	2,027	0.6	-	-	-	-
Spain	Single	25g	465	15.1	184	22.3	93	15.1
Norway	Batch		-	-	-	-	5,420	<0.1
Switzerland	Single	25g	-	-	1,753	0.6	-	-
At processing/cutting plant								
Austria[4]	Single	10g/25g	64	0	67	7.5	-	-
Belgium[4]	Single	1g/25g	568	7.0	-	-	293	13.3
	Batch	25g	-	-	170	6.5	-	-
Estonia	Batch	25g	48	0	94	1.1	90	5.6
Finland	Single	25g	768	0.0	757	0	752	0
Germany	Single	25g	79	5.1	36	11.1	-	-
Greece	Single	25g	77	15.6	27	55.6	805	2.6
Ireland[5]	Single	Varies	-	-	387	9.6	49	10.2
	Batch	25g	219	15.1	-	-	-	-
Romania	Batch	25g	294	0.7	-	-	-	-
Slovenia	Single	25g	-	-	187	0.5	172	0
Spain	Single	25g	91	15.4	144	2.8	120	4.2
Switzerland	Single	25g	-	-	1,346	<0.1	-	-
At retail								
Austria[4]	Single	10g/25g	295	7.8	86	5.8	-	-
Belgium[6]	Single	25g	88	11.4	176	12.5	80	5.0
Bulgaria	Batch	25g	4,046	0.3	-	-	-	-
Estonia	Single	10g	-	-	-	-	68	10.3
Germany	Single	25g	993	10.8	714	8.5	-	-
Greece	Single	25g	64	15.6	69	11.6	-	-
Latvia	Single	10g	85	8.2	200	3.0	-	-
Lithuania	Single	25g	136	16.2	-	-	-	-
Luxembourg	Single	25g	101	5.9	254	6.7	91	6.6
Netherlands[7]	Single	25g	1,408	7.7	1,418	8.1	1,365	8.4
Romania	batch	25g	295	2.4	-	-	-	-
Slovenia	Single	25g	315	0.6	343	2.3	-	-
Spain	Single	25g	195	3.6	206	10.2	294	3.4
United Kingdom	Single	25g	-	-	-	-	860	10.7
Switzerland[8]	Single	25g	-	-	415	6.5	-	-

Table SA6. (contd.)* Salmonella *in fresh broiler meat (unless otherwise stated) at slaughter, processing/cutting level and retail, 2006-2008

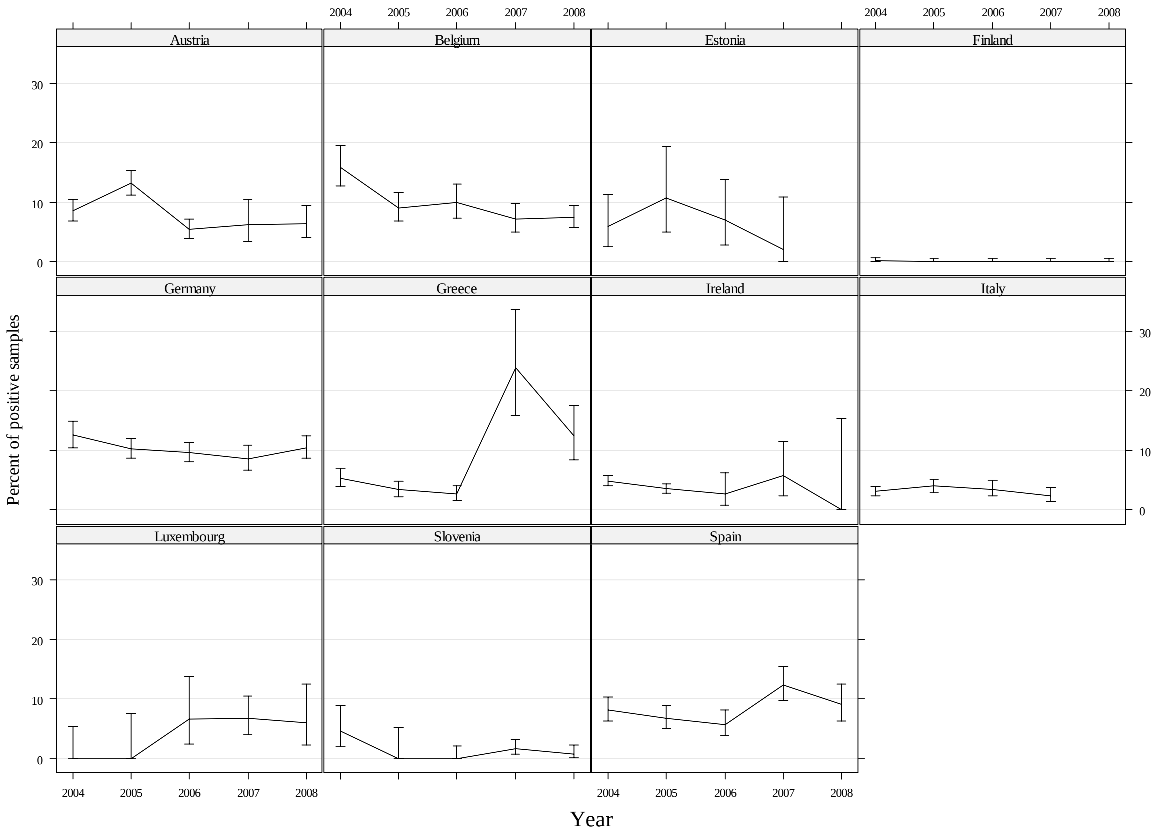
Country	Sample unit	Sample weight	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
Sampling level not stated								
Austria	Single	10g/25g	-	-	54	5.6	776	5.4
Hungary	Batch	25g	188	75.5	-	-	-	-
Italy	Batch	25g	38	2.6	206	4.9	415	3.1
	Batch	-	25	0	-	-	-	-
	Single	25g	-	-	736	2.4	847	3.5
Poland	Batch	10g/ 25g/300g	-	-	4,421	12.0	1,638	32.5
Portugal	Single	25g	-	-	-	-	-	-
Slovakia	Batch	25g	32	12.5	-	-	-	-
	Single	25g	-	-	258	0.4	258	0.4
EU 2008 Total			**15,355**	**5.1**	**23,408**	**5.6**	**11,043**	**9.4**

Note: Data are only presented for sample size ≥25. Carcass swabs are included in fresh meat.

1. 1g in 2008.
2. 60g in 2008.
3. 10g in 2008.
4. 25g in 2008.
5. 25g in 2007.
6. Meat with skin.
7. In 2008 no information is given concerning batch/single.
8. In Switzerland, from the 415 samples 245 originated from Switzerland (0.4% positive), 168 were imported (14.8% positive) and from two samples the origin was unknown.

3.1 *SALMONELLA*

Figure SA6a.* Salmonella *in fresh broiler meat*[1]*, proportion of positives and 95% CI*[2] *in selected MSs*[3]*, 2004-2008



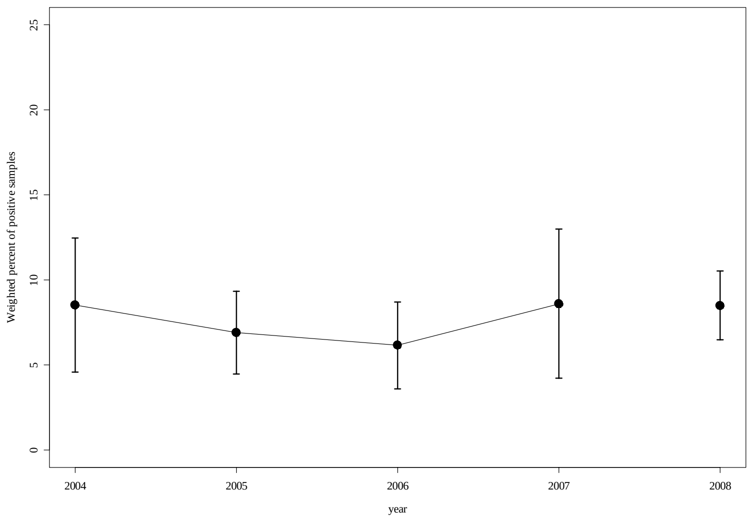
1. Combined data (samples taken at slaughter, at processing/cutting plant or at retail) have been used to estimate the percentage of *Salmonella* positive fresh broiler meat samples. Batch based data excluded.

2. Vertical bars indicate exact binomial 95% confidence intervals.

3. Includes only MS with data from a minimum of four years.

3.1 *SALMONELLA*

Figure SA6b. **Salmonella** ***in fresh broiler meat, weighted[1] mean proportions of positive samples with 95% confidence intervals, in 11 MSs[2], 2004-2008***



1. Weight was the ratio between the slaughtered broiler population size per MS and the number of tested samples per MS per year. Slaughtered numbers of broilers per MS were reported by MSs in the framework of the 2008 baseline survey in broiler flocks and broiler carcasses, and supplemented with EUROSTAT data from 2008. Batch-based data excluded.

2. Includes only MSs with data from at least four consecutive years: Austria, Belgium, Estonia, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Slovenia, and Spain.

3.1 *SALMONELLA*

Table SA7a. **Salmonella** *in non-ready-to-eat broiler minced meat, meat preparation and meat products, 2008*

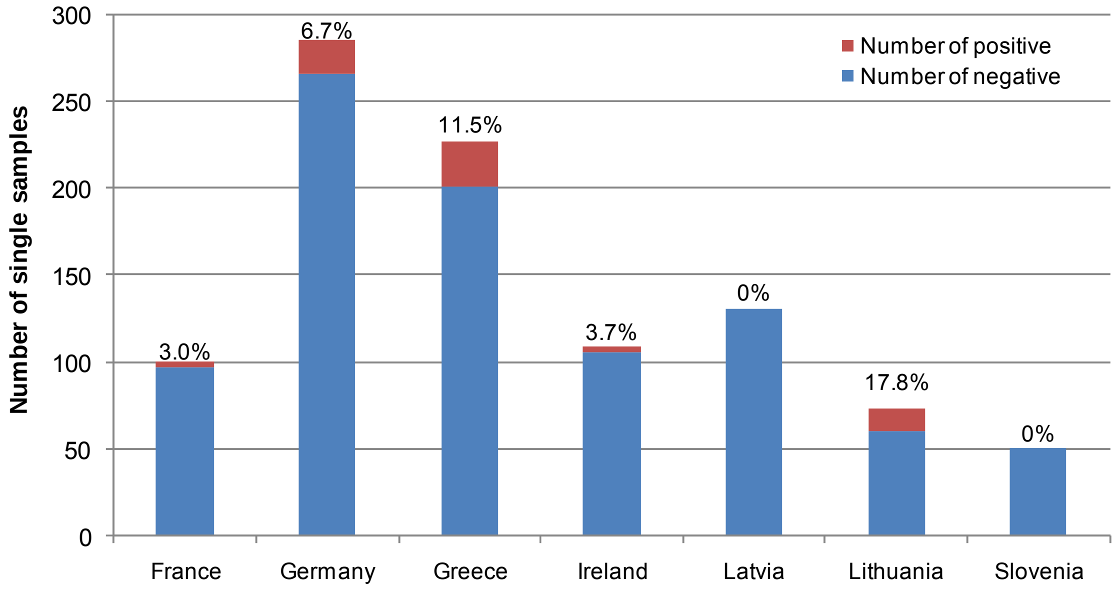
Country	Description	Sample unit	Sample weight	N	% pos
At processing plant					
Czech Republic	Meat products	Batch	25g	175	3.4
	Meat preparation	Batch	25g	1,872	0.3
Germany	Meat preparation	Single	25g	136	6.6
Greece	Meat products	Single	25g	186	10.8
Ireland	Meat products	Single	25g	109	3.7
Latvia	Minced meat	Single	10g	50	0
Poland	Meat preparation	Batch	25g	984	5.3
Romania	Minced meat	Batch	10g	44	0
	Meat preparation	Batch	25g	105	0
	Meat products	Batch	25g	122	0
Slovakia	Meat products	Batch	10g/25g	86	2.3
At retail					
Bulgaria[1]	Minced meat	Batch	-	725	0.8
	Meat products	Batch	-	910	2.2
	Meat preparation	Batch	-	6,144	0.6
France	Meat products	Single	250g	100	3.0
Germany	Meat preparation	Single	25g	149	6.7
Greece	Meat products	Single	25g	41	14.6
Latvia	Meat preparation	Single	10g	80	0
Lithuania	Meat preparation	Single	10g	73	17.8
Netherlands	Meat preparation	-	25g	108	13.9
Romania	Meat preparation	Batch	25g	57	0
	Meat products	Batch	25g	416	0
Slovenia	Meat preparation	Single	10g	50	0
Switzerland	Meat preparation	Single	10g	179	2.8
Sampling level not stated					
Hungary	Meat preparation	Batch	10g	67	47.8
	Meat products	Batch	25g	117	12.8
Slovakia	Meat preparation	Batch	25g	32	21.9
Total (14 MSs)				**12,938**	**2.0**

Note: Data are only presented for sample size ≥25.

1. Sample weight not stated.

3.1 *SALMONELLA*

Figure SA7.* Salmonella *in non-ready-to-eat products (minced meat, meat preparations and meat products) from broiler meat in the reporting MSs (single samples), 2008



Note: numbers on top of bars indicate proportion of positive samples.

***Table SA7b.* Salmonella *in ready-to-eat broiler meat product samples, 2008*[1]**

Country	Sample unit	Sample weight	N	% pos
At processing plant				
Czech Republic	Batch	25g	250	0
Ireland	Single	25g	311	0.3
Romania	Batch	25g	240	0
Slovakia	Batch	25g	177	0
Spain	Single	25g	459	2.8
At retail				
Austria	Single	25g	180	5.6
Bulgaria	Batch	-	211	0
Czech Republic	Single	25g	36	0
Germany	Single	25g	137	0.7
Greece	Single	25g	25	0
Ireland	Single	25g	463	0
Netherlands	-	25g	104	0
Romania	Batch	25g	182	0
Slovenia	Single	25g	49	0
Spain	Single	25g	327	3.7
Total (11 MSs)			**3,402**	**1.1**

Note: Data are only presented for sample size ≥25.

1. All data from 2008 were from meat products.

3.1 *SALMONELLA*

Turkey meat and products thereof

The occurrence of *Salmonella* in fresh turkey meat and products thereof at different stages of the production line in 2008 is presented in Table SA8. Overall, in non-RTE meat 5.6% of the tested units were positive for *Salmonella* in the EU, ranging from 0% findings in the Czech Republic and Finland to 35.1% in batches of minced meat from Hungary. The overall level of contamination in RTE products from turkey meat was low (0.4%) with findings ranging from 0% to 1.6%.

Table SA8.* Salmonella *in turkey meat and products thereof, 2008

Country	Description	Sample unit	Sample weight	N	% Pos
NON-READY-TO-EAT					
At slaughterhouse					
Czech Republic	Fresh	Batch	25g	201	4.0
Germany	Fresh	Single	25g	36	2.8
Cutting and processing plant					
Czech Republic	Meat preparation	Batch	25g	70	2.9
	Meat products	Batch	25g	154	0
Finland	Fresh	Single	25g	513	0
Germany	Fresh	Single	25g	59	11.9
	Meat preparation	Single	25g	96	8.3
Slovenia	Fresh	Batch	25g	74	4.1
Spain	Fresh	Single	25g	88	17.0
At retail					
Austria	Fresh	Single	25g	28	17.9
Germany	Fresh	Single	25g	488	9.2
	Meat preparation	Single	25g	82	8.5
Luxembourg	Fresh	Single	25g	28	3.6
Romania	Fresh	Batch	25g	38	2.6
Slovenia	Fresh	Single	25g	69	4.3
Spain	Fresh	Single	25g	186	3.2
Sampling level not stated					
Hungary	Fresh	Batch	25g	253	13.4
	Meat preparation	Batch	10g	30	6.7
	Meat products	Batch	10g	44	9.1
	Minced meat	Batch	10g	37	35.1
Poland	Mechanically separated meat	Batch	10g	560	1.6
Total (non-RTE, 10 MSs)				**3,134**	**5.6**
READY-TO-EAT					
Cutting and processing plant					
Germany	Meat products	Single	25g	28	0
Ireland	Meat products	Single	25g	81	1.2
Poland	Meat products	Batch	25g	273	0
At retail					
Germany	Meat products	Single	25g	100	1.0
Greece	Meat products	Single	25g	31	0
Ireland	Meat products	Single	25g	64	0
Portugal	Meat products	Batch	25g	62	1.6
Sampling level not stated					
Hungary	Meat products	Batch	25g	36	0
Total (RTE, 6 MSs)				**675**	**0.4**

Note: Data are only presented for sample size ≥25.

Eggs and egg products

Fifteen MSs reported data from investigations of table eggs and the findings are presented in Table SA9. In total, 0.5% of the tested units were positive for *Salmonella*, which is a reduction compared to 2007 (0.8%). Germany and Bulgaria reported the majority of the investigations at retail (84.0%); 0.3% and <0.1% of the samples were positive, respectively.

Fourteen MSs reported results of investigations of egg products, and on average 1.1% of the approximately 7,600 tested units were found positive. The results ranged from 0% to 5.8% in batches of dried egg products from Hungary (N=69).

Table SA9. **Salmonella *in table egg samples, 2008***

Country	Sample unit	Sample weight	N	% pos
At packing centre/processing plant				
Czech Republic	Batch	25g	451	0.4
Germany	Single	25g	1,352	<0.1
Greece	Single	25g	26	0
Italy	Single	-	46	0
	Batch	25g	29	0
Romania	Batch	25g	29	0
Slovakia	Batch	25g	81	3.7
Spain	Single	25g	207	6.3
At retail				
Austria	Single	25g	57	0
Belgium	Single	25g	109	0
Bulgaria	Batch	-	3,267	<0.1
Germany	Single	25g	6,003	0.3
Greece	Single	25g	178	0
Hungary	Batch	10 eggs	846	0.4
Ireland	Single	25g	115	0.9
Italy	Single	-	73	4.1
	Batch	-	224	0.4
Latvia	Single	25g	128	2.3
Lithuania	Single	25g	45	4.4
Poland	Batch	25g	286	0
Romania	Batch	25g	54	0
Slovakia	Batch	25g	53	22.6
Total (15 MSs)			**13,659**	**0.5**

Note: Data are only presented for sample size ≥25.

3.1 *SALMONELLA*

Pig meat and products thereof

Many of the national monitoring programmes on *Salmonella* in pig meat and products thereof are based on sampling at the slaughterhouse and meat cutting plants. At the slaughterhouse, sampling is carried out through carcass swabbing or sampling of meat. The MS monitoring programmes for *Salmonella* in pig meat are described in Appendix Table SA16.

The occurrence of *Salmonella* in fresh pig meat at different stages of the production line from 2006 to 2008 is presented in Table SA10. Overall, 0.7% of the tested units in 2008 was positive for *Salmonella*, which is slightly lower than that reported in 2007 (1.1%) and 2006 (0.9%). In general, the proportion of *Salmonella* positive samples at slaughterhouse ranged from 0% to 23.8% with Portugal reporting the highest proportion of positive samples. Norway reported no positive samples at slaughter, and very low levels (<0.1%) were recorded by Romania, Sweden and Finland. At processing and cutting plants, *Salmonella* was found in up to 5.7% in fresh pig meat samples. Belgium reported the highest proportion of positive samples. At retail, *Salmonella* was reported in 0% to 12.7% of samples. Austria and Italy reported no positive samples but only few units were tested (N=30 and 28, respectively). Spain reported the highest proportion of positive samples (12.7%) at retail.

Data on *Salmonella* in non-RTE pig minced meat, meat preparations and meat products are presented in Table SA11a. A substantial number of samples was analysed, especially by the Czech Republic and Bulgaria, who reported 76% of all samples tested. Overall, 0.6% of the tested units was positive for *Salmonella*, which is comparable to 2007 (0.9%). At the processing stage, up to 3.2% of samples were positive, whereas no *Salmonella* was found in four of 12 investigations. The proportion of *Salmonella* positive findings reached higher levels at retail compared to processing level and ranged from 0% to 10.0%.

Hungary and Slovakia reported investigations with a total of 936 samples without specifying the sampling stage, and the proportion of positive units found varied between 1.3% and 4.9%.

In RTE products of pig meat, *Salmonella* was detected in 11 of the 25 investigations with 0.1% to 28.8% positive findings, and overall 0.8% of the tested units were positive (Table SA11b). This is lower than 2007, where 4.1% of samples was *Salmonella* positive. However, the numbers are not directly comparable due to the different countries reporting. Hungary and Slovakia reported data without stating the sampling stage; 0% to 0.1% of these samples was positive. The highest proportion of positive samples at retail was reported by Germany for minced meat intended to be eaten raw (7.8%). Also, the high level of *Salmonella* positive findings (28.8%) reported by Spain at processing is remarkable, even though the number of samples was relatively low (N=66).

3.1 *SALMONELLA*

Table SA10.* Salmonella *in fresh pig meat, at slaughter, cutting/processing level and retail, 2006-2008

Country	Sample unit	Sample weight	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
At slaughterhouse								
Belgium	Single	600 cm^2	281	14.6	293	16.0	-	-
	Single[1]	100 cm^2	-	-	386	19.4	-	-
Czech Republic	Batch	100 cm^2	5,625	0.6	6,979	0.7	4,077	0.2
Denmark	Batch	300 cm^2	27,045	0.7	27,290	0.7	27,892	0.9
Estonia	Single[1]	1400 cm^2	520	0.2	636	0	683	0.1
Finland	Single[1]	1400 cm^2	6,447	<0.1	6,363	0	6,454	0
Germany[2]	Single	10g/25g	5,726	1.3	5,233	3.8	-	-
Hungary	Single	25g	-	-	178	3.4	-	-
Latvia	Single[1]	-	2,150	0.7	3,500	0.2	-	-
Lithuania	Batch	25g	-	-	480	1.9	-	-
Poland	Batch	100 cm^2	33,225	0.1	-	-	-	-
Portugal	Single[1]	100 cm^2	105	23.8	-	-	-	-
Romania	Batch[1]	25g	1,438	<0.1	-	-	-	-
	Batch[1]	400 cm^2	1,491	1.0	-	-	-	-
Slovakia	Single	100 cm^2	-	-	125	0	-	-
Spain	Single	25g	276	6.2	315	4.8	297	6.4
Sweden	Single[1]	1400 cm^2	5,833	<0.1	6,239	<0.1	5,918	0
Norway	Single[1]	1400 cm^2	2,151	0	3,472	0.1	3,122	0
At cutting/processing plants								
Belgium	Single	25g	122	5.7	537	4.1	328	2.4
Estonia	Single	25g	424	0	520	0.4	347	0
Finland	Single	25g	2,058	0.0	2,329	<0.1	2,311	0
Germany	Single	25g	348	4.9	304	8.9	-	-
Ireland	Single[1]	25g	30	0.0	-	-	-	-
	Single[1]	various	322	0.3	-	-	-	-
Romania	Batch	25g	1,698	0.8	-	-	-	-
Slovenia	Single	25g	281	0	168	0	159	0
Spain	Single	25g	149	4.0	63	7.9	88	0
At retail								
Austria[2]	Single	10g/25g	30	0	400	1.0	96	0
Bulgaria	Batch	-	4,027	0.2	-	-	-	-
Germany	Single	25g	1,902	2.2	1,664	2.8	2,101	2.9
Greece	Single	25g/200g	-	-	30	0	-	-
Italy	Single	25g	28	0	-	-	-	-
Luxembourg	Single	25g	-	-	39	5.1	-	-
Netherlands	Single	25g	319	2.8	277	3.2	422	3.1
Romania	Batch	25g	659	3.6	-	-	-	-
Slovenia	Single	25g	-	-	385	0.3	-	-
Spain	Single	25g	236	12.7	66	6.1	227	11.5
UK	Single	swab	1,693	0.5	-	-	-	-

3.1 *SALMONELLA*

Table SA10 (contd.).* Salmonella *in fresh pig meat, at slaughter, cutting/processing level and retail, 2006-2008

Country	Sample unit	Sample weight	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
Sampling level not stated								
Austria	Single	25g	-	-	-	-	33	3.0
Hungary	Single	25g	-	-	-	-	168	4.8
	Batch	25g	360	1.7	-	-	-	-
Italy[3]	Single	25g	1,034	2.3	2,430	2.9	1,880	3.8
	Batch	25g	2,908	2.9	170	3.5	-	-
	Batch	-	139	0	-	-	-	-
Poland	Batch	-	-	-	9,715	0.4	3,112	0.9
Slovakia[4]	Single	10g/25g	-	-	2,025	0	-	-
	Batch	25g	101	0	-	-	536	0.4
EU Total			**109,030**	**0.7**	**79,139**	**1.1**	**57,129**	**0.9**

Note: Data are only presented for sample size ≥25.

1. Carcasses.

2. 25g in 2008.

3. Sample weight not specified in 2008.

4. 10g/25g in 2007; 25g in 2005.

3.1 *SALMONELLA*

Table SA11a.* Salmonella *in non-ready-to-eat pig minced meat, meat preparations and meat products from pig meat, 2008

Country	Description	Sample unit	Sample weight	N	% pos
At processing plant					
Czech Republic	Meat preparation	Batch	25g	4,532	0.3
	Meat products	Batch	25g	420	0.7
	Minced meat	Batch	25g	2,732	0.2
Estonia	Meat preparation	Single	10g	93	2.2
Germany	Meat preparation	Single	25g	111	0
	Meat products	Single	25g	331	2.7
	Minced Meat	Single	25g	47	0
Greece	Meat products	Single	25g	31	3.2
Ireland	Meat products	Single	25g	130	0.8
Romania	Meat preparation	Batch	25g	1,017	0
	Meat products	Batch	25g	286	0
	Minced meat	Batch	25g	1,098	<0.1
At retail					
Austria	Meat preparation	Single	10g	114	0
Bulgaria	Meat preparation	Batch	-	11,278	0.3
	Meat products	Batch	-	2,715	0.7
	Minced meat	Batch	-	6,288	0.3
Estonia	Meat preparation	Single	10g	36	0
	Minced meat	Single	10g	39	2.6
France	Meat products	Single	250g	100	4.0
Germany	Meat preparation	Single	25g	459	1.1
	Meat products	Single	25g	824	4.2
	Minced meat	Single	25g	264	0.8
Greece	Meat products	Single	25g	26	0
Ireland	Meat products	Single	25g	714	1.3
Latvia	Meat preparation	Single	10g	225	0.9
	Minced meat	Single	10g	90	0
Luxembourg	Meat preparation	Single	25g	26	0
	Meat products	Single	25g	178	0
Netherlands	Meat preparation	Single	25g	65	1.5
	Meat products	Single	25g	525	0
Portugal	Meat products	Batch	25g	180	2.8
	Minced meat	Batch	10g	130	10.0
Romania	Meat preparation	Batch	25g	158	0
	Meat products	Batch	25g	231	0
	Minced meat	Batch	25g	178	1.7
Slovenia	Meat preparation	Single	10g	38	0
Switzerland	Meat preparation	Single	10g	148	0
Sampling level not stated					
Hungary	Meat preparation	Batch	10g	244	4.9
	Minced meat	Batch	10g	175	2.3
Slovakia	Meat preparation	Batch	10g	317	1.3
	Meat products	Batch	10-25g	200	1.5
Total (16 MSs)				**36,645**	**0.6**

Note: Data are only presented for sample size ≥25.

Table SA11b.* Salmonella *in ready-to-eat pig minced meat, meat preparations and meat products from pig meat, 2008

Country	Description	Sample unit	Sample weight	N	% pos
At processing plant					
Austria	Meat products	Single	25g	35	0
Czech Republic	Meat products	Batch	25g	1,954	0.2
Estonia	Meat products	Single	25g	113	0
Germany	Meat products	Single	25g	136	0
	Minced meat	Single	25g	300	5.7
Greece	Meat products	Single	25g	236	0
Ireland	Meat products	Single	25g	263	1.9
Romania	Meat preparation	Batch	25g	38	0
	Meat products	Batch	25g	1,335	0
Spain	Meat products	Single	25g	66	28.8
At retail					
Austria	Meat products	Single	25g	90	1.1
Bulgaria	Meat products	Batch	-	3,587	0.3
Czech Republic	Meat products	Single	25g	60	0
Germany	Meat products	Single	25g	719	0
	Minced meat	Single	25g	410	7.8
Ireland	Meat products	Single	25g	351	0.6
Latvia	Meat products	Single	25g	115	0
Portugal	Meat products	Batch	25g	1,065	1.1
Romania	Meat products	Batch	25g	1,145	0
Slovenia	Meat products	Single	25g	57	0
Spain	Meat products	Single	25g	269	4.1
United Kingdom	Meat products	Single	25g	1,096	0
Sampling level not stated					
Hungary	Meat products	Batch	25g	725	0.1
Slovakia	Meat preparation	Batch	25g	144	0
	Meat products	Batch	25g	755	0
Total (15 MSs)				**15,064**	**0.8**

Note: Data are only presented for sample size ≥25.

3.1 *SALMONELLA*

Bovine meat and products thereof

Most monitoring programmes on bovine meat and products thereof are based on sampling at the slaughterhouse and meat cutting plants. At the slaughterhouse, sampling is carried out in the form of carcass swabbing or meat collection. The MS monitoring programmes for *Salmonella* in bovine meat are described in Appendix Table SA17.

The occurrence of *Salmonella* in fresh bovine meat at different stages of the production from 2006 to 2008 is presented in Table SA12. On average, the proportion of *Salmonella* positive units was 0.2% in 2008. This is comparable to 2006 and 2007 (0.3% and 0.4% respectively). In 2008, the proportion of positive samples from slaughterhouses was very low (0 to 0.6%) in most reporting countries. Spain was the only MS reporting slightly higher levels, 1.9% of samples being positive. At cutting plants and retail, the proportion of positive samples varied between 0% and 3.8%, and Spain reported the highest level proportion of positive samples. These findings are similar to the observations in 2007 and 2006.

Data on *Salmonella* findings in non-RTE and RTE bovine minced meat, meat preparations and meat products are summarised in Tables SA13a and SA13b.

The proportion of positive units was 0.6% for non-RTE categories, which is similar to 2007 (0.2%). The range of positive units varied from 0% to 5.7% in non-RTE products. For RTE categories, the overall proportion of positive units was 1.9% an increase compared to the level of 0.2% in 2007. The range of positive units varied from 0% to 5.5% in RTE products. Spain reported the highest proportion of positive samples. Among the RTE categories, the highest proportion of positive samples was reported from meat products.

In addition, Austria and Germany investigated fermented sausages produced from ‘red meat’ and found *Salmonella* in one out of 62 samples (1.6%) and 21 out of 2,106 samples (1.0%), respectively.

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Table SA12. **Salmonella** ***in fresh bovine meat, at slaughter, cutting/processing level and retail, 2006-2008***

Country	Sample unit	Sampleweight	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
At slaughterhouse								
Belgium	Single	1,600 cm^2	-	-	-	-	69	0
Czech Republic	Batch[1,2]	100 cm^2	4,505	0.2	4,856	0.3	3,466	0.2
Denmark[3]	Single[1]	300 cm^2	7,915	0.1	7,350	0.3	8,155	0.2
Estonia	Single[1]	1,400 cm^2	324	0.6	334	1.8	320	0.3
	Single	25g	-	-	91	0	226	0
Finland	Swab	1,400 cm^2	3,125	0	3,133	0	3,237	<0.1
Germany[4]	Single	10g/25g	8,479	0.4	8,119	0.7	-	-
Hungary	Single	25g	-	-	144	0.7	-	-
Latvia	Single[1]	-	2,350	<0.1	3,000	0.1	-	-
Romania	Batch[1]	400 cm^2	925	0	-	-	-	-
	Batch	25g	1,118	0.3	-	-	-	-
Spain	Single	25g	892	1.9	60	6.7	67	7.5
Sweden	Single[1]	1,400 cm^2	3,280	0	3,782	<0.1	3,510	0.1
Norway	Single[1]	1,400 cm^2	1,588	0	2,096	0	2,035	0
At processing/cutting plants								
Estonia	Single	25g	125	0	177	0.6	78	0
Finland	Single	25g	2,054	0.0	2,062	0	2,261	0
Germany	Single	25g	141	0	97	0	-	-
Ireland	Single	25g/various	40	0	66	0	46	0
Romania	Batch	25g	699	1.0	-	-	-	-
Slovenia	Single[1]	300 cm2	-	-	-	-	44	0
	Single	25g	266	0	160	0	155	0
Spain	Single	25g	105	3.8	155	1.9	99	3.0
At retail								
Belgium	-	-	-	-	-	-	110	0
Bulgaria	Batch	-	1,226	0	-	-	-	-
Germany	Single	25g	575	0.7	489	0	-	-
Greece	Single	25g	45	0	-	-	-	-
Italy	Single		49	0	-	-	-	-
Luxembourg	Single	25g	-	-	27	0	-	-
Netherlands	Single	25g	265	0	401	0.2	873	1.5
Romania	Batch	25g	433	0	-	-	-	-
Slovenia	Single	25g	-	-	385	0.5	-	-
Spain	Single	25g	172	1.2	90	2.2	153	0.7
United Kingdom	Single	swab	3,249	0.2	-	-	-	-

Table 12 (contd.).* Salmonella *in fresh bovine meat, at slaughter, cutting/processing level and retail, 2006-2008

Country	Sample unit	Sampleweight	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
Sampling level not stated								
Estonia	Single	25g	-	-	-	-	115	0
Germany[5]	Single	25g	-	-	-	-	638	0.3
Hungary	Single	25g	-	-	-	-	202	2.0
	Batch	25g	213	2.3	-	-	-	-
Italy[6]	Batch	25g	425	0.2	-	-	-	-
	Batch	-	188	0				
	Single	25g	799	0	1,543	1.0	2,254	0.4
Luxembourg	Single	25g	-	-	-	-	98	1.0
Poland[7]	Batch	10g/25g/100g	-	-	3,002	0.5	1,731	1.1
Portugal	Single	-	-	-	-	-	1,142	0
Slovakia[8]	Single	10g/25g	-	-	1,639	0	236	0
	Batch	25g	53	0	-	-	-	-
Total (18 MSs in 2008)			**44,035**	**0.2**	**41,162**	**0.4**	**29,175**	**0.3**

Note: Data are only presented for sample size ≥25.

1. Carcasses.

2. The data also include a pool of four samples of the muscle tissue (5 cm^2 each, maximum thickness 5 mm).

3. In Denmark, the majority of samples are tested in pools of five carcass swabs. At small slaughterhouses, carcass samples are tested individually. Prevalence of *Salmonella* in single swab samples is estimated from results of a pooled analysis.

4. 25g in 2008.

5. Data from 2006 are reported totals from all sampling levels.

6. Sample weight not stated in 2008; 25g in previous years.

7. 10g, 25g, 100g in 2007; 25g in 2006.

8. 10/25g in 2007; 25g in 2006.

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Table SA13a.* Salmonella *in non-ready-to-eat minced meat, meat preparations and meat products from bovine meat, 2008

Country	Description	Sample unit	Sample weight	N	% pos
At processing plant					
Czech Republic	Meat preparation	Batch	25g	1,523	0.1
	Meat products	Batch	25g	121	0
	Minced meat	Batch	25g	45	2.2
Greece	Meat products	Single	25g	46	4.3
Ireland	Meat products	Single	25g	144	<0.1
Latvia	Minced meat	Single	10g	85	0
Romania	Meat preparation	Batch	25g	341	0
	Meat products	Batch	25g	54	0
	Minced meat	Batch	25g	266	0
Spain	Meat preparation	Single	25g	140	5.7
	Minced meat	Single	25g	187	2.1
At retail					
Austria	Meat preparation	Single	10g	38	0
	Minced meat	Single	10g	47	0
Bulgaria	Meat preparation	Batch	-	2,655	<0.1
	Meat products	Batch	-	445	0.4
	Minced meat	Batch	-	593	3.5
Germany	Meat preparation	Single	25g	32	0
	Minced meat	Single	25g	146	0
Netherlands	Meat preparation	Single	25g	54	3.7
Portugal	Minced meat	Batch	10g	95	0
Romania	Meat preparation	Batch	25g	70	0
	Meat products	Batch	25g	29	0
	Minced meat	Batch	25g	88	0
Slovenia	Minced meat	Single	10g	27	0
Sampling level not stated					
Slovakia	Meat preparation	Batch	25g	79	1.3
Total (14 MSs)				**7,350**	**0.6**

Note: Data are only presented for sample size ≥25.

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Table SA13b.* Salmonella *in ready-to-eat minced meat, meat preparations and meat products from bovine meat, 2008

Country	Description	Sample unit	Sample weight	N	% pos
At processing plant					
Czech Republic	Meat products	Batch	25g	641	0
Germany	Minced meat	Single	25g	156	0.6
Ireland	Meat products	Single	25g	309	<0.1
Romania	Meat products	Batch	25g	109	0
Spain	Meat products	Single	25g	803	5.5
At retail					
Belgium	Meat preparation	Single	25g	120	0.8
	Minced meat	Single	25g	111	0.9
Bulgaria	Meat products	Batch		94	0
Germany	Meat products	Single	25g	57	0
	Minced meat	Single	25g	552	1.6
Greece	Meat products	Single	25g	31	0
Ireland	Meat products	Single	25g	249	2.4
Latvia	Meat products	Single	25g	95	0
Luxembourg	Minced meat	Single	25g	217	0
Netherlands	Meat preparation	Single	25g	1,062	0.2
	Meat products	Single	25g	320	0.6
Romania	Meat products	Batch	25g	164	0
Spain	Meat products	Single	25g	1,046	5.0
United Kingdom	Meat products	Single	25g	134	0
Total (12 MSs)				**6,270**	**1.9**

Note: Data are only presented for sample size ≥25.

Milk and dairy products

As in previous years, very few *Salmonella* findings were reported from cow's milk in 2008. Data from investigations of raw milk intended for direct human consumption were only reported by three MSs: the Czech Republic (41 batches), Germany (121 single samples), and Hungary (40 single samples). *Salmonella* was not detected in any of these samples. Eight MSs reported data from investigations of pasteurised or UHT treated cow's milk: Austria (41 single samples), Bulgaria (106 single samples), Czech Republic (89 batches), Germany (1,182 single samples, 959 of which originated from retail), Greece (108 single samples), Hungary (54 single samples), Latvia (55 single samples), and Slovakia (62 batches). Among these, only one German sample from retail was positive for *Salmonella*. Italy reported a large number of samples of cow's milk without details on the product type and the sampling stage; 13 out of 5,018 samples were positive for *Salmonella* (single samples and batches).

Salmonella investigations of cheeses made from pasteurised or raw or low heat-treated milk from cows, goats or sheep are summarised in Table SA14. The number of MSs and number of investigated samples varied considerably depending on product type, and the vast majority of investigations were negative. In 2008, *Salmonella* was not detected in the two German investigations of hard cheeses made from pasteurised milk. In soft and semi-soft cheeses, the only positive samples were reported by Slovakia in cheeses made from raw or low heat-treated cow's and sheep's milk (one positive out of 74 batches and one positive out of 396 batches, respectively) and by Spain in cheese made from cow's milk (level of heat treatment not indicated, one positive out of 28 single samples). In unspecified cheeses, the only *Salmonella* positive samples were reported from Portugal (two positive out of 265 batches of cheese made from sheep's milk, level of heat treatment not specified) and Spain (five positive single samples out of 159, cow's milk level of heat treatment not specified).

Several MSs also reported investigations on cheese made from unspecified milk, from milk from other animal species or from milk from more than one animal species. Among these, *Salmonella* findings were reported by Belgium (two positive out of 114 single samples of unspecified cheese made from unspecified milk),

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Ireland (two positive out of 552 batches of unspecified cheese made from unspecified, raw or low heat-treated milk) and Italy (three positive out of 1,284 single samples of curd made from unspecified milk).

Nine MSs reported investigations on butter but only Spain reported *Salmonella* findings (two positive out of 39 single samples of butter made from raw or low heat-treated milk). Four MSs reported no *Salmonella* findings in cream, and 16 MSs reported no findings in ice-cream. There were no positive findings of *Salmonella* in milk powder and whey powder prepared by the 11 reporting MSs.

For additional information on *Salmonella* in milk and dairy products please refer to Level 3 tables.

Table SA14. **Salmonella *in cheeses, 2008***

Country	Description	Sample unit	Sample weight	N	% pos
Cheeses made of pasteurised milk from cows					
Austria	Unspecified, at processing	Single	25g	165	0
	Unspecified, at retail	Single	25g	92	0
Bulgaria	Soft and semi-soft, at retail	Batch	-	2,723	0
Czech Republic	Soft and semi-soft, at processing	Batch	25g	632	0
	Soft and semi-soft, at retail	Batch	25g	52	0
Germany	Hard cheese, at processing	Single	25g	501	0
	Hard cheese, at retail	Single	25g	1,726	0
	Soft and semi-soft, at processing	Single	25g	163	0
	Soft and semi-soft, at retail	Single	25g	184	0
Greece	Soft and semi-soft, at retail	Single	25g	55	0
Hungary	Soft and semi-soft	Single	25g	202	0
Romania	Soft and semi-soft, at packaging centre	Batch	25g	70	0
	Soft and semi-soft, at processing	Batch	25g	209	0
	Soft and semi-soft, at retail	Batch	25g	66	0
Slovakia	Soft and semi-soft	Batch	25g	143	0
Switzerland	Soft and semi-soft, at processing	Single	25g	51	0
Cheeses made of raw or low heat treated milk from cows					
Austria	Unspecified, at processing	Single	25g	230	0
	Unspecified, at retail	Single	25g	31	0
Bulgaria	Soft and semi-soft, at retail	Batch	-	614	0
Czech Republic	Soft and semi-soft, at processing	Batch	25g	75	0
Germany	Soft and semi-soft, at processing	Single	25g	48	0
	Soft and semi-soft, at retail	Single	25g	55	0
Portugal	Soft and semi-soft, at retail	Batch	25g	35	0
Romania	Soft and semi-soft, at processing	Batch	25g	110	0
	Soft and semi-soft, at retail	Batch	25g	221	0
Slovakia	Soft and semi-soft	Batch	25g	74	1.4
Cheeses made milk from cows; level of heat treatment not indicated					
Bulgaria	Soft and semi-soft	Batch	-	1,731	0
Czech Republic	Soft and semi-soft, at processing	Batch	25g	129	0
Italy	Unspecified, at processing	Batch	25g	35	0
	Unspecified, at processing	Single	-	309	0
	Unspecified, at processing	Single	25g	35	0
	Unspecified	Batch	25g	710	0
	Unspecified	Single	-	423	0
Latvia	Unspecified, at processing	Single	25g	55	0
	Unspecified, at retail	Single	25g	60	0
Portugal	Unspecified, at retail	Batch	25g	35	0
Romania	Soft and semi-soft	Batch	25g	51	0
Slovenia	Unspecified, at processing	Single	25g	47	0
Spain	Unspecified, at processing	Single	25g	159	3.1
	Soft and semi-soft, at processing	Single	25g	28	3.6
Switzerland	Soft and semi-soft, at processing	Single	25g	25	0

Table SA14 (contd.).* Salmonella *in cheeses, 2008

Country	Description	Sample unit	Sample weight	N	% pos
Cheeses made of pasteurised milk from sheep					
Bulgaria	Soft and semi-soft, at retail	Batch	-	827	0
Greece	Soft and semi-soft, at retail	Single	25g	594	0
Romania	Soft and semi-soft, at processing	Batch	25g	37	0
	Soft and semi-soft, at retail	Batch	25g	46	0
Slovakia	Soft and semi-soft	Batch	25g	81	0
Cheeses made of raw or low heat treated milk from sheep					
Romania	Soft and semi-soft, at retail	Batch	25g	78	0
Slovakia	Soft and semi-soft	Batch	25g	396	0.3
Cheeses made of milk from sheep, level of heat treatment not specified					
Germany	Unspecified, at processing	Single	25g	41	0
	Unspecified, at retail	Single	25g	91	0
Hungary	Soft and semi-soft, at retail	Single	25g	40	0
Italy	Unspecified, at processing	Batch	25g	54	0
	Unspecified, at retail	Batch	25g	32	0
	Unspecified	Batch	25g	228	0
	Unspecified	Single	-	132	0
Portugal	Unspecified, at retail	Batch	25g	265	0.8
Romania	Soft and semi-soft, at retail	Batch	25g	66	0
Cheeses made of pasteurised milk from goats					
Bulgaria	Soft and semi-soft, at retail	Batch		155	0
Czech Republic	Soft and semi-soft, at processing	Batch	25g	33	0
Cheeses made of milk from goats, level of heat treatment not indicated					
Bulgaria	Soft and semi-soft, at retail	Batch	-	1,168	0
Germany	Unspecified, at processing	Single	25g	87	0
	Unspecified, at retail	Single	25g	161	0
Italy	Unspecified	Single	-	59	0
Total (14 MSs)				**16,978**	**<0.1**

Note: Data are only presented for sample size ≥25.

Vegetables, fruit and herbs

Fifteen MSs reported data on investigations of different kinds of plant products: fruit, vegetables and herbs. In particular, Germany, the Netherlands, Romania and Spain carried out large investigations. In Table SA15, results from investigations are summarised. *Salmonella* was detected in very few MSs and generally at very low levels.

In fruit and vegetables reported together, *Salmonella* was detected by two MSs in single samples of pre-cut products: Germany with one positive out of 711 samples and Sweden with one out of 403 samples. In vegetables reported separately, *Salmonella* was detected in single samples by three MSs: Austria with one positive out of 29, the Netherlands with one out of 655 and Spain with eight out of 1,876.

In 2008, three MSs investigated sprouts: in Germany *Salmonella* was detected in a relatively high proportion of sprouts not specified as RTE (5.2%), while *Salmonella* was not found in RTE sprouts in Hungary and Portugal. In herbs and spices, *Salmonella* was also detected in relatively high proportions: 1.0%, 3.9% and 6.7% of samples in three of the seven investigations. The proportions are higher than in 2007, but lower than in 2005 and 2006, where positive proportions up to 7.3% and 14.8% were reported in herbs and spices by MSs. No *Salmonella* was found in RTE salads.

Investigations of nuts and nut products, fruit and dried seeds were reported by four, three and three MSs, respectively. None of these investigations comprised 25 samples or more and *Salmonella* was not detected in any of the samples.

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Table SA15.* Salmonella *in vegetables, fruits and herbs, 2008

Country	Description	Sample unit	Sample weight	N	% pos
Vegetables					
Austria	-	Single	25g	29	3.4
Hungary	-	Single	25g	29	0
	Pre-cut, RTE	Single	25g	49	0
Italy	-	Batch	25g	86	0
		Single	-	29	0
Netherlands	At cutting plant	Single	25g	655	0.2
Spain	-	Single	25g	1,876	0.4
Sprouts					
Germany	-	Single	25g	229	5.2
Hungary	RTE	Single	25g	44	0
Portugal	RTE	Batch	25g	25	0
Fruits and vegetables					
Czech Republic	Precut, RTE	Single	25g	84	0
	At processing plant	Batch	25g	233	0
Germany	Precut, RTE, delicatessen salads	Single	25g	1,256	0
	Precut	Single	25g	711	0.1
Ireland	At retail	Single	25g	165	0
	At retail, pre-cut	Single	25g	71	0
	At retail	Single	25g	99	0
Poland	Precut, RTE	Batch	25g	93	0
Portugal	Precut, RTE	Batch	25g	205	0
	At catering, precut	Single	25g	346	0
Romania	At catering, precut, RTE	Batch	25g	326	0
	At hospital or care home, precut, RTE	Batch	25g	73	0
	At processing plant, precut, RTE	Batch	25g	61	0
	Precut, RTE	Batch	25g	654	0
Slovakia	Precut, RTE	Batch	25g	214	0
	Precut	Batch	25g	66	0
Slovenia	Precut, RTE	Single	25g	47	0
Sweden	Precut, RTE	Single	25g	403	0.2
Ready-to-eat-salads					
Austria	-	Single	25g	33	0
Estonia	At processing plant	Single	25g	41	0
	-	Single	25g	47	0
Hungary	-	Single	25g	337	0
Ireland	At retail	Single	25g	684	0
Herbs and spices					
Austria	-	Single	25g	33	0
Hungary	Dried	Single	25g	198	1.0
Ireland	At retail	Single	25g	35	0
Netherlands	-	Single	25g	1,768	3.9
Romania	At processing plant	Batch	25g	1,138	0
	-	Batch	25g	186	0
Slovakia	-	Batch	25g	45	6.7
Total (15 MSs)				**13,215**	**0.7**

Note: Data are only presented for sample size ≥25.

3.1 *SALMONELLA*

Fish, fishery products, crustaceans, live bivalve molluscs and molluscan shellfish

Fifteen MSs and Norway reported investigations of *Salmonella* in fish and fishery products. Several MSs (Germany, Hungary, Italy, Lithuania and Spain) reported positive samples although generally at very low levels, and overall 0.3% of the tested samples were contaminated. Lithuania reported the highest proportion of positive samples (8.5%, N=247; unspecified fishery products at retail).

Eleven MSs and Norway reported investigations of *Salmonella* in crustaceans, live bivalve molluscs and molluscan shellfish. Belgium reported 14.3% positive samples of raw crustaceans at retail (N=28), Germany reported 0.5% positive samples of crustaceans at retail (N=1,073), Greece and Spain reported 0.9% and 1.6% positive samples of live bivalve molluscs (N=115 and 112, respectively), and Italy recorded 1.2% positive findings in molluscan shellfish at different levels (N=3,612). Overall, 0.5% of the tested units of crustaceans, 0.9% of the tested units of live bivalve molluscs and 1.1% of the tested units of molluscan shellfish were *Salmonella* positive. This is at the same level as 2007.

Other RTE foodstuffs

In 2008, only a few *Salmonella* findings were reported from other RTE foods. Other RTE foodstuffs include bakery products, cakes, pastry, desserts, non-alcoholic beverages, cereals and meals, chocolate, cocoa and cocoa preparations, confectionery products and pastes, fermented sausages, foodstuffs intended for special nutritional uses, infant formula, juice, other processed food products and prepared dishes, sauce and dressings, soups and sweets.

Lithuania and Spain reported *Salmonella* in bakery products (ten positive out of 35 samples and 29 positive out of 6,339 samples, respectively), Hungary reported one positive sample of chocolate (N=145), Hungary and Slovakia reported *Salmonella* in confectionary products and pastes (one positive out of 209 samples and nine positive out of 36 samples, respectively). Hungary, Ireland, Italy, Lithuania, Portugal, Slovakia and Spain reported findings of *Salmonella* in other processed food products and prepared dishes.

For detailed information please refer to Level 3 tables.

3.1.3 *Salmonella* in animals

Many MSs have *Salmonella* control or surveillance programmes in place for a number of farm animal species (see Appendix Tables SA2-SA18 for further descriptions). An overview of the countries that reported data on *Salmonella* in animals for 2008 is presented in Table SA16.

Table SA16. Overview of countries reporting data for* Salmonella *in animals, 2008

Data	Total number of MSs reporting	Countries
Gallus gallus (no further sampling level)	7	**MSs:** BG, CZ, HU, IT, PL, PT, UK
		Non-MS: NO
Breeders of *Gallus gallus*	25	**All MSs** except LU and MT
		Non-MSs: CH, NO
Laying hens	26	**All MSs** except MT
		Non-MSs: CH, NO
Broilers	20	**All MSs** except CY, FR, HU, IE, LV, LT, MT.
		Non-MSs: CH, NO
Turkeys	18	**MSs:** AT, BE, BG, CZ, DE, DK, FI, GR, HU, IE, IT, LU, PL, PT, SE, SI, SK, UK
		Non-MS: NO
Ducks	17	**MSs:** AT, BG, CZ, DE, DK, GR, HU, IE, IT, LV, NL, PL, PT, RO, SE, SK, UK
		Non-MS: NO
Geese	11	**MSs:** AT, DE, HU, IE, IT, LV, NL, PL, SE, SK, UK
		Non-MS: NO
Other poultry	3	**MSs:** EE, IT, SK
Pigs	23	**All MSs** except CY, FR, LT, MT
		Non-MSs: CH, NO
Cattle	20	**All MSs** except BE, CY, DK, FR, LT, MT, PL
		Non-MSs: CH, NO
Sheep and goats	13	**MSs:** AT, BG, CZ, DE, GR, IE, IT, NL, PT, RO, SE, SK, UK
		Non-MSs: CH, NO
Other animal species	20	**All MSs** except CY, FI, FR, HU, LT, MT, SI
		Non-MSs: CH, NO

Note: In the following chapter, only countries reporting ≥25 samples have been included for analyses.

3.1 *SALMONELLA*

Breeding flocks of *Gallus gallus* and flocks of laying hens and broilers

The year 2008 was the second year when MSs were obliged to implement the new *Salmonella* control programmes in breeding flocks of *Gallus gallus* in accordance with Regulation (EC) No 2160/2003. These control programmes aim to meet the *Salmonella* reduction target set by Regulation (EC) No 1003/2005 and covers the following serovars: *S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow and *S.* Hadar. The target is set for adult breeding flocks in a production phase comprising at least 250 birds and MSs must meet the target by end 2009. The minimum control programme requirements for *Salmonella* detection are laid down in the Regulation and include sampling three times during the rearing period and every two weeks during the production period. Therefore, flocks can be found positive at different stages and ages, e.g. as day-old chicks, at the end of the rearing period (before movement to production) or during the production period (i.e. the laying period). A flock is reported positive if one or more of the samples have been found positive. Sampling required by the Regulation is more intensive than the requirements set out in the former Directive 92/117/EC that obliged MSs to run control programmes in breeding flocks for *S.* Enteritidis and *S.* Typhimurium, only. Therefore, the new control programmes are likely to be more sensitive and reveal more *Salmonella* positive flocks.

In 2008, control programmes approved by the Commission were implemented in 26 MSs and Norway. For more detailed information see Appendix Table SA2. In total, 25 MSs and two non-MSs reported data within the framework of the programme. The following result from the sampling of breeding flocks including both meat and egg production lines, were reported at flock level.

The prevalence of *Salmonella* spp. and the five serovars (*S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow, *S.* Hadar) targeted in the control programmes in *Gallus gallus* breeding flocks during the production period in 2008 are presented in Table SA17 and Figures SA8 and SA9. Overall, 1.8% of breeding flocks in the EU were positive at some stage during the production period. In total, 19 MSs reported prevalence of the five target serovars that was lower or equal to the EU reduction target limit of 1%. Ten MSs (Austria, Bulgaria, Cyprus, Estonia, Finland, Greece, Latvia, Lithuania, Slovakia and Sweden) and two non-MSs did not detect the five targeted serovars in their breeding flocks and nine MSs (Belgium, Denmark, France, Germany, Hungary, Ireland, the Netherlands, Slovenia and the United Kingdom) reported 1% or less of the production flocks positive. Six MSs (Czech Republic, Italy, Poland, Portugal, Romania and Spain) reported a prevalence of over 1% of the five targeted serovars, however at low levels. The MSs have to meet the target by 31 December 2009.

A total of 12 MSs (Belgium, Czech Republic, France, Germany, Greece, Hungary, Ireland, Italy, Poland, Portugal, Spain and the United Kingdom) reported findings of serovars other than five target ones, however at low levels. Belgium reported the highest prevalence (7.3%) of flocks positive with serovars other than the targeted ones.

The map presented in Figure SA9 shows the geographical distribution of *Salmonella* in breeding flocks of *Gallus gallus*. In 2008, the prevalence of the five targeted serovars in production breeding flocks was higher in some Mediterranean and eastern MSs.

3.1 *SALMONELLA*

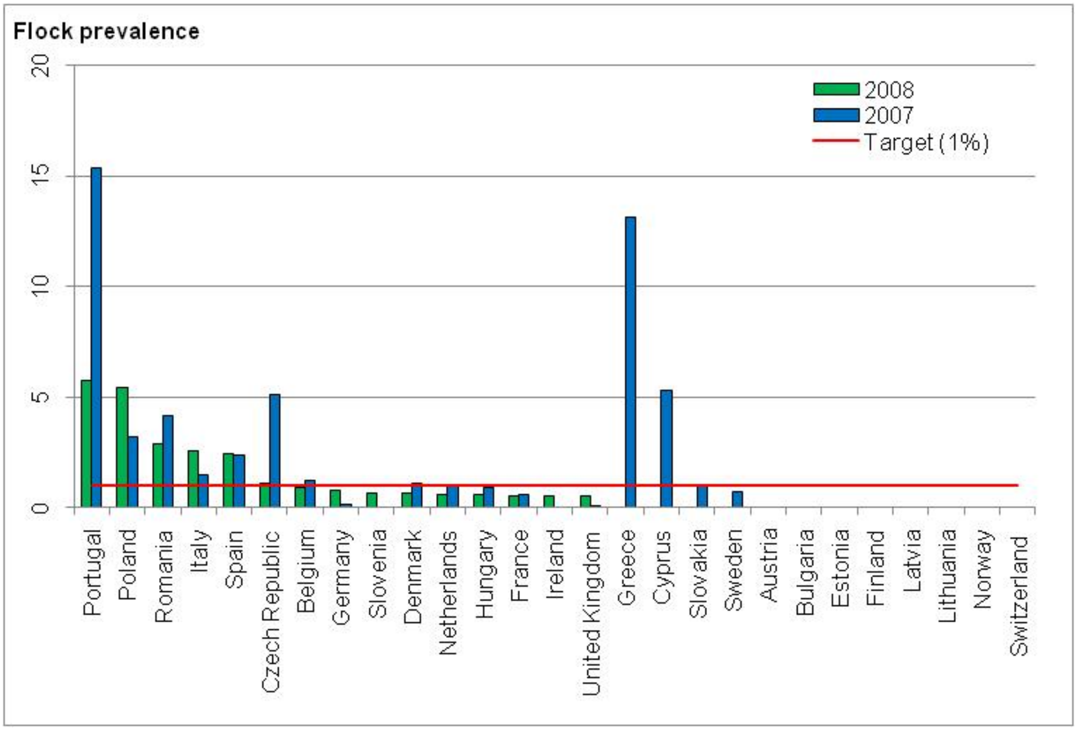
Table SA17.* Salmonella *in breeding flocks of* Gallus gallus *(all types of breeding flocks, flock based data) during production period in countries running control programmes in accordance with the Regulation (EC) No 2160/2003, 2008

Country	Breeding flocks (elite, grand parent and parent)								
	N	% positive							
		pos (all)	5 target sero-vars[1]	S. Enteritidis	S. Typhimurium	S. Infantis	S. Virchow	S. Hadar	Other serovars, non-typeable, and unspecified
Austria	52	0	0	0	0	0	0	0	0
Belgium	550	8.2	0.9	0.5	0.4	0	0	0	7.3
Bulgaria	85	0	0	0	0	0	0	0	0
Cyprus	35	0	0	0	0	0	0	0	0
Czech Republic	557	1.8	1.1	1.1	0	0	0	0	0.7
Denmark	317	0.6	0.6	0	0.6	0	0	0	0
Estonia	6	0	0	0	0	0	0	0	0
Finland	175	0	0	0	0	0	0	0	0
France	1,103	0.9	0.5	<0.1	0.5	0	0	0	0.4
Germany[2]	31,635	1.4	0.8	0.6	<0.1	0.1	0	0	0.7
Greece	72	1.4	0	0	0	0	0	0	1.4
Hungary	2,204	2.5	0.5	0.4	0.1	0	0	0	2.0
Ireland	203	2.0	0.5	0.5	0	0	0	0	1.5
Italy	429	9.1	2.6	0.9	0	0	0.5	1.4	6.5
Latvia[3]	26	0	0	0	0	0	0	0	0
Lithuania[4]	108	0	0	0	0	0	0	0	0
Netherlands	1,164	0.6	0.6	0.3	0.3	0	0	0	0
Poland	1,069	6.3	5.4	3.7	0.5	0.7	0.4	<0.1	0.8
Portugal	209	6.7	5.7	5.3	0	0	0.5	0	1.0
Romania	35	2.9	2.9	0	0	0	2.9	0	0
Slovakia	249	0	0	0	0	0	0	0	0
Slovenia	151	0.7	0.7	0	0.7	0	0	0	0
Spain	1,304	3.6	2.5	1.7	0.5	0	0	0.3	1.2
Sweden	148	0	0	0	0	0	0	0	0
United Kingdom	1,636	1.3	0.5	0	0.5	0	0	0	0.8
EU Total	**43,522**	**1.8**	**0.9**	**0.6**	**0.2**	**0.1**	**<0.1**	**<0.1**	**0.9**
Norway	182	0	0	0	0	0	0	0	0
Switzerland	119	0	0	0	0	0	0	0	0

1. *S*. Enteritidis, *S*. Typhimurium, *S*. Infantis, *S*. Virchow, *S*. Hadar.
2. Germany reported not having counted flocks only once in case they were tested multiple times.
3. Latvia reported data as Surveillance programme, not as control programme.
4. Lithuania reported data as grandparent breeding flocks.

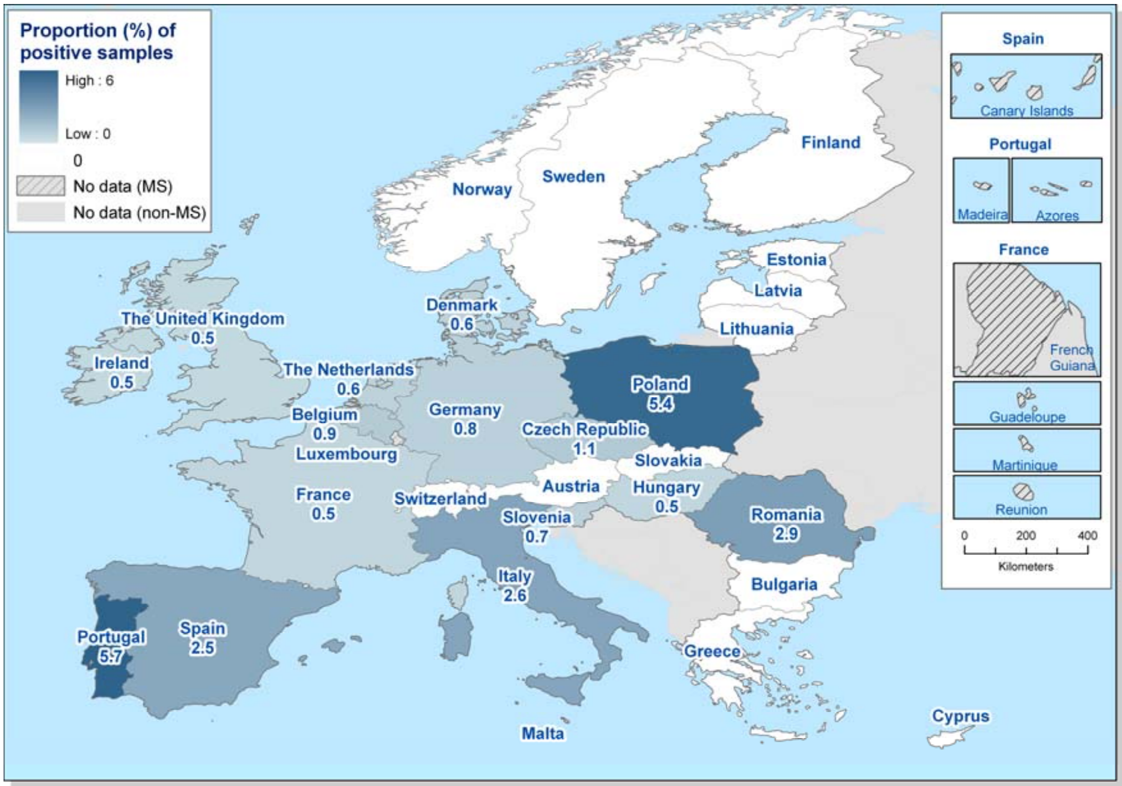
3.1 *SALMONELLA*

Figure SA8. ***Prevalence of*** **S.** ***Enteritidis,*** **S.** ***Typhimurium,*** **S.** ***Infantis,*** **S.** ***Virchow*** ***and*** **S.** ***Hadar in*** **Gallus gallus** ***breeding flocks during the production period (flock-based data) in the EU, 2007-2008***



3.1 *SALMONELLA*

Figure SA9. Prevalence of the five targeted serovars (*S. *Enteritidis,* S. *Typhimurium,* S. *Infantis,* S. *Virchow and* S. *Hadar) in* Gallus gallus *breeding flocks during the production period, 2008



3.1 *SALMONELLA*

The majority of the elite breeding flock production in the EU is placed in the United Kingdom (Table SA18). During the production period no elite flocks tested positive for *Salmonella* in 2008, however the Czech Republic found two flocks positive with *S*. Enteritidis during the rearing period.

The production of grandparent breeding flocks is also concentrated in a limited number of MSs, primarily in France, Lithuania, the Netherlands and the United Kingdom (Table SA18). Generally, the occurrence of *Salmonella* in grandparent flocks was low to very low. At production stage, the Czech Republic reported two grandparent flocks positive with *S*. Enteritidis, France reported one grandparent flock positive for another *Salmonella* serovar and the United Kingdom reported six grandparent flocks positive for *S.* Typhimurium and one grandparent flock positive for *S.* Thompson.

The data on *Salmonella* in parent breeding flocks are divided into breeding flocks for the egg production line and meat production line and are presented separately in the following chapters.

Table SA18.* Salmonella *in elite and grandparent breeding flocks (Gallus gallus, flock based data) in countries running control programmes in accordance with the Regulation (EC) No 2160/2003, 2008

Country	Period	N	% positive							
			pos (all)	5 target serovars[1]	*S*. Enteritidis	*S*. Typhimurium	*S*. Infantis	*S*. Virchow	*S*. Hadar	Other serovars, non-typeable, and unspecified
Elite breeding flocks										
Belgium	Production	3	0	0	0	0	0	0	0	0
Czech Republic	Rearing	8	25.0	25.0	25.0	0	0	0	0	0
	Production	5	0	0	0	0	0	0	0	0
United Kingdom	Production	101	0	0	0	0	0	0	0	0
Total (elite flocks, 3 MSs)		**117**	**1.7**	**1.7**	**1.7**	**0**	**0**	**0**	**0**	**0**
Grandparent breeding flocks										
Czech Republic	Rearing	1	0	0	0	0	0	0	0	0
	Production	8	25.0	25.0	25.0	0	0	0	0	0
Denmark	Rearing	6	0	0	0	0	0	0	0	0
	Production	18	0	0	0	0	0	0	0	0
Finland	Rearing	11	0	0	0	0	0	0	0	0
	Production	7	0	0	0	0	0	0	0	0
France[2]	Rearing	214	0	0	0	0	0	0	0	0
	Production	167	0.6	0	0	0	0	0	0	0.6
Ireland	Production	11	0	0	0	0	0	0	0	0
Lithuania	Production	108	0	0	0	0	0	0	0	0
Poland	Production	24	0	0	0	0	0	0	0	0
Netherlands	Unspecified	278	0.4	0	0	0	0	0	0	0.4
Sweden	Rearing	11	0	0	0	0	0	0	0	0
	Production	13	0	0	0	0	0	0	0	0
United Kingdom	Production	179	3.9	3.4	0	3.4	0	0	0	0.6
Total (grandparent flocks, 11 MSs)		**1,056**	**1.0**	**0.8**	**0.2**	**0.6**	**0**	**0**	**0**	**0.3**
Norway	Production	4	0	0	0	0	0	0	0	0

Note. Rearing include also testing in day-old chicks.

1. *S*. Enteritidis, *S*.Typhimurium, *S*. Infantis, *S*. Virchow, *S*. Hadar.

2. In France, elite and grandparent flocks are reported together.

3.1 *SALMONELLA*

Egg production line of *Gallus gallus*

Parent breeding flocks

Eighteen MSs and two non-MSs reported *Salmonella* data specifically for parent breeding flocks in the egg production line (Table SA19). The proportion of positive flocks is similar to findings in 2007. However, in Bulgaria, the Czech Republic, France, Greece, Slovakia and Spain more flocks were reported positive in 2008 compared to 2007. Nine MSs and two non-MSs reported no infected parent breeding flocks, while seven MSs reported 0.7% to 17.6% parent breeding flocks positive with one or more of the five targeted *Salmonella* serovars at any time during production. *S.* Hadar was not isolated by any MS, and *S.* Infantis and *S.* Virchow were only reported by one MSs, respectively.

3.1 *SALMONELLA*

Table SA19.* Salmonella *in parent breeding flocks for egg production line,* Gallus gallus *(flock-based data) in countries running control programmes in accordance with the Regulation (EC) No 2160/2003, 2007-2008

Country	Period	2008									2007		
		N	% positive								N	% positive	
			pos (all)	5 target serovars[1]	S. Enteritidis	S. Typhimurium	S. Infantis	S. Virchow	S. Hadar	Other serovars, non-typeable, and unspecified		pos (all)	5 target serovars[1]
Austria	Rearing	7	0	0	0	0	0	0	0	0	5	0	0
	Production	17	0	0	0	0	0	0	0	0	11	0	0
Bulgaria	Rearing	212	0	0	0	0	0	0	0	0	10	0	0
	Production	442	0.7	0.7	0.7	0	0	0	0	0	140	0	0
Cyprus	Production	2	0	0	0	0	0	0	0	0	-	-	-
Czech Republic	Rearing	17	17.6	17.6	17.6	0	0	0	0	0	26	11.5	11.5
	Production	59	0	0	0	0	0	0	0	0	18	22.2	5.6
Denmark	Rearing	10	0	0	0	0	0	0	0	0	11	0	0
	Production	6	0	0	0	0	0	0	0	0	12	0	0
Estonia	Rearing	6	0	0	0	0	0	0	0	0	-	-	-
	Production	6	0	0	0	0	0	0	0	0	-	-	-
Finland	Rearing	19	0	0	0	0	0	0	0	0	11	0	0
	Production	24	0	0	0	0	0	0	0	0	21	0	0
France	Rearing	50	2.0	0	0	0	0	0	0	2.0	194	0	0
	Production	67	0	0	0	0	0	0	0	0	114	0.9	0.9
Germany	Rearing	3	0	0	0	0	0	0	0	0	10	0	0
	-	-	-	-	-	-	-	-	-	-	23	17.4	17.4
Greece	Rearing	7	14.3	14.3	0	14.3	0	0	0	0	1	0	0
	Production	16	0	0	0	0	0	0	0	0	14	0	0
Latvia	Rearing	6	0	0	0	0	0	0	0	0	-	-	-
	Production	8	0	0	0	0	0	0	0	0	6	0	0
Netherlands	Rearing	167	1.2	0.6	0	0	0	0.6	0	0.6	206	2.9	1.5
	Production	183	0	0	0	0	0	0	0	0	175	1.1	0.6
Poland	Rearing	29	10.3	10.3	10.3	0	0	0	0	0	-	-	-
	Production	340	3.5	2.6	2.1	0	0.6	0	0	0.9	-	-	-
Slovakia	Rearing	62	3.2	3.2	1.6	1.6	0	0	0	0	47	0	0
	Production	53	0	0	0	0	0	0	0	0	47	0	0
Slovenia	Rearing	2	0	0	0	0	0	0	0	0	6	0	0
	Production	4	0	0	0	0	0	0	0	0	7	0	0
Spain	Production	93	2.2	1.1	0	1.1	0	0	0	1.1	98	0	0
Sweden	Rearing	13	0	0	0	0	0	0	0	0	9	0	0
	Production	19	0	0	0	0	0	0	0	0	24	0	0
United Kingdom	Production	117	0.9	0	0	0	0	0	0	0.9	101	1.0	0
Total (18 MSs in 2008)		**2,059**	**1.5**	**1.1**	**0.8**	**0.1**	**<0.1**	**<0.1**	**0**	**0.3**	**1,347**	**1.6**	**1.0**
Norway	Rearing	26	0	0	0	0	0	0	0	0	12	0	0
	Production	30	0	0	0	0	0	0	0	0	12	0	0
Switzerland	Rearing	53	0	0	0	0	0	0	0	0	-	-	-
	Production	42	0	0	0	0	0	0	0	0	-	-	-

Note. Rearing include also testing in day-old chicks.

1. *S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow, *S.* Hadar.

3.1 *SALMONELLA*

Laying hen flocks

In 2008, MSs implemented new *Salmonella* control programmes in laying hen flocks of *Gallus gallus* providing eggs intended for human consumption in accordance with Regulation (EC) No 2160/2003. The control programmes consist of proper and effective measures of prevention, detection, and control of *Salmonella* at all relevant stages of the egg production line, particularly at the level of primary production, in order to reduce *Salmonella* prevalence and the risk to public health. All MSs except Malta, and Norway had control programmes approved by the Commission. For more detailed information see Appendix Table SA5.

Minimum detection requirements laid down in the Regulation include sampling flocks two times during the rearing period (day old chicks and at the end of the rearing period before moving to the laying unit), as well as sampling every fifteenth week during the production period starting at the latest when the animals are 24 weeks old. Test results have to be reported, as well as any relevant additional information, on a yearly basis to the EC/EFSA as part of the annual report on trends and sources of zoonoses and zoonotic agents. As flocks may test positive at different stages and ages of their lifespan, positive flocks have to be counted and reported once only, irrespective of the number of sampling and testing operations.

The legislation foresees that a Community target for the reduction of the prevalence of *S*. Enteritidis and *S*. Typhimurium in laying hens was established for a three-year period to commence in 2008. In order to have a good knowledge of the epidemiological situation before setting the Community target, a baseline survey on the prevalence of *Salmonella* in laying hen flocks was performed in a harmonised manner in 2004-2005 in the Community (Decision 2004/665/EC). Twenty-four MSs and Norway participated in the survey and the baseline prevalence of *Salmonella* was assessed in participating countries (EFSA, 2006). In Regulation (EC) No 1168/2006, the Community target in laying hens referred to in the Regulation (EC) No 2160/2003 is defined as an annual minimum percentage of reduction in the number of adult laying hen flocks (i.e. in the production period) remaining positive by the end of the previous year. The annual targets are proportionate depending on the prevalence in the preceding year. For the most advanced MSs, the Community target is defined as a maximum percentage of flock remaining positive of 2%. The first annual targets should be achieved in 2008 based on the monitoring starting at the beginning of that year. The MS prevalence assessed in the framework of the EU-wide baseline survey in laying hens 2004-2005 is the reference prevalence for the 2008 targets. In addition, the final achievement of the target is to be evaluated based on the results of three consecutive years by 31 December 2010.

The verification of the achievement of the target is based on the results of required testing in adult laying flocks. Based on Regulation (EC) No 1168/2006, the EC and EFSA recommended that results of the 2008 *Salmonella* testing programmes in adult laying hens, used for checking the target achievement, are to be reported in accordance with the following four categories:

1. Results from all samples taken under the testing programme (both by food business operators and competent authorities) = summary
2. Results from the census sampling performed by the food business operators (**point 2.1 of the Annex**)
3. Results from the objective sampling performed by the competent authority ("in one flock per year per holding comprising at least 1,000 birds" – **point 2.1.(a) of the Annex**)
4. Results from the sampling carried out by the competent authority in case of positivity suspicion (*Salmonella* found earlier in the same building **point 2.1.(b)**, suspicion in connection with food-borne outbreaks **point 2.1.(c)**, *Salmonella* detected in other flocks in the holding **point 2.1.(d)**, where the competent authority considers it appropriate **point 2.1.(e)**).

Based on those categories, four indicators, set out in the following box, were established and the reported corresponding results are presented in Table SA20.

3.1 *SALMONELLA*

Description of the four indicators

The following combined sampling of adult laying hen flocks under the control programme conducted by industry (all holdings) and competent authority (holdings comprising at least 1,000 birds) are needed to calculate the Summary Indicator ❶. Each flock is counted once, irrespective of the number of sampling and testing operations).

- The total number of *Salmonella* spp. positive laying hen flocks in production (including the results of both official sampling from holdings with at least 1,000 birds and industry sampling of all holdings)
- The total number of *S*. Enteritidis and/or *S*. Typhimurium positive laying hen flocks in production (including the results of both official sampling from holdings with at least 1,000 birds and industry sampling of all holdings)
- The total number of laying hen flocks under the control programme.

The following results of census sampling of adult laying hen flocks under the control programme, performed by industry (each flock being counted once) are necessary to calculate the Industry Sampling Indicator ❷:

- The number of *Salmonella* spp. positive laying hen flocks in production detected positive by the industry;
- The number of *S*. Enteritidis and/or *S*. Typhimurium positive laying hen flocks in production detected positive by the industry;
- The total number of laying hen flocks tested by the industry.

The following results of objective sampling of flocks in holdings comprising at least 1,000 birds performed by competent authority (each flock being counted once) are needed to calculate the Official Objective Sampling Indicator ❸:

- the number of *Salmonella* spp. positive laying hen flocks in production detected positive by the competent authority;
- the number of *S*. Enteritidis and/or *S*. Typhimurium positive laying hen flocks in production detected positive by the competent authority;
- the total number of laying hen flocks tested by the competent authority in the framework of objective sampling.

The following results of sampling in cases of suspicion, listed in Annex 2.1 (b) to (e) of Commission Regulation (EC) No 1168/2006, performed by the competent authority (each flock being counted once) are necessary to calculate the Official Suspect Sampling Indicator ❹:

- the number of *Salmonella* spp. positive laying hen flocks in production detected positive by the competent authority;
- the number of *S*. Enteritidis and/or *S*. Typhimurium positive laying hen flocks in production detected positive by the competent authority;
- the total number of laying hen flocks tested by the competent authority in case of suspicion.

3.1 *SALMONELLA*

In total, 25 MSs and two non-MSs reported data within the framework of the laying hen flock programme, whereas Malta and Romania did not provide any information. All results presented are reported at flock level. A flock was reported as positive if one or more samples were positive at any time during the lifespan of the flock. However, only flocks tested positive for *S.* Typhimurium and/or *S.* Enteritidis during the production period are taken into consideration when assessing whether MSs meet the target.

The prevalence of *Salmonella* spp. and of the two serovars (*S.* Enteritidis and *S.* Typhimurium) targeted in the control programmes for laying hen flocks during the rearing period are in Table SA21. In total, 13 MSs and two non-MSs reported data on flocks during rearing; five MSs and one non-MS reported 0% positive and of the eight MSs and one non-MS, with positive flocks, only Greece reported more than 2% positive flocks (14.3%) for *S.* Typhimurium and/or *S.* Enteritidis.

The prevalence of *Salmonella* spp. and of two serovars (*S.* Enteritidis and *S.* Typhimurium) targeted in the control programmes for laying hen flocks during the production period are presented for production flocks of laying hens in Table SA22. The prevalence figures derive from indicator ➊ or from other indicators, used as proxy of indicator ➊. The comparison between prevalence and target in production flocks of laying hens for MSs and non-MSs is displayed in Figure SA10 and the geographical distribution of MS prevalence is presented in Figure SA11.

Already in 2008, 20 MSs and Norway met the targets that have to be achieved by 31 December 2010. Latvia and Luxembourg were clearly above the target in 2008, while Slovenia was slightly above the target in 2008. Bulgaria, Slovakia and Switzerland did not have any target for 2008; Bulgaria and Romania were not MSs in 2006 and therefore did not participate in the baseline survey that formed the setting of targets for MSs and Slovakia and Switzerland did not participate in the baseline survey. For these countries, targets will be based on the findings in 2008. Bulgaria had no positive flocks, Switzerland reported 0.7% positive flocks and Slovakia 7.2% positive flocks. Overall, 3.5% of laying flocks in the EU was positive for *S.* Enteritidis and/or *S.* Typhimurium at some stage during the production period. Bulgaria and Lithuania were the only MSs reporting no positive flocks, and Cyprus only reported other serovars than the two targeted ones. All other MSs reported between 0.1% and 15.6% samples positive with *S.* Enteritidis and/or *S.* Typhimurium (Table SA22).

In general, more MSs found *Salmonella* spp. in laying hen flocks compared to breeding flocks in the egg production line. This may be because of tighter bio-security at breeding flock level and due to the fact that there has been a mandatory control programme in breeding flocks since 1998.

3.1 *SALMONELLA*

Table SA20.* Salmonella *in laying hen flocks* (Gallus gallus) *during production period according to sampling context in accordance with Regulation (EC) No 1168/2006, 2008

Country	Control and eradication programmes							
	Official and industry sampling		Industry sampling		Official sampling		Official sampling	
			Census sampling		Objective sampling		Suspect sampling	
	N	Pos	N	Pos	N	Pos	N	Pos
Austria	-	-	1,966	49	1,088	33	4	0
Belgium	649	76	649	42	277	23	19	11
Bulgaria[1]	119	0	-	-	-	-	-	-
Cyprus[2]	-	-	-	-	40	5	-	-
Czech Republic	449	40	449	14	449	26	34	3
Denmark[3]	508	3	508	2	495	0	16	1
Estonia[4,5]	52	4	36	1	48	4	1	1
Finland	950	1	950	0	485	1	4	0
France	3,067	187	3,067	141	2,834	29	144	97
Germany	6,304	220	3,921	71	612	32	81	18
Greece[2]	-	-	-	-	112	35	-	-
Hungary	866	110	-	-	-	-	-	-
Ireland	-	3	-	2	204	2	1	0
Latvia[6]	-	-	-	-	69	14	-	-
Lithuania[2]	-	-	-	-	13	0	-	-
Luxembourg[5,7]	-	-	7	1	-	-	-	-
Netherlands[8]	2,346	62	-	-	-	-	-	-
Poland[5,9]	1,533	192	-	-	-	-	-	-
Portugal	227	72	-	-	-	-	-	-
Slovakia[10]	138	10	-	-	-	-	-	-
Slovenia	172	18	172	10	74	11	10	7
Spain[2]	-	-	-	-	845	295	-	-
Sweden	724	5	724	3	291	1	1	1
United Kingdom	-	67	-	37	182	6	-	24
Norway	1,080	0	1,080	0	380	0	-	-
Switzerland[11]	-	-	402	0	306	2	-	-

1. In Bulgaria, no information on sampling strategy was provided.
2. Cyprus, Greece, Lithuania and Spain provided no information on sampling strategy for samples collected by the industry under control and eradication programmes.
3. In Denmark, an additional 13 flocks with less than 1,000 animals were tested by the authorities, one flock was positive.
4. In Estonia, no information on sampling strategy for samples collected by the industry or the authorities under control and eradication programmes.
5. In Estonia, Luxembourg and Poland, no information on the sampling period was provided.
6. In Latvia, objective sampling by the industry reported as surveillance data.
7. In Luxembourg, objective sampling by the industry reported as monitoring data.
8. In the Netherlands, no information on sampling strategy or who took the sample for sampling under control and eradication programmes.
9. In Poland, an additional 3,913 samples with 472 positive were reported with no information on sampling strategy.
10. In Slovakia, additional 559 samples with 62 positive were reported with no information on programme context or sampling strategy.
11. In Switzerland, census sampling for official sampling under the control and eradication programmes.

3.1 *SALMONELLA*

Table SA21.* Salmonella *in laying hen flocks of* Gallus gallus *in rearing period (flock-based data) in countries running control programmes

Country	N	% positive				
		pos (all)	S. Ent or S. Typ	S. Enteritidis	S. Typhimurium	Other serovars, non-typeable, and unspecified
Austria	470	2.6	1.3	1.1	0.2	1.3
Belgium	293	1.7	0.3	0.3	0	1.4
Bulgaria	134	0	0	0	0	0
Czech Republic	400	1.5	1.2	1.0	0.3	0.3
Denmark	258	0.4	0.4	0	0.4	0
Finland	222	0	0	0	0	0
France	2,093	3.2	0.5	0.2	0.3	2.7
Greece	7	14.3	14.3	14.3	0	0
Hungary	1,010	0	0	0	0	0
Netherlands	1,929	0.8	0.7	0.6	<0.1	0.1
Slovakia	208	3.4	0	0	0	3.4
Slovenia	99	0	0	0	0	0
Sweden	114	0	0	0	0	0
Total (13 MSs)	**7,237**	**1.6**	**0.5**	**0.4**	**0.1**	**1.1**
Norway	153	0	0	0	0	0
Switzerland	224	0.4	0.4	0	0.4	0

3.1 *SALMONELLA*

Table SA22.* Salmonella *in laying hen flocks of* Gallus gallus *(flock-based data, production period) in countries running control programmes

Country	Period	N	Target (production period)	% positive				
				pos (all)	S. Ent or S. Typ	S. Enteritidis	S. Typhimurium	Other serovars, non-typeable, and unspecified
Austria	Production	1,966	8.5	2.5	1.4	1.2	0.2	1.1
Belgium	Production	649	19.4	11.7	3.7	3.5	0.2	8.0
Bulgaria[1]	Production	119	-	0	0	0	0	0
Cyprus[1]	Production	40	7.2	12.5	0	0	0	12.5
Czech Republic	Production	449	37.5	8.9	7.6	7.6	0	1.3
Denmark	Production	508	2.0	0.6	0.4	0.2	0.2	0.2
Estonia[2]	-	52	8.2	7.7	1.9	1.9	0	5.8
Finland	Production	950	2.0	0.1	0.1	0	0.1	0
France	Production	3,067	7.2	6.1	3.2	2.0	1.2	2.9
Germany[1]	Production	6,304	17.0	3.5	2.7	2.4	0.4	0.7
Greece[1]	Production	112	18.0	31.3	14.3	14.3	0	17.0
Hungary	Production	866	23.6	11.7	8.7	6.7	2.0	3.0
Ireland[1]	Production	326	2.0	0.9	0.3	0	0.3	0.6
Italy	Production	821	7.0	20.5	6.8	6.1	0.7	14.0
Latvia	Production	69	2.0	20.3	14.5	13.0	1.4	5.8
Lithuania[1]	Production	13	26.7	0	0	0	0	0
Luxembourg[2]	-	7	2.0	14.3	14.3	0	14.3	0
Netherlands[1]	Production	2,346	7.0	2.6	2.6	2.6	<0.1	0
Poland[2]	-	1,533	33.3	12.5	10.6	10.1	0.5	1.9
Portugal[1]	Production	227	28.6	31.7	10.6	9.7	0.9	21.1
Slovakia[1]	Production	138	-	7.2	7.2	7.2	0	0
Slovenia	Production	172	8.3	10.5	8.7	8.7	0	1.7
Spain[1]	Production	845	30.9	34.9	15.6	13.6	2.0	19.3
Sweden[1]	Production	724	2.0	0.7	0.4	0	0.4	0.3
United Kingdom	Production	5,523	7.1	1.2	1.0	0.9	<0.1	0.3
EU Total		**27,826**		**5.9**	**3.5**	**3.1**	**0.5**	**2.3**
Norway	Production	1,080	2.0	0	0	0	0	0
Switzerland	Production	306	-	0.7	0.7	0	0.7	0

1. N= Number of units tested since the reported number of existing flocks was not the same as the number of units tested.

2. Estonia, Luxembourg and Poland did not provide information on sampling stage.

3.1 *SALMONELLA*

Figure SA10. Prevalence of **S.** ***Enteritidis and/or*** **S.** ***Typhimurium for laying hen flocks of*** **Gallus gallus** ***during the production period (flock based data) and targets for MSs and Norway, 2008***

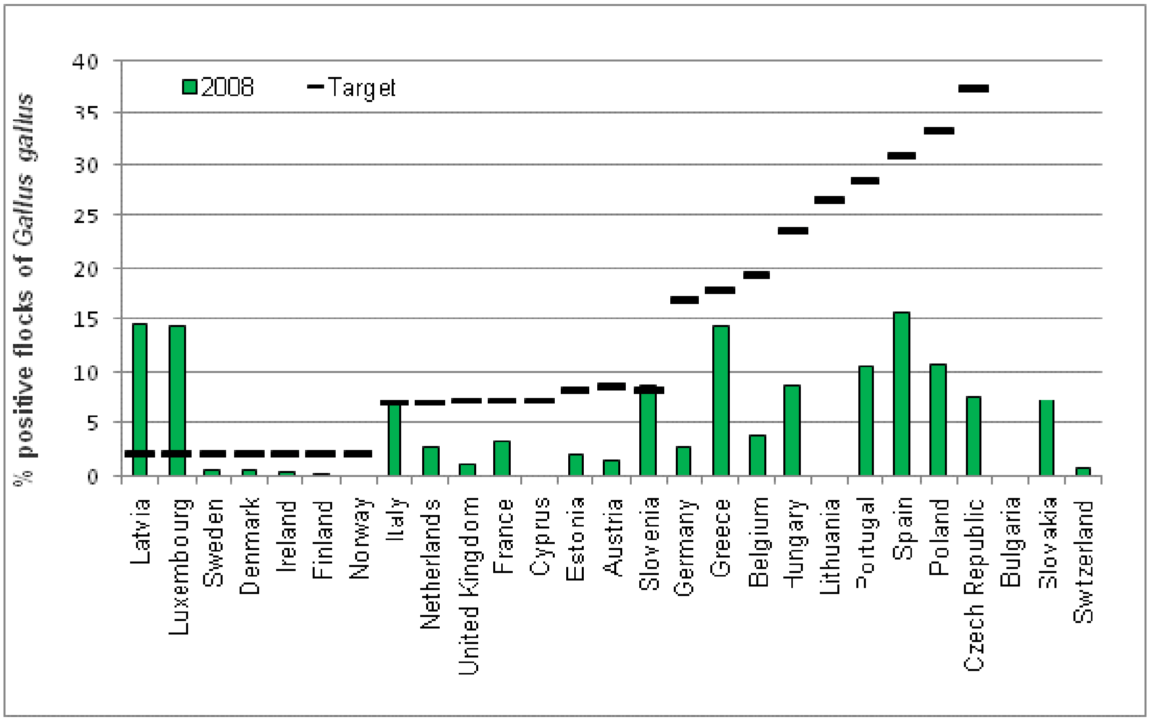
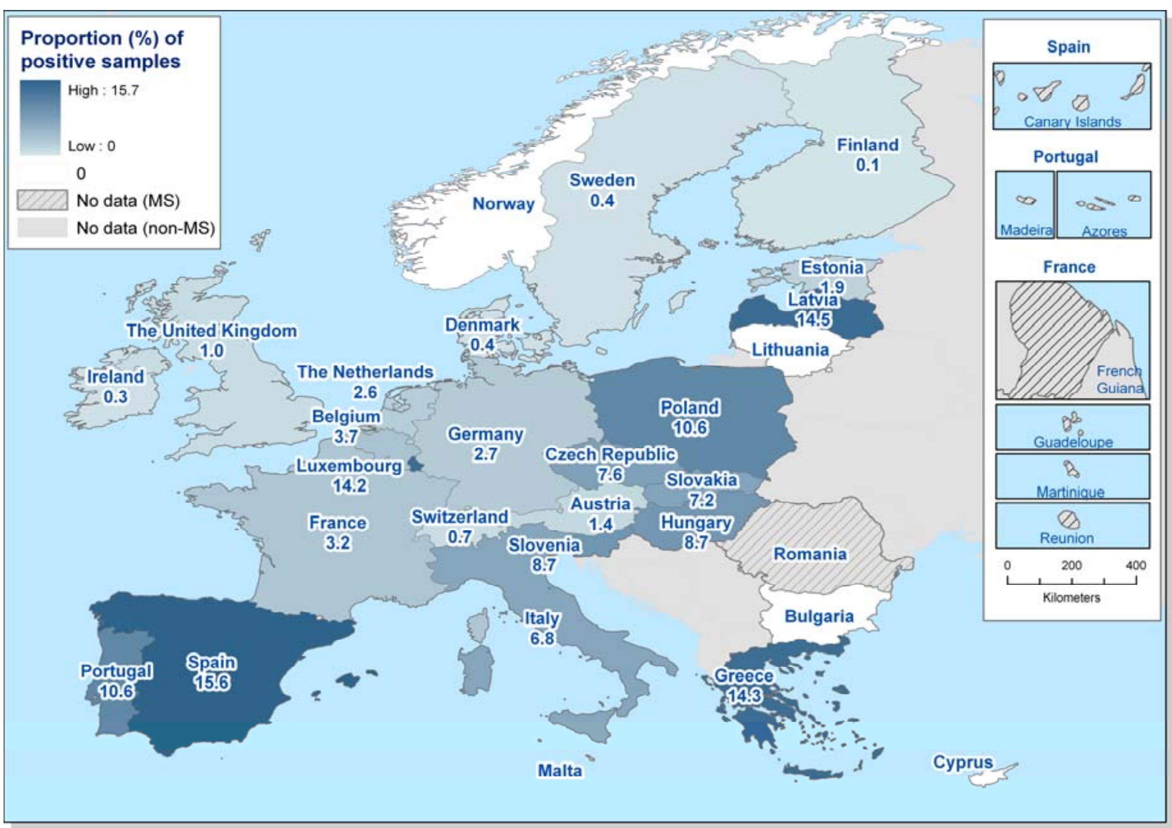


Figure SA11. Prevalence of the two targeted serovars, **S.** ***Enteritidis and/or*** **S.** ***Typhimurium, in*** **Gallus gallus** ***laying hen flocks during the production period, 2008***



3.1 *SALMONELLA*

Meat production line of *Gallus gallus*

Parent breeding flocks

Twenty MSs and two non-MSs reported data specifically for parent breeding flocks in the meat production line (Table SA23). Bulgaria, Cyprus, Finland, Greece, Latvia, Norway, Sweden and Switzerland did not report any positive flocks, whereas the other MSs reported *Salmonella* prevalence between 0.4% and 7.8%. Of the 11 MSs reporting flocks positive with one of the five target serovars, only Poland and Spain reported prevalence higher than the 1% target. *S*. Enteritidis was the most frequently isolated serovar and reported from most MSs with positive parent breeding flocks. *S.* Virchow was reported only by Poland.

In 2008, the total proportion of positive flocks observed is similar to findings in 2007 (Table SA23). However, there were considerable variations among MSs; the Czech Republic, Greece, Ireland and Sweden reported reductions in prevalence, whereas France, Slovenia and Spain reported increases. In 2007, the more sensitive control programme was implemented by MSs in accordance with Regulation (EC) No 1003/2005. The *Salmonella* spp. and the prevalence of the five target serovar appear to be relatively comparable in parent breeding flocks for laying hen and meat production lines.

3.1 *SALMONELLA*

Table SA23.* Salmonella *in parent breeding flocks for broiler production,* Gallus gallus *(flock based data) in countries running control programmes in accordance with the Regulation (EC) No 2160/2003, 2007-2008

Country	Period	2008										2007		
		N	% positive									N	% positive	
			pos (all)	5 target serovars[1]	*S.* Enteritidis	*S.* Typhimurium	*S.* Infantis	*S.* Virchow	*S.* Hadar	Other serovars, non typeable, and unspecified			pos (all)	5 target serovars[1]
Austria	Rearing	56	3.6	0	0	0	0	0	0	3.6		22	0	0
	Production	35	0	0	0	0	0	0	0	0		50	8.0	0
Bulgaria	Rearing	135	0	0	0	0	0	0	0	0		27	0	0
	Production	135	0	0	0	0	0	0	0	0		108	0	0
Cyprus	Production	33	0	0	0	0	0	0	0	0		-	-	-
Czech Republic	Rearing	564	2.3	0.5	0.2	0.2	0.2	0	0	1.8		700	2.6	0.9
	Production	485	1.6	0.8	0.8	0	0	0	0	0.8		525	6.3	4.8
Denmark	Production	293	0.7	0.7	0	0.7	0	0	0	0		152	0	0
	Rearing	146	0	0	0	0	0	0	0	0		258	1.2	1.2
Estonia	Rearing	-	-	-	-	-	-	-	-	-		3	0	0
	Production	-	-	-	-	-	-	-	-	-		3	0	0
Finland	Rearing	167	0	0	0	0	0	0	0	0		139	0	0
	Production	144	0	0	0	0	0	0	0	0		142	0	0
France	Rearing	855	1.1	0.6	0.6	0	0	0	0	0.5		1,710	0.2	0.2
	Production	869	1.0	0.7	0.1	0.6	0	0	0	0.3		906	0.7	0.7
Germany	Rearing	45	0	0	0	0	0	0	0	0		79	3.8	1.3
	Production	15,583	1.4	0.8	0.5	<0.1	0.1	0	0	0.6		2,329	0.8	<0.1
Greece	Rearing	48	0	0	0	0	0	0	0	0		7	0	0
	Production	43	0	0	0	0	0	0	0	0		22	22.7	22.7
Ireland	Production	192	2.1	0.5	0.5	0	0	0	0	1.6		487	5.5	0
Latvia	Production	18	0	0	0	0	0	0	0	0		-	-	-
	Rearing	18	0	0	0	0	0	0	0	0		15	0	0
Netherlands	Rearing	1,133	0.4	0.4	<0.1	0.4	0	0	0	0		1,365	0.1	0.1
	Production	981	0.7	0.7	0.3	0.4	0	0	0	0		997	1.3	1.0
Poland	Rearing	61	3.3	3.3	3.3	0	0	0	0	0		-	-	-
	Production	705	7.8	7.0	4.7	0.7	0.9	0.6	0.1	0.9		-	-	-
Portugal	Rearing	-	-	-	-	-	-	-	-	-		20	65.0	65.0
Slovakia	Rearing	268	0.7	0.7	0.7	0	0	0	0	0		134	0	0
	Production	118	0	0	0	0	0	0	0	0		528	0.9	0.8
Slovenia	Rearing	89	0	0	0	0	0	0	0	0		80	0	0
	Production	147	0.7	0.7	0	0.7	0	0	0	0		111	0	0
Spain	Production	1,211	3.7	2.6	1.8	0.4	0	0	0.3	1.2		741	2.6	2.4
Sweden	Production	116	0	0	0	0	0	0	0	0		100	2.0	2.0
	Rearing	104	0	0	0	0	0	0	0	0		114	0.9	0.9
United Kingdom	Production	1,239	1.0	0.2	0	0.2	0	0	0	0.9		1,055	0.9	<0.1
Total (20 MSs)		**26,036**	**1.5**	**0.9**	**0.6**	**0.2**	**0.1**	**<0.1**	**<0.1**	**0.6**		**12,929**	**1.4**	**0.8**
Norway	Rearing	113	0	0	0	0	0	0	0	0		87	0	0
	Production	148	0	0	0	0	0	0	0	0		135	0.7	0
Switzerland	Rearing	34	0	0	0	0	0	0	0	0		-	-	-
	Production	77	0	0	0	0	0	0	0	0		-	-	-

Note: Rearing include also testing in day-old chicks.

1. *S.* Enteritidis, *S.*Typhimurium, *S.* Infantis, *S.* Virchow, *S.* Hadar.

3.1 *SALMONELLA*

Broiler flocks

In 2008, 15 MSs and one non-MS reported 2.8% of the tested broiler flocks *Salmonella* positive. This is a decrease compared to 2007 when the prevalence was 3.7%. Bulgaria, Greece, Italy and Norway were the only countries to report no positive broiler flocks. Among the other reporting MSs, *Salmonella* prevalence in flocks ranged between <0.1% and 23.1%. Nine MSs reported a reduction in prevalence and three MSs an increase compared to 2007. In particular, Germany reported a marked increase from 7.0% in 2007 to 23.1% in 2008 (Table SA24).

Twelve MSs and one non-MS provided data both from parent breeding flocks and broiler flocks. Five of the MSs and Norway that reported a prevalence of *Salmonella* spp. less than 1% in parent breeding flocks also reported low prevalence in broiler flocks (<1%) (Table SA23 and Table SA24).

Eleven MSs provided data consistently from 2004 to 2008 on *Salmonella* spp. in broiler flocks, while ten MSs reported consistently data on *S*. Enteritidis/*S*. Typhimurium in broiler flocks. MS specific trends are presented in Figures SA12a and SA12c for *Salmonella* spp. and *S*. Enteritidis/*S*. Typhimurium in broiler flocks, respectively. In the majority of the MSs providing data the trend appears to be either decreasing or at the same level, except Germany, which reported an increase of *Salmonella* spp. prevalence in 2008. The trends of the weighted mean prevalence of *Salmonella* spp. and *S*. Enteritidis/*S*. Typhimurium at MS-group level are presented in Figures SA12b and SA12d, respectively. Both the MS-group level trends for *Salmonella* spp. and *S.* Enteritidis/*S.* Typhimurium seem to be stable or decrease slightly, but these trends were not statistically significant.

See section 4.2 in the materials and methods chapter for statistical details.

3.1 *SALMONELLA*

Table SA24. **Salmonella** ***in broiler flocks (all age groups[1], flock based data), 2006-2008***

Country	2008			2007			2006		
	N	% pos (all)	% S. Enteritidis and S. Typhimurium	N	% pos (all)	% S. Enteritidis and S. Typhimurium	N	% pos (all)	% S. Enteritidis and S. Typhimurium
Austria	4,390	4.1	0.9	5,123	1.9	0.2	4,546	1.3	0.2
Belgium[2]	8,148	4.2	0	8,809	3.1	0	13,596	2.4	0
Bulgaria	3,055	0	0	946	0	0	-	-	-
Czech Republic	253	9.5	7.1	-	-	-	-	-	-
Denmark	3,717	1.2	0.3	3,486	1.9	0.2	3,640	2.2	0.4
Estonia	350	0.9	0.9	62	9.7	9.7	154	5.2	5.2
Finland	3,311	<0.1	0	3,278	0.2	0	3,020	0.3	0
France	-	-	-	-	-	-	383	8.9	0.5
Germany	1,379	23.1	0	1,552	7.0	<0.1	1,566	11.9	0.7
Greece	31	0	0	104	3.8	0	262	6.5	0.8
Hungary	-	-	-	-	-	-	359	66.0	8.1
Italy	252	0	0	136	5.9	1.5	75	32.0	16.0
Latvia	-	-	-	150	5.3	3.3	121	9.1	7.4
Lithuania	-	-	-	-	-	-	-	-	-
Netherlands	51,600	1.6	<0.1	56,263	1.6	<0.1	26,025	0.8	0.1
Poland	16,481	5.3	2.8	27,218	8.7	4.6	10,010	10.1	5.2
Slovakia	-	-	-	4,548	4.0	2.6	4,430	2.1	1.6
Slovenia	3,036	0.3	0	2,491	1.8	0.2	1,800	0.5	0.3
Spain	645	18.3	10.9	815	25.3	14.0	388	41.2	29.6
Sweden	3,385	0.2	0.1	2,428	0.4	0.3	2,351	0.2	0.2
EU Total	**100,033**	**2.8**	**0.6**	**117,409**	**3.7**	**1.3**	**72,726**	**3.4**	**1.2**
Norway	4,787	0	0	4,419	<0,1	<0,1	4,051	0	0

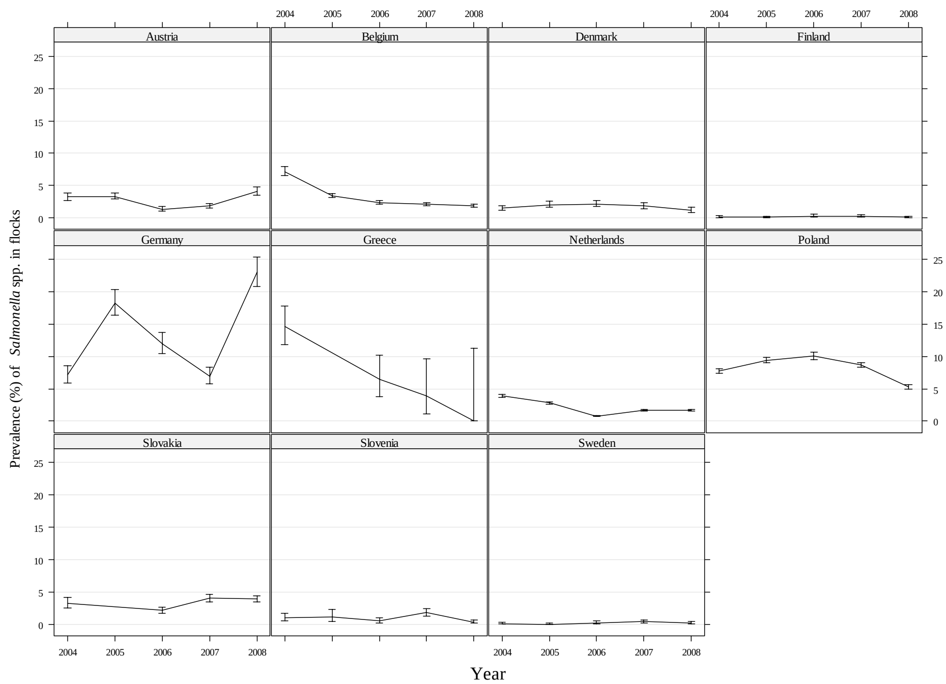
Note: The United Kingdom did not include the number of tested flocks, but reported 74 incidents of isolation of *Salmonella* in broiler flocks in 2008 and 82 in 2007.

1. Combined data (day-old chicks, rearing and production flocks) have been used to estimate the percentage of positive flocks. This percentage represents flocks found positive at any point in the lifespan.

2. In Belgium in 2008: 200 spent hen batches were included of which 91 were positive.

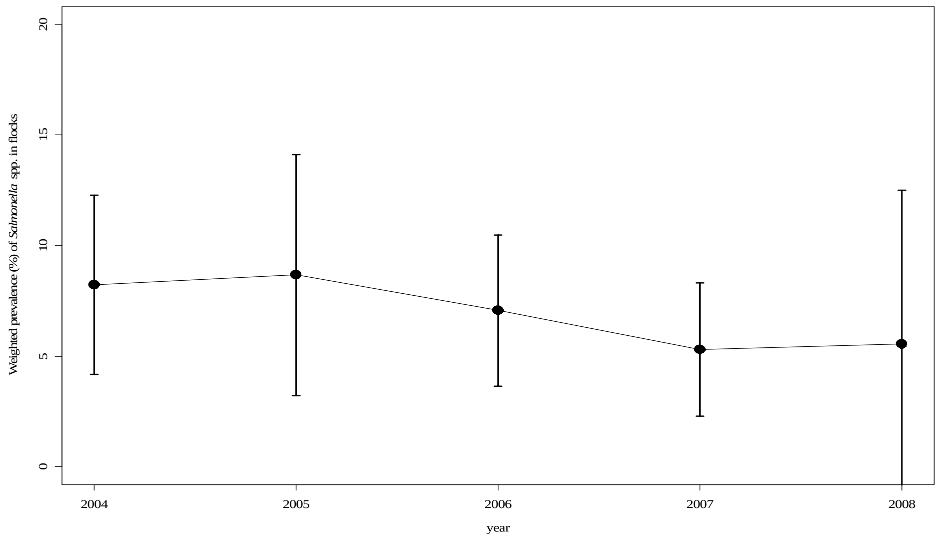
3.1 *SALMONELLA*

Figure SA12a. **Salmonella** ***spp. in broiler flocks (all age groups[1], flock based data), prevalence and 95% CI[2] in MSs running a control programme[3], 2004 - 2008***



1. Combined data (day-old chicks, rearing and production) have been used to estimate the prevalence of flocks that were found positive at any point in their lifespan.
2. Vertical bars indicate exact binomial 95% confidence intervals.
3. Includes only MSs with data from at least four years.

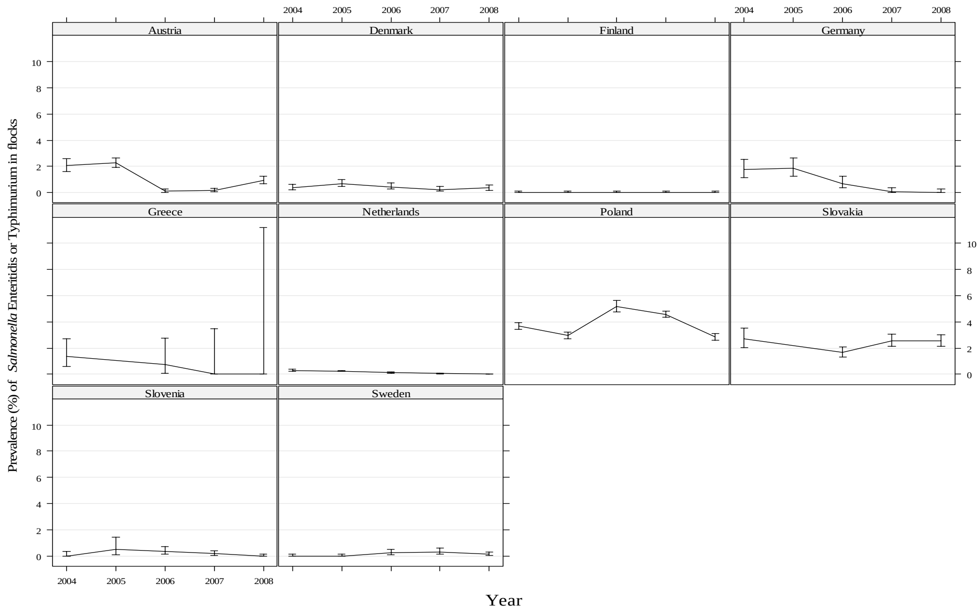
Figure SA12b. **Salmonella** ***spp. in broiler flocks (all age groups[1], flock based data), weighted[2] mean prevalence and 95% CI in the group of 11 MSs running a control programme[3], 2004 – 2008***



1. Combined data (day-old chicks, rearing and production) have been used to estimate the percentage of positive flocks. This percentage represents flocks found positive at any point in the lifespan of a flock.
2. Weight is the ratio between the slaughtered broilers per MS and the number of tested flocks per MS per year. Slaughtered numbers of broilers per MS were reported by MSs in the framework of the 2008 baseline survey in broiler flocks and broiler carcasses, and supplemented with EUROSTAT data from 2008.
3. Include only MSs with data from at least four years: Austria, Belgium, Germany, Denmark, Finland, Greece, Netherlands, Poland, Slovakia, Slovenia and Sweden.

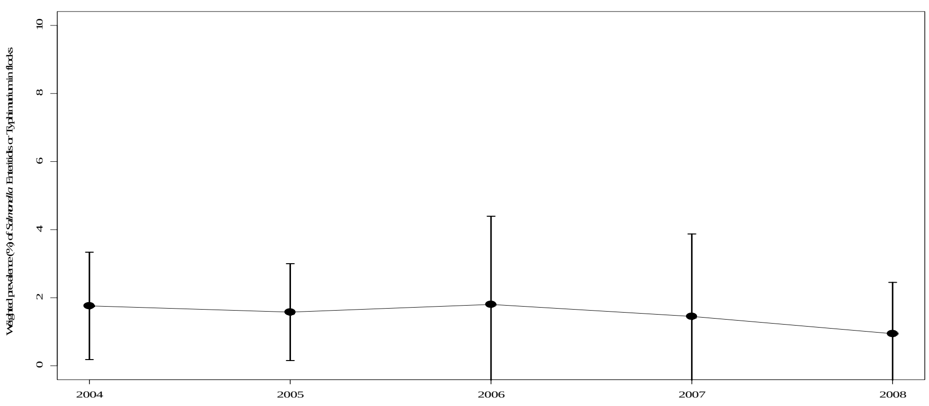
3.1 *SALMONELLA*

Figure SA12c. S. Enteritidis and S. Typhimurium in broiler flocks (all age groups[1], flock based data), prevalence and 95% CI[2] in MSs running a control programme[3], 2004-2008



1. Combined data (day-old chicks, rearing and production) have been used to estimate the percentage of positive flocks. This percentage represents flocks found positive at any point in the lifespan of a flock.
2. Vertical bars indicate exact binomial 95% confidence intervals.
3. Only MSs with data from at least four years are included.

Figure SA12d. S. Enteritidis and S. Typhimurium in broiler flocks (all age groups[1], flock based data), weighted[2] mean prevalence and 95% CI in the group of 10 MSs running a control programme[3], 2004-2008



1. Combined data (day-old chicks, rearing and production) have been used to estimate the percentage of positive flocks. This percentage represents flocks found positive at any point in the lifespan of a flock
2. Weight is the ratio between the slaughtered broilers per MS and the number of tested flocks per MS per year. Slaughtered numbers of broilers per MS were reported by MS in the framework of the 2008 baseline survey in broiler flocks and broiler carcasses, and supplemented with EUROSTAT data from 2008.
3. Only MSs with data from at least four years are included: Austria, Denmark, Finland, Germany, Greece, Netherlands, Poland, Slovakia, Slovenia and Sweden.

3.1 *SALMONELLA*

Turkeys, ducks and geese

Finland, Germany and Slovakia reported information from the routine monitoring of turkey breeding flocks in 2008. *Salmonella* was not detected in Finland, while the proportion of positive flocks was 4.2% and 4.8% in Germany and Slovakia, respectively. In addition, eight MSs and one non-MS provided data on the routine monitoring of turkey production flocks. All MSs found *Salmonella* positive flocks at levels of 0.2% to 9.2% (Table SA25). Only Slovenia reported no findings of *S.* Enteritidis and *S.* Typhimurium.

Four MSs reported data from *Salmonella* testing in duck breeding flocks. In total, 102 flocks were tested and 11.8% were positive. Norway did not detect any positive breeding flocks. Four MSs provided data on *Salmonella* in production flocks of ducks. Prevalence ranged between 0% and 70.5% (Table SA25). Austria, Denmark and Poland reported flocks positive with *S*. Enteritidis and *S*. Typhimurium. The extremely high prevalence of *Salmonella* in Denmark was mainly caused by *S*. Anatum.

Slovakia and Norway reported data from *Salmonella* testing in geese breeding flocks. Slovakia reported two positive samples out of four samples tested and Norway reported zero positive samples out of two flocks tested. Only Austria, Germany and Poland reported data on *Salmonella* in production flocks of geese with a prevalence of 6.5%, 8.0% and 9.2, respectively (Table SA25).

For further information of reported data please refer to Level 3 tables.

3.1 *SALMONELLA*

Table SA25.* Salmonella *in production flocks of turkeys, ducks and geese (all age groups[1], flock based data), 2006-2008

Country	2008			2007			2006		
	N	% pos (all)	% S. Enteridis and S. Typhimurium	N	% pos (all)	% S. Enteridis and S. Typhimurium	N	% pos (all)	% S. Enteridis and S. Typhimurium
Turkeys									
Austria	325	9.2	0.6	276	5.4	0	282	9.6	0
Belgium	-	-	-	91	7.7	0	-	-	-
Denmark	69	1.4	1.4	-	-	-	32	0	0
Finland	466	0.2	0.2	711	0.1	0.1	1,026	0.2	0.2
Germany[2,3]	60	6.7	1.7	26	3.8	0	675	3.4	0.7
Greece	53	5.7	5.7	29	10.3	3.4	34	14.7	0
Ireland	-	-	-	27	14.8	0	76	0	0
Italy[4]	-	-	-	46	8.7	6.5	-	-	-
Netherlands	-	-	-	216	1.9	0	-	-	-
Poland	3,279	7.9	2.6	7,150	6.6	1.8	2,260	6.3	2.1
Slovakia	-	-	-	151	4.6	0	29	6.9	6.9
Slovenia	190	2.6	0	121	3.3	0	92	4.3	0
Sweden	251	0.8	0.4	115	0.9	0	140	0	0
Total (turkeys, 8 MSs in 2008)	**4,693**	**6.5**	**2.0**	**8,959**	**5.8**	**1.5**	**4,646**	**4.4**	**1.2**
Norway[5]	557	0	0	424	0	0	345	0	0
Ducks									
Austria	66	22.7	4.5	33	21.2	0	26	11.5	7.8
Bulgaria	74	0	0	-	-	-	-	-	-
Denmark	61	70.5	6.6	-	-	-	255	93.3	0
Germany[2]	-	-	-	25	4.0	4.0	119	19.3	8.4
Greece	-	-	-	-	-	-	32	6.3	3.1
Poland	516	15.1	8.3	690	10.3	2.9	204	15.2	7.4
Sweden	-	-	-	-	-	-	40	7.5	5.0
Total (ducks, 4 MSs in 2008)	**717**	**19.0**	**7.0**	**748**	**10.6**	**2.8**	**676**	**44.4**	**4.4**
Norway	-	-	-	85	0	0	50	0	0
Geese									
Austria	62	6.5	3.2	94	11.7	4.3	94	8.5	3.2
Germany	25	8.0	8.0	29	20.7	17.2	56	3.6	1.8
Poland	1,442	9.2	4.6	2,726	9.1	4.1	1,238	11.1	3.4
Total (geese, 3 MSs in 2008)	**1,529**	**9.0**	**4.6**	**2,849**	**9.3**	**4.2**	**1,388**	**10.6**	**3.3**

Note: Data are only presented for sample size ≥25.

1. Combined data (day-old chicks, rearing and production) have been used to estimate the percentage of positive flocks. This percentage represents flocks found positive at any point in the lifespan.
2. In Germany in 2006: additional 2 positives of 79 tested animals (2.5%) were reported.
3. Germany reported for 2006: 18 positive of 30,384 tested animals (0.1%).
4. Italy reported for 2006: 45 positive of 165 tested slaughter batches (27.3%).
5. Norway reported for 2008: data including a small amount of ducks and geese.

3.1 *SALMONELLA*

Pigs

Only Estonia and Finland reported data on the occurrence of *Salmonella* at farm level from a bacteriological monitoring of pigs in breeding and fattening herds (other than the baseline survey) (Table SA26). None of the MSs isolated *Salmonella* from this stage of production. Estonia, Finland, Sweden and Norway reported data on the occurrence of *Salmonella* from the bacteriological monitoring of lymph nodes at slaughter; Estonia reported the highest prevalence (8.2%), while the three Nordic countries reported no or very low prevalence. This is similar to findings from previous years.

Three MSs reported survey data on the occurrence of *Salmonella* at farm and slaughter level (Table SA27). Italy reported 25.0% positive animals at farm level and Spain reported the highest prevalence (38.6%) at slaughter level.

Table SA26.* Salmonella *in pigs from bacteriological monitoring programmes, 2006-2008

Country	Sample level	Sample unit	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
Estonia	Farm	Animal, faeces	810	0	2,255	0	600	0.2
Finland	Farm	Animal (AI station), faeces	-	-	-	-	220	0
	Farm	Herd (breeding), faeces	45	0	66	0	68	0
Netherlands	Farm	Holding (fattening), faeces	-	-	228	19.3	100	23.0
Sweden[1]	Farm	Herd (breeding), faeces	-	-	115	0	-	-
	Farm	Herd (fattening), faeces	-	-	-	-	976	0
Norway	Farm	Herd (breeding), faeces	-	-	122	0	143	0
Estonia	Slaughter	Animal (fattening), lymph nodes	146	8.2	-	-	-	-
Finland	Slaughter	Animal (breeding), lymph nodes	3,040	<0.1	3,066	<0.1	3,070	0.1
	Slaughter	Animal (fattening), lymph nodes	3,112	<0.1	3,166	<0.1	3,262	<0.1
Italy[2]	Slaughter	Slaughter batch, lymph nodes	-	-	-	-	68	58.8
Slovenia	Slaughter	Animal (fattening), lymph nodes	-	-	-	-	224	2.2
Sweden	Slaughter	Animal (breeding), lymph nodes	2,625	0.3	2,890	0.4	2,794	0.3
	Slaughter	Animal (fattening), lymph nodes	3,187	0.3	3,354	0.3	3,153	<0.1
Norway[3]	Slaughter	Animal (breeding), lymph nodes	-	-	1,012	0	1,173	0
	Slaughter	Animal (fattening), lymph nodes	2,126	0	2,542	0	2,411	0

Note: Data are only presented for sample size ≥25.

1. In Sweden (2006), 550 pooled samples from 976 herds in the voluntary programme BIS run by the industry.
2. In Italy, only the Veneto Region has a monitoring programme.
3. Not indicated whether 2008 data from Norway are for breeding or fattening animals.

Table SA27.* Salmonella *in pigs, surveys, 2008

Country	Sample level	Sample unit	N	% pos
Italy	Farm	Animal, faeces	107	1.9
		Animal, organ/tissue	28	25.0
Luxembourg	Slaughter	Animal (fattening), lymph nodes	148	8.1
Spain	Slaughter	Slaughter batch (fattening)	171	38.6

Note: Data are only presented for sample size ≥25.

3.1 *SALMONELLA*

Cattle

Data from the bacteriological monitoring of cattle were reported by six MSs and one non-MS (Table SA28). Italy reported 5.4% of tested samples positive and the Netherlands reported 2.0% of tested holdings positive at farm level. All reporting countries reported no or very low proportions of positive samples in cattle at slaughter. This is similar to reports from previous years.

Two MSs reported survey data on the occurrence of *Salmonella* in cattle (Table SA29). Spain reported a prevalence of 28.0% at slaughter.

Table SA28.* Salmonella *in cattle from bacteriological monitoring programmes, 2006-2008

Country	Sample level	Sample unit	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
Estonia[1]	Farm	Animal	1,607	0.2	1,302	0.8	1,213	<0.1
Finland[5]	Farm	Herd, faeces	246	0.4	281	0.4	205	0
Italy[2]	Farm	Animal, faeces	707	5.4	-	-	-	-
Netherlands	Farm	Holding, faeces	1,716	2.0	-	-	-	-
Italy[2,3]	Prior to Slaughter	Animal, organ/tissue	89	0	-	-	67	4.5
Slovenia	Prior to Slaughter	Animal, faeces	386	0.3	199	1.0	236	1.3
Finland	Slaughter	Animal, lymph nodes	2,988	<0.1	2,930	<0.1	3,022	<0.1
Italy[2]	Slaughter	Animal	553	0.4	-	-	-	-
Sweden[4]	Slaughter	Animal, lymph nodes	3,320	0.1	3,853	0.1	3,518	<0.1
Norway	Slaughter	Animal, lymph nodes	1,831	0	2,218	<0.1	2,317	0

Note: Data are only presented for sample size ≥25.

1. In Estonia, faecal samples from 5-10 animals were pooled for investigation (2007).
2. In Italy, only the Veneto Region has a monitoring programme.
3. In Italy, faecal samples from 15 animals per batch are examined (2007).
4. In Sweden, 23 suspected herds were sampled, *Salmonella* was detected in 13 herds (2007).
5. In Finland, herds producing AI bulls.

Table SA29.* Salmonella *in cattle, surveys, 2008

Country	Sample level	Sample unit	N	% pos
Italy	Farm	Animal, faeces	130	6.2
		Animal, organ/tissue	214	7.0
Spain	Slaughter	Slaughter batch, faeces	168	28.0

Note: Data are only presented for sample size ≥25.

Other animal species

Other poultry species, such as guinea fowl, ostriches, partridges, quails and pheasants, as well as wild birds, were tested for *Salmonella* in some MSs. Results show that all types of poultry can be infected with *Salmonella* and several serovars may be present even though there was a tendency for *S.* Typhimurium to be most frequently isolated, especially from wild birds.

The reported data on *Salmonella* in sheep, goats and solipeds were primarily results from diagnostic submissions. In several countries, *Salmonella* was detected in sheep (Austria, Bulgaria, the Czech Republic, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Romania, Slovakia, Sweden, the United Kingdom, Switzerland and Norway), goats (Austria, Bulgaria, the Czech Republic, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Romania, Slovakia, Sweden and Norway) and solipeds (Austria, the Czech Republic, Germany, Ireland, Italy, the Netherlands, Portugal, Slovakia, Sweden, the United Kingdom and Norway).

Pets, in particular cats and dogs, have been investigated for *Salmonella* in several countries with findings of *Salmonella*. A relatively high proportion of *Salmonella* positive samples from reptiles, snakes and turtles was observed, however these samples are based on suspected clinical cases.

For further information of reported data please refer to Level 3 tables.

3.1 *SALMONELLA*

3.1.4. *Salmonella* in feedingstuffs

Data on *Salmonella* in feedingstuffs in MSs derive from different surveillance programmes and unbiased reporting of random sampling of domestic and imported feedingstuffs (Appendix, Table SA1). Presentation of sample and batch-based data from the different monitoring systems were therefore summarised, and include both domestic and imported feedingstuffs. Due to significant differences in monitoring and reporting, strategy data are not comparable between MSs, and cannot be considered as national prevalence.

Table SA30 shows the EU proportion of *Salmonella* positive samples in animal and vegetable derived feed material in 2006-2008. The level of *Salmonella* contamination in animal derived feed material varied slightly in the period but no general trend was apparent.

The overall observed levels of contamination in fishmeal were on average considerably higher compared to meat and bone meal and ranged from 1.9% in 2006 to 2.9% in 2007 compared to 0.7% in 2007 and 2.3% in 2006 in meat and bone meal.

In 2008, *Salmonella* contamination of cereals was reported to be 0.2%. As in previous years, the *Salmonella* contamination level of this feed material was lower compared to other feed materials. During the years 2006-2008 there has been a general decrease in the occurrence of *Salmonella* in feed materials derived from oil seeds and products thereof, from an overall EU proportion positive of 2.5% in 2006 to 1.8% in 2008.

In the years 2002-2005, feed material derived from oil seeds and products thereof was the most contaminated with *Salmonella*, but in 2008 the contamination in fish meal is at a slightly higher level. This finding generally indicates that fish meal together with oil seeds like soybean, rape, sunflower and products thereof, are probably the most likely sources of *Salmonella* in animal feed.

In compound feedingstuffs, the proportion of *Salmonella* positive findings ranged from 0% to 3.6% in cattle feed and pig feed, and up to 8.3% in poultry feed (Table SA31). No general trend was apparent, but for pig and poultry compound feeds the observed ranges of positive samples were smaller in 2008 than recorded in 2007.

The relevance of the positive findings depend on whether the data are representative of the feedingstuffs on the national market, or whether it reflects intensive sampling of high risk products. The national reports include only limited information regarding the sampling strategy.

The reported occurrence of *S*. Enteritidis and *S*. Typhimurium in feedingstuffs was low and mainly other *Salmonella* serovars were detected from the feedingstuffs. *S*. Enteritidis was detected in the final products of compound feedingstuffs for poultry in Czech Republic (one batch), France (one batch), Germany (one sample), Italy (one sample), Latvia (one batch), the Netherlands (one batch), Poland (one batch) and Slovakia (two samples). *S*. Enteritidis was also detected in final products of compound feedingstuffs for cattle in Belgium (one batch) and for pigs in Slovakia (one batch). Germany (one sample), Slovakia (two samples) and United Kingdom (one sample) reported findings of *S*. Enteritidis in feed material of land animal origin.

S. Typhimurium was detected in final products of compound feedingstuffs for poultry in France (two batches), Germany (two samples) and the Netherlands (one sample). There were also reported findings of *S*. Typhimurium in feed materials of oil seed in France (one batch) and Germany (one batch), and Italy reported findings in feed materials of land animal origin (two samples).

For more information on reported data please refer to Level 3 tables.

Table SA30.* Salmonella *in animal and vegetable derived feed material, 2006-2008

EU Totals	2008		2007		2006	
	N	% pos	N	% pos	N	% pos
Fishmeal	1,688	2.1	3,123	2.9	2,414	1.9
Meat and bone meal	8,399	1.0	11,270	0.7	12,350	2.3
Cereals	5,262	0.2	5,489	0.4	5,331	0.3
Oil seeds and products	18,786	1.8	22,885	2.2	18,449	2.5

3.1 *SALMONELLA*

Table SA31.* Salmonella *in compound feedingstuffs, 2006-2008

Feedingstuff	2008		2007		2006	
	N	% pos	N	% pos	N	% pos
Cattle feed						
Austria	30	0	-	-	-	-
Belgium	55	3.6	-	-	-	-
Bulgaria	162	0	-	-	-	-
Czech Republic	75	0	54	0	-	-
Finland	287	0	374	0	452	0.2
Germany	412	0	49	0	197	0
Hungary	-	-	-	-	50	0
Ireland	46	0	69	0	79	0
Italy	51	0	193	2.1	177	2.8
Luxembourg	35	0	39	0	32	9.4
Netherlands	2,229	0.5	2,428	0.2	2,438	0.3
Poland	465	0.6	1,011	1.0	507	0.8
Portugal	53	0	37	2.7	-	-
Slovakia	413	0.5	65	0	37	0
Slovenia	-	-	26	3.8	61	1.6
Spain	77	2.6	25	8.0	111	5.4
Total (cattle feed, 14 MSs in 2008)	**4,390**	**0.5**	**4,370**	**0.5**	**4,141**	**0.7**
Norway	-	-	5	0	-	-
Switzerland	119	0	-	-	-	-
Pig feed						
Austria	63	1.6	-	-	-	-
Belgium	56	3.6	-	-	-	-
Czech Republic	446	0	180	0	-	-
Finland	231	0	274	0	338	0
France	-	-	597	1.0	-	-
Germany	412	0.2	107	0	513	0
Hungary	159	0	-	-	316	1.6
Italy	176	2.3	121	2.5	150	0
Latvia	44	0	47	0	39	0
Luxembourg	32	3.1	56	3.6	60	3.3
Netherlands	2,543	0.3	2,898	0.1	2,917	0.3
Poland	851	1.2	1,853	1.6	1,406	1.3
Portugal	78	2.6	33	3.0	-	-
Romania	-	-	60	0	-	-
Slovakia	353	0.3	173	0	384	0.3
Slovenia	-	-	51	5.9	83	0
Spain	71	1.4	54	3.7	28	0
Total (pig feed, 17 MSs in 2008)	**5,515**	**0.6**	**6,504**	**0.8**	**6,234**	**0.6**
Norway	58	0	79	0	60	0

Note: Data are only presented for sample size ≥25.

Table SA31 (contd).* Salmonella *in compound feedingstuffs, 2006-2008

Feedingstuff	2008		2007		2006	
	N	% pos	N	% pos	N	% pos
Poultry feed						
Austria	204	0.5	188	0	341	0.3
Belgium	334	2.1	287	0.7	114	0.9
Bulgaria	25	0	-	-	-	-
Czech Republic	699	0.1	587	1.0	-	-
Finland	83	0	92	0	-	-
France	4,462	1.2	4,477	1.4	-	-
Germany	1,611	2.1	51	0	-	-
Hungary	200	0.5	-	-	338	1.2
Ireland	29	0	-	-	31	3.2
Italy	259	1.2	467	2.6	325	3.7
Latvia	55	5.5	80	1.3	41	0.0
Luxembourg	29	0	-	-	40	2.5
Netherlands	6,547	0.2	7,397	0.3	7,617	0.3
Poland	1,151	1.1	2,559	2.2	2,215	1.1
Portugal	48	0	26	0	-	-
Romania	33	0	314	0	-	-
Slovakia	499	2.0	399	1.3	371	0.8
Slovenia	35	2.9	65	0	104	1.0
Spain	36	8.3	99	10.1	58	3.4
Total (poultry feed, 19 MSs in 2008)	**16,339**	**0.9**	**17,088**	**1.0**	**11,595**	**0.6**
Norway	76	0.0	190	0	61	0.0
Switzerland	39	0.0	-	-	-	-

Note: Data are only presented for sample size ≥25.

3.1 *SALMONELLA*

3.1.5 Salmonella serovars

The information available on the distribution of *Salmonella* serovars along the food chain varies greatly between countries. In all MSs, the serotyping of *Salmonella* isolates is carried out according to the Kaufmann-White Scheme.

In the following, the ten most frequently reported serovars among isolates from humans, food, animal species and feedingstuffs are presented. For human data, the most common phage types of *S.* Enteritidis and *S.* Typhimurium serovars are also presented. For the non-human data, information on serovar distribution will be presented in a food chain perspective by comparing serovar distribution in compound feed for a specific animal species with serovars from the relevant animals and foodstuffs. However, it should be noticed that the amount of data in some categories are scarce and conclusions therefore should be drawn with great care.

The ranking of serovars was done within each group by adding up the number of each serotype across all countries. The serovar distributions for each MS mostly include isolates reported from monitoring and clinical investigations, but also data from investigations where the framework of sampling was not stated. Data from HACCP sampling was not included. The distributions were based on the number of typed isolates, including non-typeable isolates. Most MSs reported a subset designated “other serotypes”. For some MSs this may include isolates belonging to the ten most common serovars in the Community and the relative Community occurrence of some serovars may therefore be underestimated.

For detailed data on serovars in humans, foodstuffs, animals, feedingstuffs, and data on phage types in humans, please refer to Level 3 tables.

3.1 *SALMONELLA*

Serovars in humans

Information on serovars in humans was provided by 26 MSs. The distribution of the ten most common serovars in humans is shown in Table SA32 and in Figure SA13.

As in previous years, the two most commonly reported *Salmonella* serovars in 2008 were *S.* Enteritidis and *S.* Typhimurium, representing 58.0% and 21.9% of all reported serovars in human confirmed cases (N=120,760) (Table SA32). Reported *S.* Enteritidis serovars decreased by 14.0% (N=11,381) in the Community while on the contrary, reported *S.* Typhimurium serovars increased by 27.1% (N=5,642). Compared to 2007, the impact on the *S.* Enteritidis notification rate in the EU was a decrease of 4.8 per 100,000 population (from 19.4 in 2007 to 14.6 in 2008). In parallel, the *S.* Typhimurium notification rate increased from 4.9 cases to 5.5 cases per 100,000 population in the EU in 2008.

Based on the TESSy data, 16 MSs showed a decline in the reported number of *S.* Enteritidis cases. Czech Republic experienced the largest decrease of 41.8% in reported *S.* Enteritidis cases, corresponding to a drop from 160.0 cases to 92.3 cases per 100,000 population (Figure SA14). Germany reported 33.9% less confirmed *S.* Enteritidis cases in 2007 than in 2008, accounting for 44.6% of the total reduction in the number of reported cases at Community level. Despite general declining trends at Community level, some MSs experienced an increase in *S.* Enteritidis notification rates (Lithuania, Estonia, Malta and Finland) (Figure SA14).

According to TESSy data, several MSs showed an increase in the reported number of *S.* Typhimurium cases (Figure SA15). Denmark experienced, by far, the highest increase of 484.5% (N=1,662) during the previous year, corresponding to a rise from 6.3 cases to 36.8 cases of *S.* Typhimurium per 100,000 population. Denmark and France accounted for 64.9% (N=2,779) of the total increase of *S.* Typhimurium cases in 2008. The other eight serovars of the top ten most common serovars reported in the EU, were only slightly different from 2007. *S.* Bovismorbificans was a new entry on the list with an increase of 220 cases (78.3%) from 281 in 2007 to 501 in 2008. *S.* Agona cases increased by 64.3% from 387 cases in 2007 to 636 cases in 2008 (Table SA32).

The two most frequently reported phage types of *S.* Enteritidis in 2008 were PT4 (21.9%) and PT8 (19.3%) although PT4 showed a remarkable decrease of 39.4% during the previous year (Table SA33). The top seven most common phage types remained the same between 2007 and 2008, though PT21 surpassed PT1 in 2008 due to a marked decrease of PT1 by 41.5%. One new phage type, PT2 was added to the top ten list of *S.* Enteritidis phage types. For *S.* Typhimurium, U292 was a “newcomer” topping the list but being solely attributed to Denmark. Other new *S.* Typhimurium phage types were U320 and DT135. *S.* Typhimurium DT193 and DT104 increased by 32.5% (with 184 cases) and 52.6% (with 252 cases) respectively. Six of the top ten *S.* Typhimurium phage types in 2008 were the same as in 2007 (Table SA33). The proportion of *S.* Enteritidis and *S.* Typhimurium cases with phage type data remains very low (12.2% and 20.2% respectively).

3.1 *SALMONELLA*

Figure SA13. Distribution of the ten most common **Salmonella** ***serovars in humans, 2008***

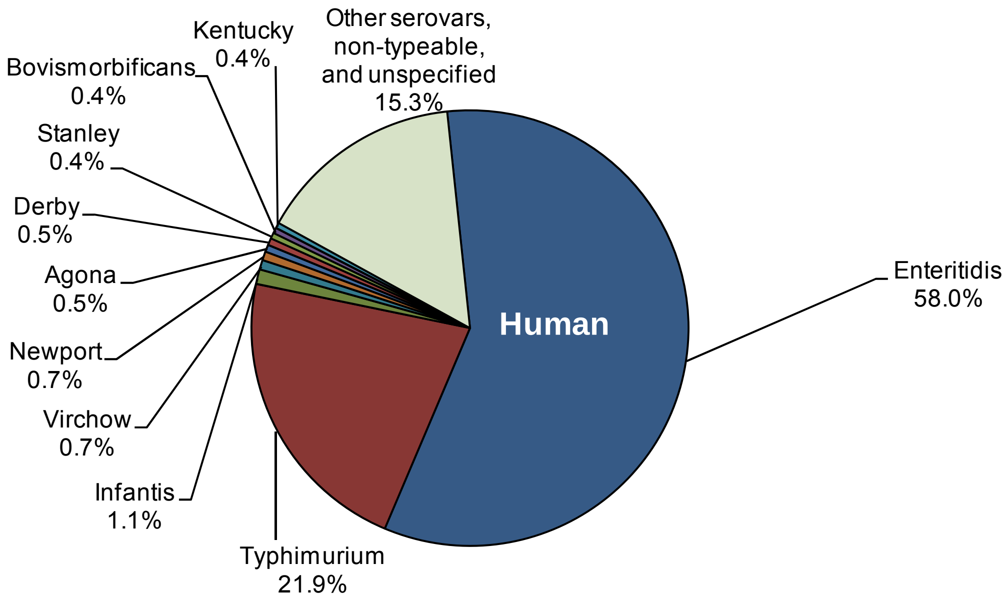


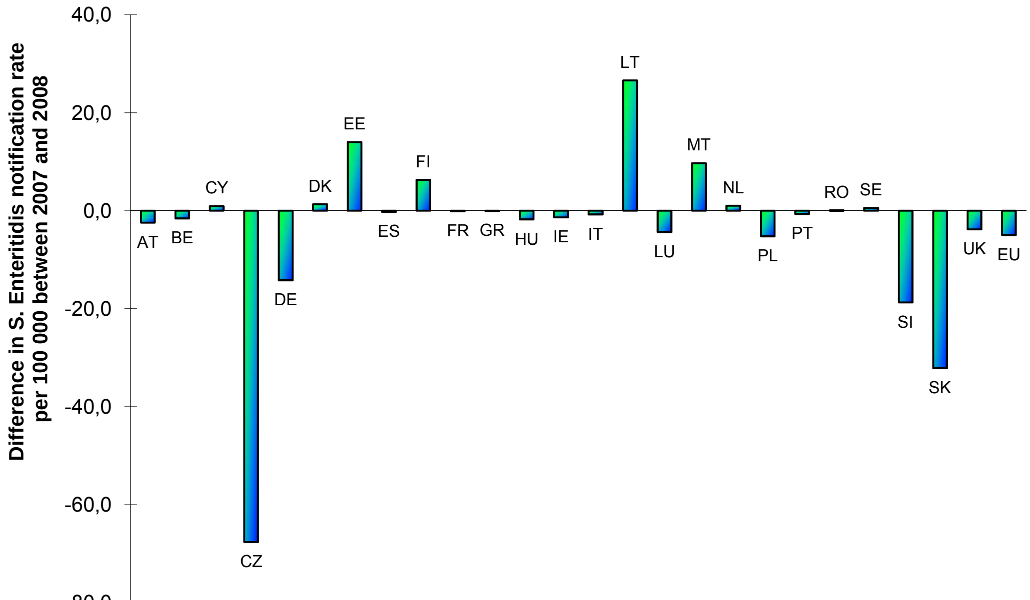
Table SA32. Distribution of confirmed salmonellosis cases in humans by serovar (10 most frequent serovars), TESSy data, 2007-2008

2008			2007		
Top Ten TESSy			Top Ten TESSy		
Serovar	**N**	**%**	**Serovar**	**N**	**%**
Enteritidis	70,091	58.0	Enteritidis	81,472	64.5
Typhimurium	26,423	21.9	Typhimurium	20,781	16.5
Infantis	1,317	1.1	Infantis	1,310	1.0
Virchow	860	0.7	Virchow	1,068	0.8
Newport	787	0.7	Newport	733	0.6
Agona	636	0.5	Stanley	589	0.5
Derby	624	0.5	Hadar	479	0.4
Stanley	529	0.4	Derby	469	0.4
Bovismorbificans	501	0.4	Kentucky	431	0.3
Kentucky	497	0.4	Agona	387	0.3
Other	18,495	15.3	Other	18,562	14.7
Total	**120,760**		**Total**	**126,281**	
Unknown	6,636		Unknown	9,814	

Source: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

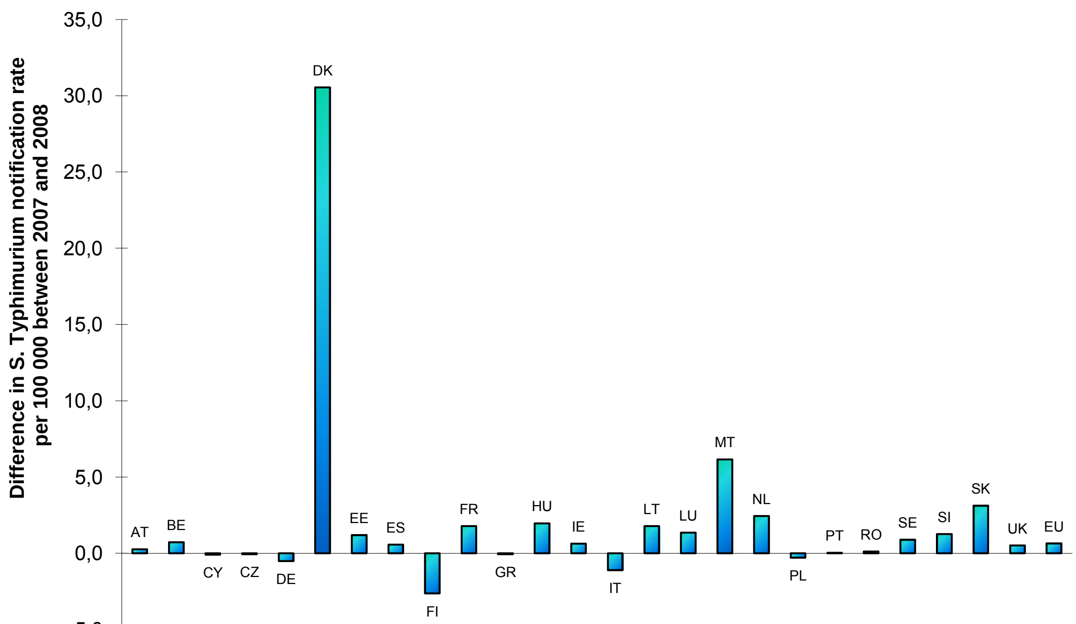
3.1 *SALMONELLA*

Figure SA14. Difference in **Salmonella** ***Enteritidis notification rate per 100,000 population between 2007 and 2008 by reporting MSs and in the EU, TESSy data.***



	AT	BE	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LT	LU	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU
S. Enteritidis	-2,5	-1,6	0,9	-67,7	-14,2	1,3	14,0	-0,3	6,3	-0,1	0,0	-1,8	-1,4	-0,8	26,6	-4,4	9,7	1,0	-5,2	-0,7	0,1	0,5	-18,8	-32,1	-3,8	-5,0

Figure SA15. Difference in **Salmonella** ***Typhimurium notification rate per 100,000 population between 2007 and 2008 by reporting MSs and in the EU, TESSy data.***



	AT	BE	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LT	LU	MT	NL	PL	PT	RO	SE	SI	SK	UK	EU
S. Typhimurium	0,3	0,7	-0,1	-0,1	-0,5	30,5	1,2	0,6	-2,6	1,8	-0,1	2,0	0,6	-1,1	1,8	1,3	6,2	2,4	-0,3	0,0	0,1	0,9	1,3	3,1	0,5	0,6

Table SA33. Distribution of confirmed salmonellosis cases in humans by phage type for S. Enteritidis and S. Typhimurium, 2007-2008, TESSy data.

2008						2007					
Top Ten TESSy						Top Ten TESSy					
S. Enteritidis (N=8,561)			*S.* Typhimurium (N=5,344)			*S.* Enteritidis (N=13,604)			*S.* Typhimurium (N=6,525)		
Phage type	N	%	Phage type	N	%	Phage type	N	%	Phage type	N	%
PT4	1,877	21.9	U292	1,021	19.1	PT4	3,096	22.8	DT193	567	8.7
PT8	1,656	19.3	DT193	751	14.1	PT8	1,972	14.5	DT104	479	7.3
PT21	951	11.1	DT104	731	13.7	PT1	1,548	11.4	DT120	478	7.3
PT1	905	10.6	DT120	557	10.4	PT21	824	6.1	NT	279	4.3
PT14b	613	7.2	RDNC	241	4.5	PT14b	675	5.0	DT104b	260	4.0
PT6	580	6.8	U320	203	3.8	PT6	541	4.0	U302	255	3.9
PT12	371	4.3	NT	152	2.8	PT12	318	2.3	RDNC	250	3.8
PT2	278	3.2	U302	146	2.7	PT6a	261	1.9	DT8	90	1.4
PT6a	177	2.1	DT135	141	2.6	RDNC	180	1.3	U313	67	1.0
RDNC	104	1.2	DT104b	134	2.5	PT1b	128	0.9	DT195	64	1.0

Note: NT: Not typeable

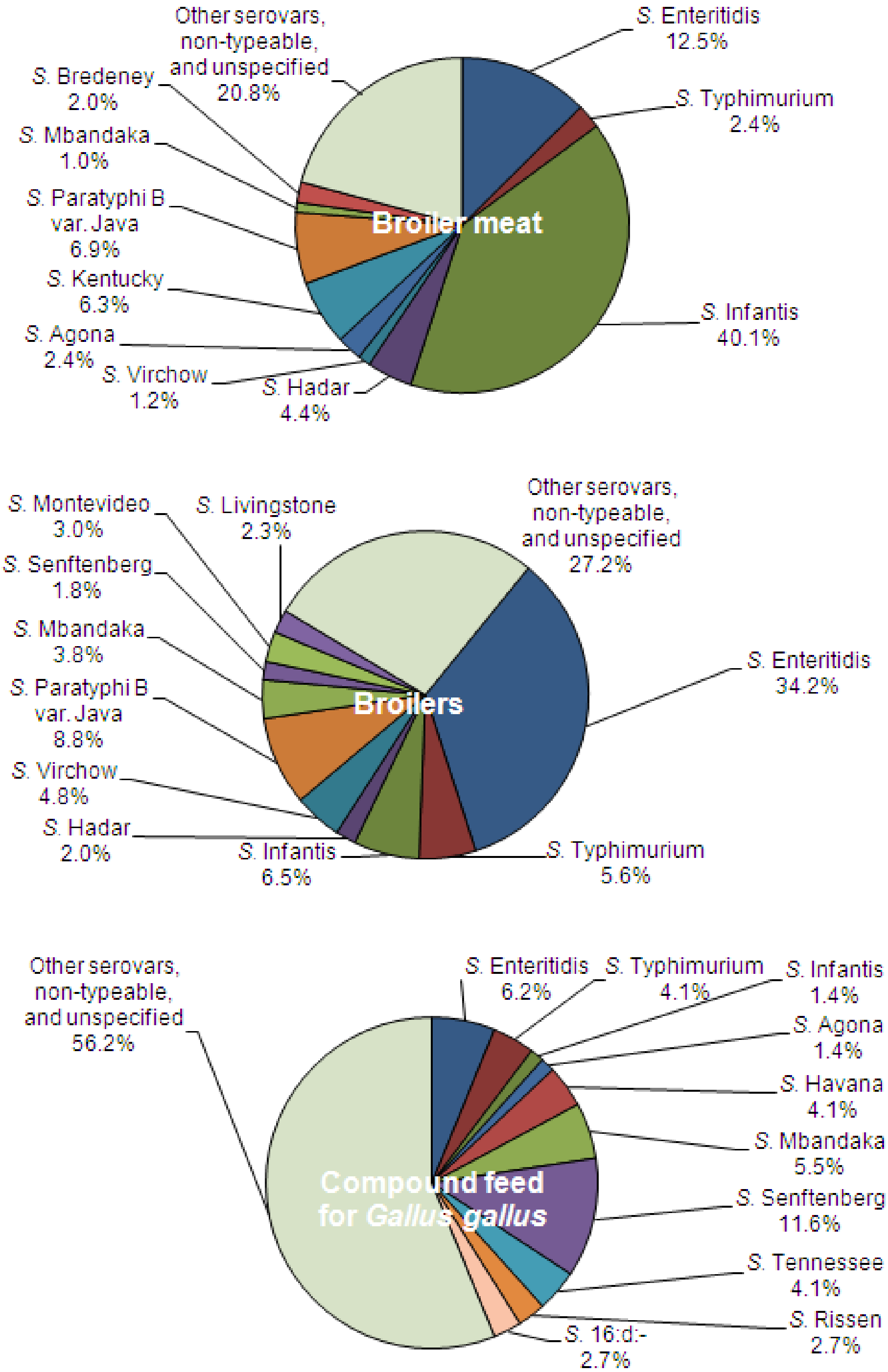
RDNC: reacts but does not conform

Source: Denmark, Estonia, Germany, Hungary, Ireland, Italy, Netherlands, Romania, Slovakia, Sweden, United Kingdom

3.1 *SALMONELLA*

Serovars in the poultry production

Figure SA16. Distribution of the ten most common **Salmonella** ***serovars in broiler meat, flocks of*** **Gallus gallus** ***and compound feed for poultry, 2008***



Note: Data are only included for MS sample size ≥10.

Graph on broiler meat includes data from 15 MSs (Austria, Czech Republic, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Romania, Slovakia, Slovenia and Spain), N=2,585. 92% of the *S.* Infantis isolates originated from one MS.

Graph on broiler data includes data from 19 MSs (Austria, Belgium, Czech Republic, Denmark, Estonia, Germany, Greece, Hungary, Italy, Latvia, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, and United Kingdom), N=6,674.

Graph on compound feed includes data from 13 MSs (Austria, Belgium, Czech Republic, France, Germany, Hungary, Italy, Latvia, Netherlands, Poland, Slovakia, Slovenia, Spain), N=146.

3.1 *SALMONELLA*

No MSs reported data from serotyping of ten or more *Salmonella* isolates from eggs. This corresponds to the generally very low number of *Salmonella* found in eggs in 2008.

Broiler meat

Fifteen MSs reported data on *Salmonella* serovar distribution in broiler meat. Overall, *S*. Infantis was by far the most frequent serovar reported from broiler meat in 2008 (40.1%) (Figure SA16 and Table SA34). However, this result was due to a high number of isolates from Hungary where this serovar is dominant. Likewise, *S*. Paratyphi B var. Java (6.9%) was the third most common serovar due to a high prevalence among isolates from the Netherlands, and *S*. Kentucky (6.3%) was ranked as number four due to a high prevalence among isolates from Ireland. On the contrary, *S*. Enteritidis was the second most common serovar reported due to a generally high occurrence in most MSs (12.5%). The predominance of some serovars in broiler meat in specific MSs indicates that *Salmonella* is established in different MSs.

S. Typhimurium constituted only 2.4% of the isolates, which is low compared to 2007, where this serovar constituted 7.2% of the isolates. This decrease was partly caused by the high number of *S*. Infantis isolates being reported from Hungary and a lower prevalence among isolates from Italy and Poland.

S. Bredeney (2.0%) and *S*. Mbandaka (1.0%) were new among the ten most common serovars in 2008, replacing *S*. Ohio and *S*. Indiana.

Table SA34. Distribution[1] of the ten most common* Salmonella *serovars in broiler meat, 2008

Countries	No. of isolates serotyped	% positive										
		S. Infantis	S. Enteritidis	S. Paratyphi B var. Java	S. Kentucky	S. Hadar	S. Agona	S. Typhimurium	S. Bredeney	S. Virchow	S. Mbandaka	Other serovars, non-typeable, and unspecified
Total no. of isolates	**2,585**	**1,036**	**324**	**179**	**163**	**114**	**63**	**61**	**51**	**31**	**25**	**538**
Austria	83	28.9	31.3	1.2	-	2.4	2.4	1.2	2.4	-	-	30.1
Czech Republic	72	20.8	15.3	-	6.9	-	29.2	2.8	-	-	-	25.0
Germany	306	5.6	22.2	7.5	-	2.0	0	7.8	1.0	1.3	-	52.6
Greece	48	-	31.3	-	-	43.8	-	0	-	-	-	25.0
Hungary	967	95.7	2.7	0.4	-	0	0.1	0.4	0	-	0.3	0.4
Ireland	229	1.7	0.4	-	68.6	0.4	7.4	3.1	0.4	0.9	0.4	16.6
Italy	326	-	15.0	-	-	19.9	-	1.8	12.6	-	-	50.6
Latvia	26	-	88.5	-	-	0	-	0	7.7	0	-	3.8
Lithuania	86	-	22.1	-	-	-	14.0	-	1.2	-	1.2	61.6
Netherlands	208	6.3	1.4	72.6	-	2.4	1.4	1.4	-	1.0	2.4	11.1
Poland	116	22.4	31.0	-	-	6.9	6.0	8.6	-	9.5	8.6	6.9
Romania	27	3.7	44.4	-	-	0	0	0	0	18.5	-	33.3
Slovakia	20	10.0	55.0	-	5.0	-	0	0	0	-	-	30.0
Slovenia	13	53.8	15.4	-	-	-	0	0	0	-	7.7	23.1
Spain	58	3.4	37.9	-	-	10.3	-	6.9	1.7	12.1	6.9	20.7
Proportion of serotyped isolates		**40.1**	**12.5**	**6.9**	**6.3**	**4.4**	**2.4**	**2.4**	**2.0**	**1.2**	**1.0**	**20.8**

Note: Data are only presented for sample size ≥10. Both clinical and monitoring isolates are included, and it should be noted that there can be some overlap of isolates between the two reportings and the sum of isolates does not correspond to the number of tested flocks.

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all reported serovars.

3.1 *SALMONELLA*

Gallus gallus

Nineteen MSs provided information on *Salmonella* serovars in *Gallus gallus* flocks in 2008. This covers information from breeding flocks, laying hen flocks and broiler flocks. As in previous years, *S.* Enteritidis was the most frequently reported serovar (34.2% of the isolates) followed by *S.* Paratyphi B var. Java (8.8%), *S.* Infantis (6.5%) and *S*. Typhimurium (5.6%) (Figure 16 and Table SA35). All MSs providing information on serovars in *Gallus gallus* reported findings of *S.* Enteritidis except Sweden. Also, *S.* Typhimurium, and to a lesser extent *S.* Infantis, were widely distributed among MSs. In contrast, the second most prevalent serovar at Community level, *S.* Paratyphi B var. Java, was almost solely detected in the Netherlands.

For further information of reported data please refer to Level 3 tables.

Table SA35. Distribution[1] of the ten most common* Salmonella *serovars in flocks of* Gallus gallus*, 2008

Countries	Number of isolates serotyped	% positive										
		S. Enteritidis	S. Paratyphi B var. Java	S. Infantis	S. Typhimurium	S. Virchow	S. Mbandaka	S. Montevideo	S. Livingstone	S. Hadar	S. Senftenberg	Other serovars, non-typeable, and unspecified
Total no. of isolates	**6,674**	**2,283**	**587**	**433**	**372**	**318**	**256**	**202**	**153**	**134**	**119**	**1,817**
Austria	570	41.1	0.4	6.7	6.7	0.2	0.2	22.5	0.2	1.4	3.9	17.0
Belgium	941	36.3	-	4.9	9.4	2.7	2.4	0.9	2.4	0.4	2.6	38.0
Czech Republic	119	70.6	-	3.4	2.5	-	-	9.2	-	-	-	14.3
Denmark	47	2.1	-	8.5	25.5	-	-	-	-	-	-	63.8
Estonia	23	73.9	-	-	-	-	-	-	-	-	-	26.1
Germany	449	34.3	-	1.1	3.8	1.6	3.1	-	-	-	2.7	53.5
Greece	61	57.4	-	8.2	6.6	3.3	-	-	-	1.6	1.6	21.3
Hungary	127	11.8	-	68.5	3.1	-	3.1	-	2.4	-	0.8	10.2
Italy	593	11.6	-	-	4.6	-	-	5.4	10.6	10.5	-	57.3
Latvia	18	66.7	-	-	11.1	5.6	-	-	-	-	5.6	11.1
Netherlands	1,023	10.9	57.1	8.2	4.2	1.5	5.7	-	1.6	2.4	-	8.4
Poland	575	60.3	-	10.8	6.8	4.7	6.4	0.2	0.5	2.6	0.5	7.1
Portugal	189	49.2	-	0.5	1.1	2.1	10.6	-	-	-	0.5	36.0
Romania	596	35.9	-	2.7	1.5	37.2	-	1.2	2.3	-	4.2	14.9
Slovakia	392	59.7	-	7.7	0.8	-	0.3	1.0	1.0	1.5	0.3	27.8
Slovenia	72	52.8	-	9.7	12.5	-	-	4.2	-	-	-	20.8
Spain	491	41.1	-	7.7	5.9	1.6	5.1	1.0	1.8	2.6	0.8	32.2
Sweden	12	-	-	-	58.3	-	-	-	8.3	-	-	33.3
United Kingdom	376	21.3	0.3	1.6	9.6	1.6	19.4	0.8	4.3	-	6.4	34.8
Proportion of serotyped isolates		**34.2**	**8.8**	**6.5**	**5.6**	**4.8**	**3.8**	**3.0**	**2.3**	**2.0**	**1.8**	**27.2**

Note: Data are only presented for sample size ≥10. Both clinical and monitoring isolates are included, and it should be noted that there can be some overlap of isolates between the two reportings and the sum of isolates does not correspond to the number of tested flocks.

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all reported serovars.

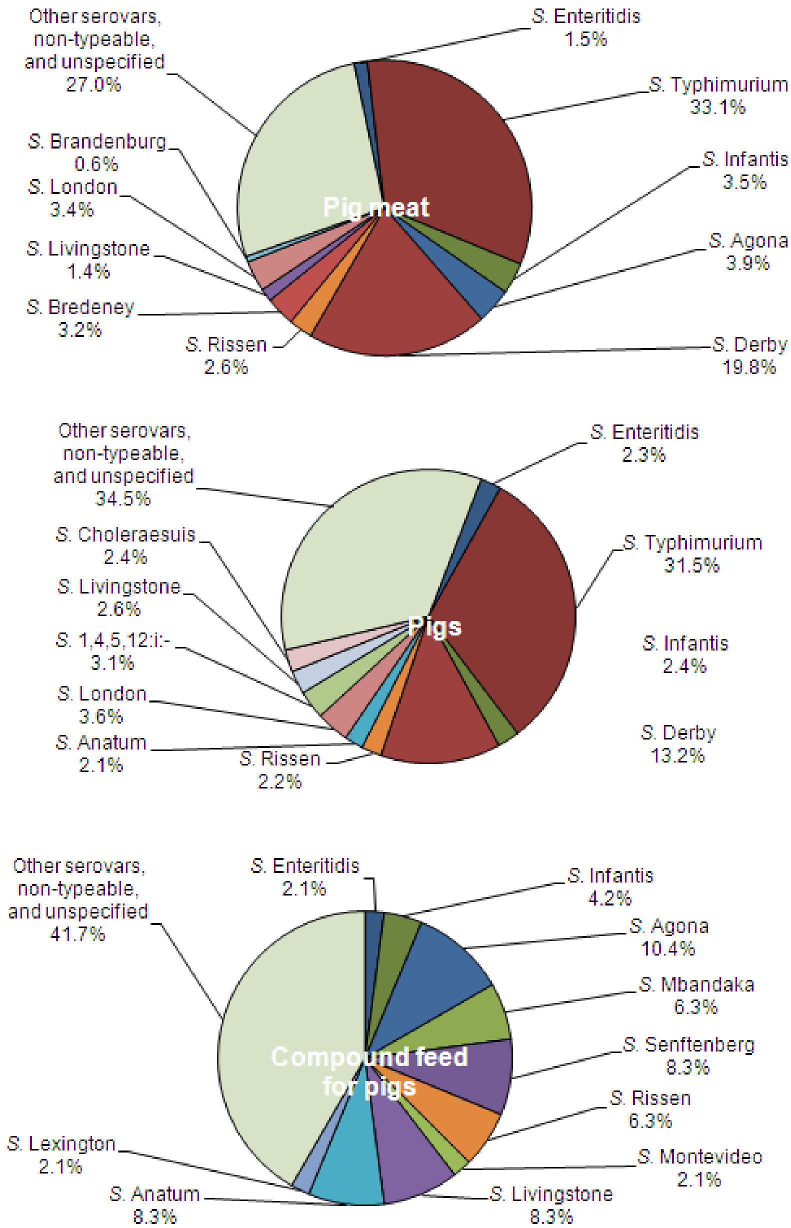
3.1 *SALMONELLA*

Compound feed for *Gallus gallus*

In total, 13 MSs provided data on the serovar distribution in compound feed for poultry, however there were only 146 isolates and the diversity of serovars was very high (Figure SA16**)**. The most common serovar in compound feed for poultry was *S.* Senftenberg (11.6%)**.** This serovar is also reported in flocks of *Gallus gallus* but only ranking as tenth most frequent serovar**.** The most prevalent serovars in broilers, *S.* Enteritidis (37.0%) and *S.* Typhimurium (6.0%) were also represented in the compound feed Top 10**.**

Serovars in the pig meat production

Figure SA17. Distribution of the ten most common **Salmonella** ***serovars in pig meat, pig herds and compound feed for pigs, 2008***



Note: Data are only included for MS sample size ≥10.

Graph on pig meat include data from 10 MSs (Czech Republic, Germany, Denmark, Hungary, Ireland, Italy, Latvia, Netherlands, Romania and Sweden), N=1,417.

Graph on pig data include data from 17 MSs (Austria, Belgium, Czech Republic, Estonia, Germany, Hungary, Ireland, Italy, Luxembourg, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom), N=4,897

Graph on compound feed include data from 13 MSs (Austria, Belgium, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain), N=48.

3.1 *SALMONELLA*

Pig meat

Ten MSs reported data of *Salmonella* serovars in pig meat. *S*. Typhimurium (33.1%) and *S*. Derby (19.8%) were the most frequently isolated serovars in pig meat in 2008 (Figure 17 and Table SA36). The serovar distribution was largely comparable to the distribution in 2007, except for the fact that *S*. Agona (3.9%) and *S*. Livingstone (1.4%) replaced *S*. 1,4,5,12:i:- and *S*. Group B in the top ten. These two serovars were only reported in high numbers by one MS each in 2007, while *S*. Agona and *S*. Livingstone were reported by several MSs in 2008.

Table SA36. Distribution[1] of the ten most common* Salmonella *serovars in pig meat, 2008

Country	No. of isolates serotyped	% positive										
		S. Typhimurium	*S.* Derby	*S.* Agona	*S.* Infantis	*S.* London	*S.* Bredeney	*S.* Rissen	*S.* Enteritidis	*S.* Livingstone	*S.* Brandenburg	Other serovars, non-typeable, and unspecified
Total no. of isolates	**1,417**	**469**	**280**	**55**	**49**	**48**	**46**	**37**	**21**	**20**	**9**	**383**
Czech Republic	57	12.3	29.8	14.0	8.8	3.5	-	-	7.0	-	-	24.6
Denmark	199	44.2	28.1	1.0	5.5	-	-	-	-	3.0	-	18.1
Germany	197	49.7	1.5	0.5	0.5	-	-	-	0.5	1.5	3.0	42.6
Hungary	128	37.5	23.4	0.8	20.3	1.6	3.9	5.5	0.8	0.8	-	5.5
Ireland	201	47.3	11.4	17.4	2.5	8.0	6.0	0.5	1.0	-	0.5	5.5
Italy	532	19.4	27.6	-	-	5.3	3.6	4.9	0.9	0.6	-	37.8
Latvia	17	5.9	5.9	-	-	-	5.9	-	17.6	-	-	64.7
Netherlands	12	50.0	8.3	-	-	-	-	-	8.3	16.7	8.3	8.3
Romania	64	34.4	1.6	12.5	1.6	-	14.1	4.7	-	7.8	-	23.4
Slovakia	10	10.0	10.0	-	-	-	-	-	40.0	-	10.0	30.0
Proportion of serotyped isolates		**33.1**	**19.8**	**3.9**	**3.5**	**3.4**	**3.2**	**2.6**	**1.5**	**1.4**	**0.6**	**27.0**

Note: Data are only presented for sample size ≥10. Both clinical and monitoring isolates are included, and it should be noted that there can be some overlap of isolates between the two reportings and the sum of isolates doed not correspond to the number of tested flocks.

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all reported serovars.

3.1 *SALMONELLA*

Pigs

Information on serovar distribution in pig herds was provided by 17 MSs. *S.* Typhimurium was by far the most frequent serovar (31.5%) followed by *S.* Derby (13.2%) in 2008 (Figure 17 and Table SA37). *S.* Typhimurium was reported by all MSs whereas *S.* Derby was reported from 15 MSs.

Table SA37. Distribution[1] of the ten most common* Salmonella *serovars in pig herds, 2008

Countries	No. of isolates serotyped	% positive										
		S. Typhimurium	*S.* Derby	*S.* London	*S.* 1,4,5,12:i:-	*S.* Livingstone	*S.* Choleraesuis	*S.* Infantis	*S.* Enteritidis	*S.* Rissen	*S.* Anatum	Other serovars, non-typeable, and unspecified
Total no. of isolates	**4,897**	**1,544**	**646**	**177**	**154**	**127**	**119**	**118**	**112**	**109**	**101**	**1,690**
Austria	69	29.0	15.9	-	-	13.0	-	4.3	1.4	-	-	36.2
Belgium	1,010	48.8	15.7	0.8	-	3.4	-	3.0	0.4	3.8	2.2	22.0
Czech Republic	73	26.0	12.3	2.7	-	-	-	1.4	8.2	-	-	49.3
Estonia	21	9.5	-	-	-	-	33.3	9.5	9.5	-	-	38.1
Germany	1,318	33.1	7.1	1.6	-	0.9	0.5	1.5	2.1	-	1.1	52.0
Hungary	61	21.3	14.8	-	-	4.9	16.4	19.7	-	-	-	23.0
Ireland	18	72.2	11.1	-	-	-	-	-	-	-	-	16.7
Italy	634	17.7	16.7	-	24.3	1.4	9.9	-	0.5	-	-	29.5
Luxembourg	21	52.4	33.3	-	-	-	-	4.8	-	-	-	9.5
Netherlands	758	16.5	22.7	14.8	-	7.7	-	4.4	1.5	-	3.8	28.8
Poland	82	39.0	12.2	-	-	-	8.5	-	15.9	-	-	24.4
Romania	60	18.3	1.7	-	-	-	33.3	-	-	-	-	46.7
Slovakia	82	24.4	17.1	4.9	-	-	4.9	-	22.0	-	-	26.8
Slovenia	55	14.5	1.8	-	-	-	1.8	18.2	34.5	-	-	29.1
Spain	385	16.1	10.1	5.2	-	0.5	-	0.8	1.0	18.4	9.1	38.7
Sweden	31	64.5	-	-	-	-	-	6.5	-	-	-	29.0
United Kingdom	219	67.1	5.9	4.6	-	-	-	0.5	1.4	-	-	20.5
Proportion of serotyped isolates		**31.5**	**13.2**	**3.6**	**3.1**	**2.6**	**2.4**	**2.4**	**2.3**	**2.2**	**2.1**	**34.5**

Note: Data are only presented for sample size ≥10. Both clinical and monitoring isolates are included, and it should be noted that there can be some overlap of isolates between the two reportings and the sum of isolates does not correspond to the number of tested flocks.

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all reported serovars.

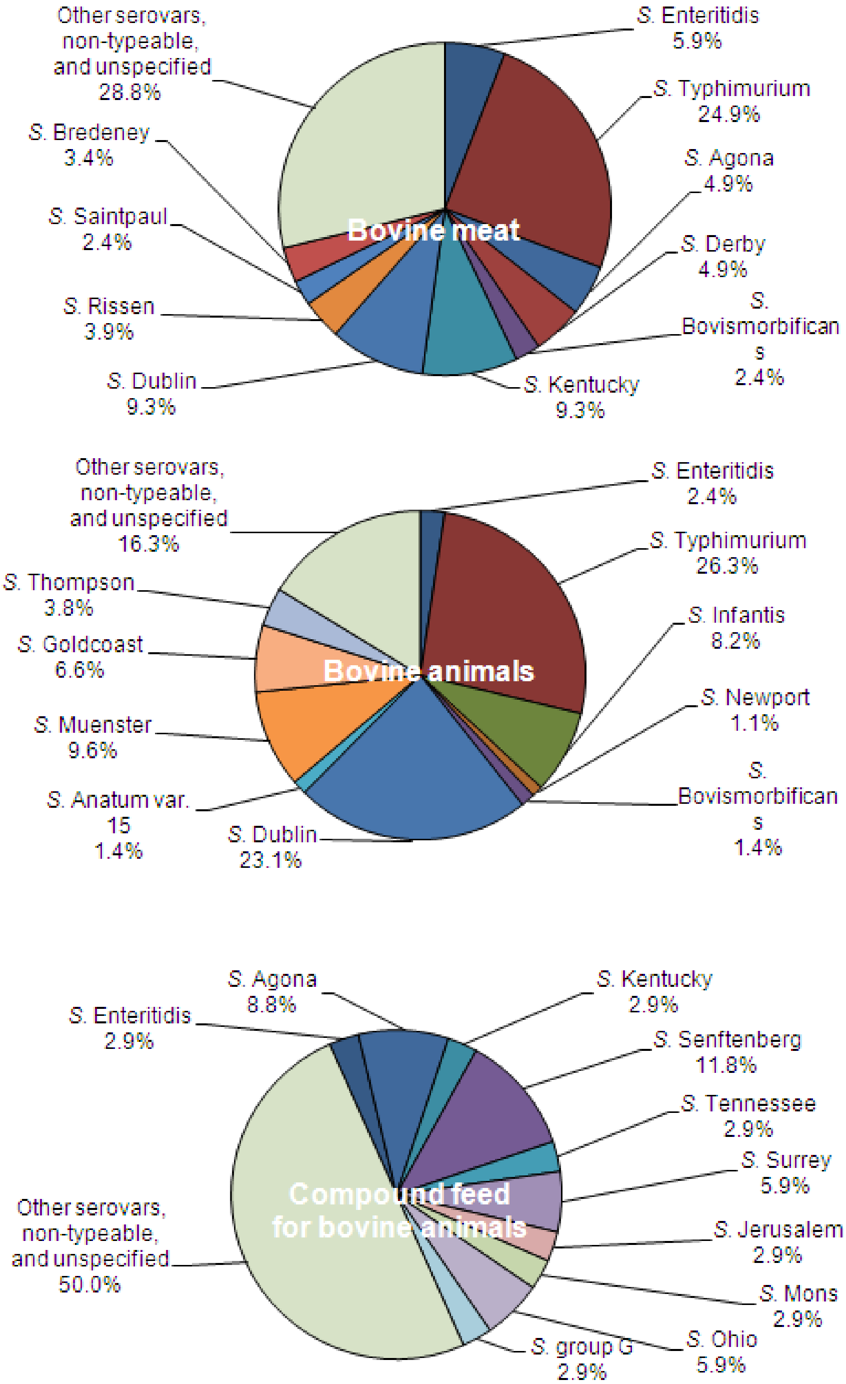
Compound feed for pigs

In total, 13 MSs and one non-MS provided data on the serovar distribution in compound feed for pigs. As for poultry, the diversity of serovars was very high and there were only 48 isolates. *S.* Agona (10.2%) was the most common type in pig feed whereas *S.* Senftenberg (8.3%) was the second most common serovar. *S.* Typhimurium and *S.* Derby, which are very dominating in pig herds, were not in the compound feedTop 10 serovars.

3.1 *SALMONELLA*

Serovars in the bovine meat production

Figure SA18. Distribution of the ten most common* Salmonella *serovars in bovine meat, cattle herds and compound feed for cattle, 2008



Note: Data are only included for MS sample size ≥ 10

Graph on bovine meat include data from 7 MSs (Czech Republic, Germany, Hungary, Ireland, Italy, Netherlands and Romania), N=146.

Graph on cattle include data from 15 MSs (Austria, Belgium, Czech Republic, Germany, Denmark, Estonia, Finland, Hungary, Ireland, Italy, Netherlands, Slovakia, Spain, Sweden and United Kingdom), N=4,792.

Graph on compound feed include data from 6 MSs (Belgium, France, Netherlands, Poland, Slovakia, Spain), N=34.

3.1 *SALMONELLA*

Bovine meat

Seven MSs reported specific information on *Salmonella* serovars in bovine meat in 2008 (Figure SA18 and Table SA38). As in previous years, *S*. Typhimurium (24.9%) and *S*. Dublin (9.3%) were the most frequently detected serovars from bovine meat. *S*. Kentucky was just as common as *S*. Dublin due to the high prevalence reported by Ireland. Likewise, *S*. Agona (4.9%) entered the list due to a relatively high number reported by Ireland. It should be noted that several of the serovars were only reported in low numbers, and their presence on the list should be interpreted with caution.

Table SA38. Distribution[1] of the ten most common* Salmonella *serovars in bovine meat, 2008

Country	No. of isolates serotyped	% positive										
		S. Typhimurium	S. Dublin	S. Kentucky	S. Enteritidis	S. Derby	S. Agona	S. Rissen	S. Bredeney	S. Saintpaul	S. Bovismorbificans	Other serovars, non-typeable, and unspecified
Total, No. of isolates	**205**	**51**	**19**	**19**	**12**	**10**	**10**	**8**	**7**	**5**	**5**	**59**
Czech Republic	12	25.0	-	-	16.7	16.7	-	-	-	-	-	41.7
Germany	15	6.7	-	-	6.7	-	-	-	-	6.7	-	80.0
Hungary	15	13.3	-	-	26.7	-	-	-	26.7	-	6.7	26.7
Ireland	67	29.9	10.4	28.4	-	4.5	14.9	1.5	3.0	1.5	-	6.0
Italy	53	22.6	-	-	7.5	7.5	-	13.2	1.9	5.7	-	41.5
Netherlands	33	39.4	36.4	-	3.0	3.0	-	-	-	-	-	18.2
Romania	10	-	-	-	-	-	-	-	-	-	40.0	60.0
Proportion of serotyped isolates		**24.9**	**9.3**	**9.3**	**5.9**	**4.9**	**4.9**	**3.9**	**3.4**	**2.4**	**2.4**	**28.8**

Note: Data are only presented for sample size ≥10. Both clinical and monitoring isolates are included, and it should be noted that there can be some overlap of isolates between the two reportings and the sum of isolates does not correspond to the number of tested flocks.

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all reported serovars.

3.1 *SALMONELLA*

Cattle

Information on serovar distribution in the cattle herds was provided by 15 MSs and one non-MS. The distribution of the ten most common serovars in cattle herds is shown in Figure 18 and Table SA39. *S*. Typhimurium covers 26.3% of the isolates and detected in all reporting countries. The second most commonly reported serovar was *S*. Dublin (23.1%). This serovar was reported from nine countries.

Table SA39. Distribution[1] of the ten most common* Salmonella *serovars in cattle herds, 2008

Countries	No. of isolates serotyped	% positive										
		S. Typhimurium	S. Dublin	S. Muenster	S. Infantis	S. Goldcoast	S. Thompson	S. Newport	S. Enteritidis	S. Anatum var. 15	S. Bovismorbificans	Other serovars, non-typeable, and unspecified
Total no of isolates	**5,725**	**1,508**	**1,320**	**547**	**469**	**376**	**216**	**62**	**136**	**80**	**78**	**933**
Austria	51	15.7	62.7	-	-	-	-	-	7.8	-	-	13.7
Belgium	112	33.0	59.8	-	1.8	-	-	-	0.9	-	-	4.5
Czech Republic	18	77.8	-	-	5.6	-	-	-	11.1	-	-	5.6
Denmark	33	60.6	-	-	-	-	-	-	-	-	-	39.4
Estonia	14	7.1	71.4	-	21.4	-	-	-	-	-	-	-
Finland	99	96.0	-	-	-	-	-	-	2.0	-	-	2.0
Germany	3,985	28.7	7.2	13.7	11.4	9.4	5.3	1.1	3.0	2.0	1.6	16.4
Hungary	35	2.9	-	-	22.9	-	8.6	-	-	-	25.7	40.0
Ireland	298	10.7	88.3	-	-	-	-	-	-	-	-	1.0
Italy	65	36.9	-	-	-	-	-	-	3.1	-	-	60.0
Netherlands	81	24.7	65.4	-	-	-	-	-	-	-	3.7	6.2
Slovakia	15	80.0	6.7	-	-	-	-	-	-	-	6.7	6.7
Spain	47	4.3	-	-	-	2.1	-	-	-	-	-	93.6
Sweden	48	43.8	33.3	-	-	-	-	-	6.3	-	-	16.7
United Kingdom	824	9.5	71.6	-	-	0.1	-	2.1	0.1	-	-	16.6
Proportion of serotyped isolates		**26.3**	**23.1**	**9.6**	**8.2**	**6.6**	**3.8**	**1.1**	**2.4**	**1.4**	**1.4**	**16.3**
Norway	13	100	-	-	-	-	-	-	-	-	-	-

Note: Data are only presented for sample size ≥10. Both clinical and monitoring isolates are included, and it should be noted that there can be some overlap of isolates between the two reportings and the sum of isolates does not correspond to the number of tested flocks.

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all reported serovars.

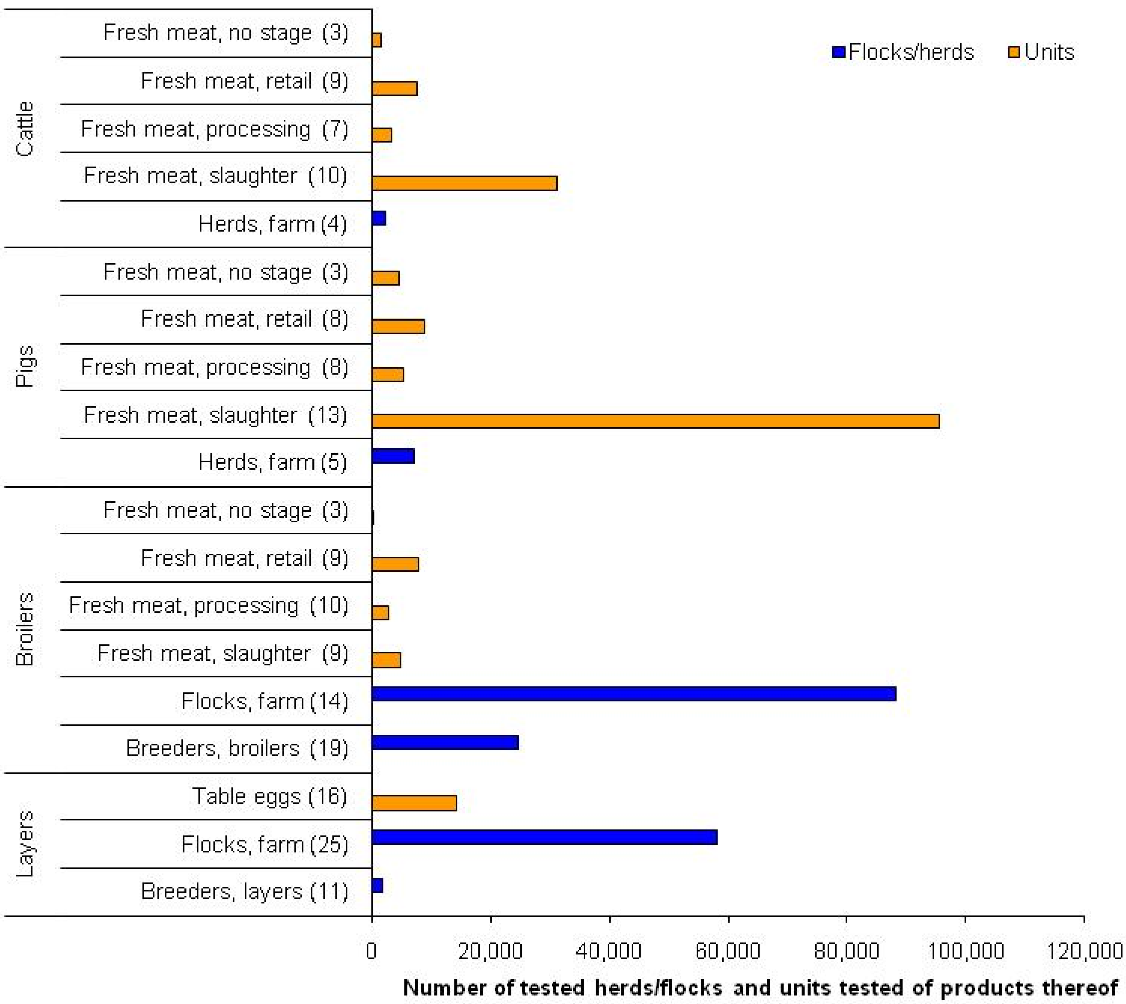
Compound feed for cattle

Also in relation to compound feed for cattle, only six MSs provided data on the serovar distribution (Figure SA18) and the diversity of serovars was very high. As for compound feed for poultry, *S.* Senftenberg (12.5%) was the most common definitive serovar, however results should be interpreted with care since only 34 isolates were reported in total.

3.1.6 Overview of *Salmonella* in the farm-to-fork

During the past few years the quality and validity of reported data on the occurrence of *Salmonella* in food and animals has improved. This is due to the efforts of MS reporters, the implementation of the Community *Salmonella* microbiological criteria, multi-annual control plans and the harmonisation of the *Salmonella* control programmes. Figure SA19 illustrates what type of data was reported in 2008. At farm level, 25 MSs reported on laying hen flocks, 19 MSs on meat line breeding flocks and 14 MSs on broiler flocks. Only little information was provided on *Salmonella* prevalence in pig and cattle herds.

Figure SA19. The number of herds/flocks and units tested at different sampling levels including all reported data, 2007. Number of included MSs in brackets



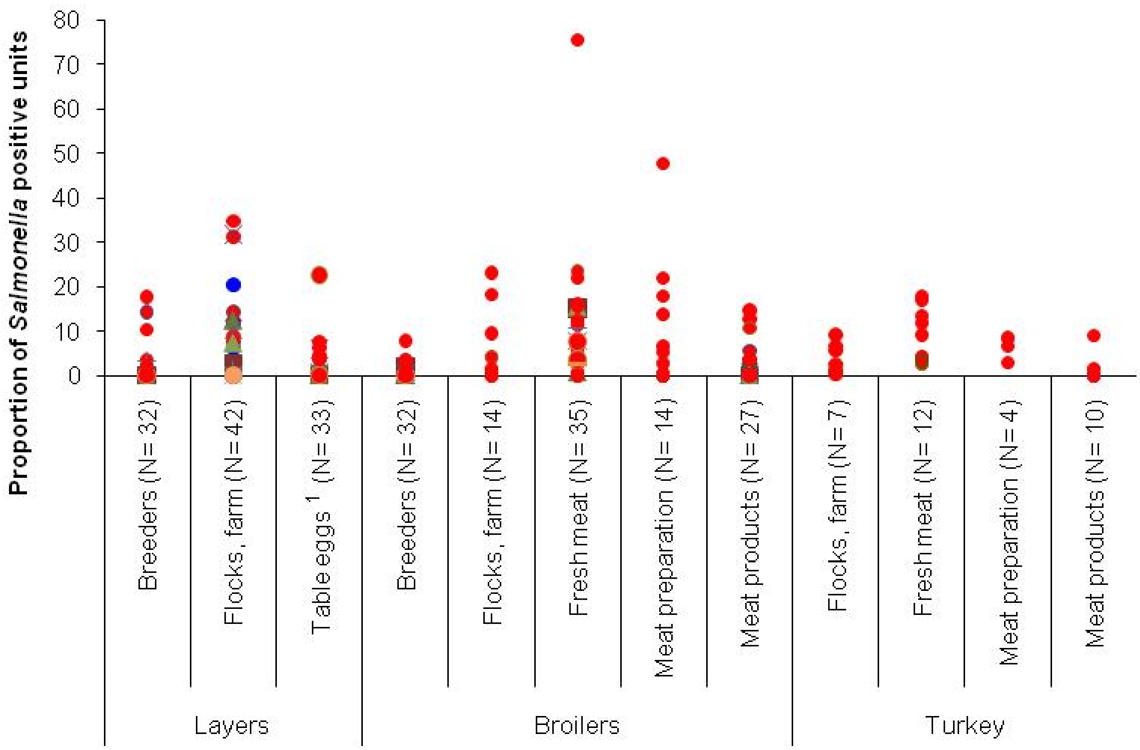
Note. Table eggs include tests at packing centres, retail and where no level of sampling was reported.

In Figures SA20 and SA21 an overview of *Salmonella* prevalence in different animal populations and different meat products thereof reported by MSs is provided. In total, 262 and 206 investigations were included in these figures, respectively. More than half of the tested units were related to poultry production mainly from flocks of *Gallus gallus* including breeding, laying hens and broiler flocks. Overall, 89.3% of the reported investigations presented *Salmonella* prevalence below 10%. Improved data quality and validity allows comparison of results in breeding flocks and laying hens between countries where harmonised monitoring and control schemes are introduced but does at the same time compromise the possibility to evaluate trends over time. For areas where harmonised schemes have not yet been established, comparison between countries can only be done with detailed knowledge of the data included. However, the data demonstrates a substantial variation in the prevalence among observations reported by MSs especially in flocks of laying hens, broilers flocks, broiler and turkey meat and sheep. *Salmonella* was rarely detected from cattle and products thereof, and solipeds.

Analysis of data demonstrates a substantial variation among countries in the occurrence of *Salmonella* in different food categories and animal species. This variation could, in part, be due to differences in sampling and testing schemes and also due to true differences in the occurrence of *Salmonella* between countries. Similarly, great variations between MS specific *Salmonella* prevalence were also observed in the EU-wide baseline surveys in laying hens, broilers, turkeys and slaughter pigs that have been published in previous years. Generally, there was no tendency for increasing or decreasing proportion of positive units for products presented to consumers.

Figure SA22 presents the proportion of positive units in investigations of other food categories. Each point represents the result of a reported investigation. For most investigations, *Salmonella* was reported in all food categories at a similar level as the products of origin and generally at comparable levels to 2007.

Figure SA20. Proportion of* Salmonella *positive samples by animal species and food category within the EU, 2008. Each point represents a MS observation

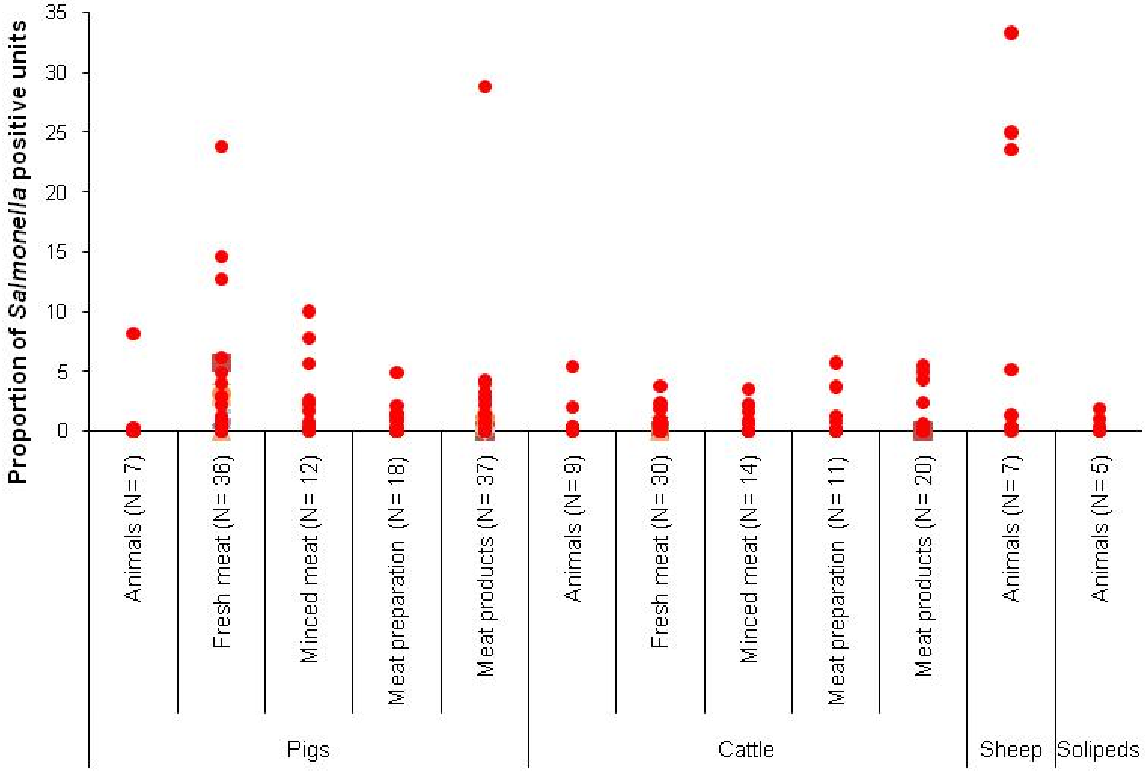


Note: Data are only presented for sample size ≥25.

N=number of investigations including both batch and single samples.

1. Table eggs tested at packing centers and retail as well as data where no level of sampling was indicated are included.

Figure SA21. Proportion of **Salmonella** ***positive samples by animal species and food category within the EU, 2008. Each point represents a MS observation***

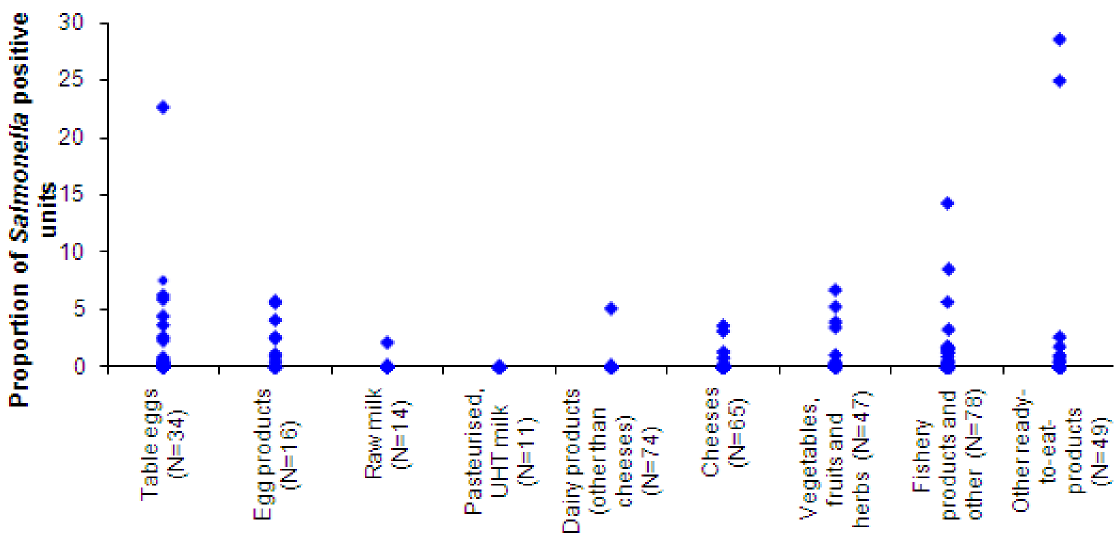


Note: Data are only presented for sample size ≥25.

N= number of investigations including both batch and single samples.

3.1 *SALMONELLA*

Figure SA22. Proportions of* Salmonella *positive units in food other than meat, by food category within the EU, 2008. Each point represents a MS investigation



Note: Data are only presented for sample size ≥25.

N= number of investigations including both batch and single samples.

Milk includes both cow's milk and sheep's milk; fishery products include crustaceans, live bivalve molluscs and molluscan shellfish; vegetables and fruits include vegetables, fruits, spices and herbs, RTE salads and sprouts.

Other RTE products include: bakery products, cakes, pastry, desserts, non-alcoholic beverages, cereals and meals, chocolate, cocoa and cocoa preparations, confectionary products and pastes, foodstuffs intended for special nutritional uses, infant formula, juice, other processed food products and prepared dishes, sauce and dressings, soups, sweets, bottled water.

Overall, reported data from 2008 support the generally accepted perception that the main sources of *Salmonella* infections in humans are from different types of meat and eggs in the EU. A relatively high prevalence is reported from raw meat (non-RTE) whereas occurrence in RTE-products is significantly lower.

In recent years, increased attention has been given to investigate *Salmonella* in fruit and vegetables as a result of several international *Salmonella* outbreaks caused by these types of foodstuffs e.g. lettuce, tomatoes and basil, imported from countries outside the EU. This initiated an increased number of investigations of fruit and vegetables in 2007, which however have lowered again in 2008. This is probably due to the fact that *Salmonella* was only detected in very few instances in fruit and vegetables and generally at very low levels from these types of products. Furthermore, direct monitoring of pathogen, e.g. *Salmonella,* seems to be a very cost-ineffective way to ensure food safety in fruit and vegetables and underlines the importance of HACCP and Good Production Practises to ensure food safety of this product group.

In comparison to the distribution in human cases, serovar and phage type distribution in foodstuffs and food producing animals can provide initial information as to the significance of different sources of human infections. Only limited proportions of serovars (and phage types) are reported as part of routine surveillance and therefore only weak conclusions can be drawn. However, recently, several harmonised baseline surveys have been conducted in different populations of food production animals, and together with data reported in the annual zoonoses report, it will constitute the basis for a source attribution analysis of human salmonellosis, which is being prepared by EFSA.

S. Enteritidis was still the most frequent cause of human salmonellosis at Community level but the relative importance of *S.* Typhimurium was underpinned in 2008 due to an increased number of human cases in several MSs. This increase relates partly to continuous outbreaks, particularly a very large outbreak of *S* Typhimurium U292 in Denmark. An unusual feature in this outbreak is that the cases of *S.* Typhimurium U292 have almost entirely been detected in Denmark. *S.* Typhimurium was the most frequently isolated serovar in pigs (and cattle) and products thereof and was also among the top three serovars isolated from broilers and table eggs. In most MSs, *S.* Enteritidis was also the most frequently isolated serovar from poultry meat and especially in table eggs, whereas it is less commonly found from pigs and cattle and products thereof. *S*. Derby is common in turkey and pig production and, to some extent, in the cattle production. *S.* Derby took the seventh place in the top ten list of most commonly reported serovars in humans, presenting an increase of 33% in comparison to the previous year.

Some serovars are particularly frequent in certain countries e.g. a high proportion of *S.* Infantis positive flocks of *Gallus gallus* in Hungary (68.5%) which is also reflected in broiler meat (95.7%) whereas the most frequently occurring serovar in flocks of *Gallus gallus* in the Netherlands was *S.* Paratyphi B var. Java (57.1%). In humans, *S.* Infantis was the third most commonly reported serovar as in previous years. In Hungary, however, the high prevalence of *S.* Infantis in poultry flocks was not reflected as an unusual increase in reported human cases.

Some single serovars may be seen as animal species-indicators. *S.* Enteritidis is, as mentioned above, closely related to poultry, whereas *S*. Dublin is almost exclusively related to cattle production. Human cases caused by *S.* Dublin constitute less than 0.1% even though this serovar is known to be highly pathogenic.

In addition to source attribution based on sero- and phage typing, information from the outbreak investigation can contribute to the understanding of the attribution of human cases of salmonellosis to different food sources. In 91.6% of the 490 verified outbreaks due to *Salmonella*, detailed information on implicated foodstuffs was provided. The most common single foodstuff category reported was eggs and egg products, responsible for 40.8% of the outbreaks (primarily *S.* Enteritidis outbreaks), while pig meat was reported as the implicated foodstuff in 7.1% of the outbreaks (primarily *S.* Typhimurium outbreaks). Bakery products (all due to *S.* Enteritidis), mixed meals or buffet meals and broiler meat (primarily *S.* Enteritidis) were the source in 13.5%, 6.3% and 3.9% of the verified outbreaks, respectively. This data is generally in line with the observations made from the serovar distributions.

3.1 *SALMONELLA*

3.1.7 Discussion

In 2008, salmonellosis was again the second most often reported zoonotic disease in humans in the EU, following campylobacteriosis. The notification rate of salmonellosis cases is decreasing, which is demonstrated by the statistically significant trend observed since 2004 at EU level. From 2007 to 2008, a substantial decrease in the reported *S.* Enteritidis cases in humans was noted, whereas simultaneously, an increase in the cases caused by *S.* Typhimurium was observed.

MSs are obliged to implement *Salmonella* control programmes for the most common serovars reported in human cases in poultry flocks. For the breeding flocks of fowl (*Gallus gallus),* 2008 was the second year of implementation of the intensified programmes and for laying hen flocks, 2008 was the first year of mandatory implementation of the control programme.

During the first year of implementation of control programmes for laying hens, already 19 MSs have met their relative *Salmonella* reduction targets set for the year. Only three MSs exceeded their target level. The MS specific targets are based on the MS prevalence reported in a baseline survey on the prevalence of *Salmonella* in laying hen flocks carried out in 2004-2005. In breeding flocks, MSs have to meet the Community target of ≤1% of flocks infected with the five target serovars by end 2009. Promisingly in 2008, already 20 MSs reported a prevalence lower than this target. In addition, six MSs reported prevalence only slightly above the 1% target, and all MSs except one, that reported high levels of infection in 2007, have had substantial improvements in 2008.

The data for 2008 suggests that the new *Salmonella* control programmes in poultry have had a positive impact on public health by reducing the number of human salmonellosis cases, particularly cases caused by the *S.* Enteritidis serovar. The reduction of *Salmonella* prevalence in laying hen flocks and the decrease in human reported cases in 2008 was particularly observed in the Czech Republic, Slovakia, and Germany.

As in previous years, eggs and egg products as well as products, containing raw eggs, continued to be the most important food vehicle in food-borne *Salmonella* outbreaks in 2008. This underlines the importance of strict control programmes in laying hens and their breeding flocks.

Comparing the results from the two mandatory control programmes, MSs found, in general, a higher proportion of *Salmonella* spp. in laying hen flocks than in breeding flocks. This is likely to be because of tighter bio-security measures at breeding flock level and due to the fact that *Salmonella* control programmes in breeding flocks have been mandatory since 1998.

The results from the control programmes in breeding and laying hen flocks are promising and encourage considering broadening the intensified control efforts further to other animal populations, such as breeding and slaughter pigs.

Community targets for the reduction of *Salmonella* in broiler and in turkey flocks have been laid down in the Community legislation in 2007 and 2008 and the first year of implementation of mandatory control programmes by MSs in these animal populations is 2009 and 2010, respectively. The *Salmonella* reduction targets for breeding and slaughter pigs are foreseen to be set up in the coming years.

In foodstuffs, *Salmonella* was mainly reported from fresh poultry meat and products thereof followed by fresh pig meat in 2008. Furthermore, substantial numbers of other foodstuffs were tested by MSs, and *Salmonella* was very rarely found in these products. This includes different types of fruit and vegetables where *Salmonella* was reported in few investigations, mostly from herbs and spices and sprouted seeds.

When comparing the reported results regarding the compliance with the Community *Salmonella* microbiological criteria, the food categories most often exceeding the criteria were minced meat and meat preparations. In the case of egg products, more non-compliance was reported in 2008 compared to the two previous years; 2.8% in 2008, and 0.4% and 0.2% in 2007 and 2006, respectively. This may be linked to the implementation of the *Salmonella* control programmes in laying hens, which might have implied that more eggs from *Salmonella* positive flocks were channelled to the production of egg products. In all other food categories covered by the *Salmonella* criteria, exceeding the criteria, was rarely detected and this was comparable to previous years.

3.1 *SALMONELLA*

In the reported food-borne *Salmonella* outbreaks in 2008, pig meat was the reported vehicle in more outbreaks than broiler meat; in 7.1% and 3.9% of the verified outbreaks, respectively. Particularly, pig meat and products thereof, were important suspected food sources in *S*. Typhimurium outbreaks. These results suggest that pig meat contaminated with *S.* Typhimurium may have contributed to the significant increase of *S.* Typhimurium cases in human observed in 2008.

3.2 *CAMPYLOBACTER*

Campylobacteriosis in humans is caused by thermotolerant *Campylobacter* spp. The infective dose of these bacteria is generally low. The species most commonly associated with human infection are *C. jejuni* followed by *C. coli*, and *C. lari*, but other *Campylobacter* species are also known to cause human infection.

The incubation period in humans averages from two to five days. Patients may experience mild to severe symptoms, with common clinical symptoms including watery, sometimes bloody diarrhoea, abdominal pain, fever, headache and nausea. Usually, infections are self-limiting and last only a few days. Infrequently, extra-intestinal infections or post-infection complications such as reactive arthritis and neurological disorders occur. *C. jejuni* has become the most recognised antecedent cause of Guillain-Barré syndrome, a polio-like form of paralysis that can result in respiratory and severe neurological dysfunction and even death.

Thermotolerant *Campylobacter* spp. are widespread in nature. The principal reservoirs are the alimentary tracts of wild and domesticated birds and mammals. They are prevalent in food animals such as poultry, cattle, pigs and sheep; in pets, including cats and dogs; in wild birds and in environmental water sources. Animals, however, rarely succumb to disease caused by these organisms.

The bacteria can readily contaminate various foodstuffs, including meat, raw milk and dairy products, and less frequently fish and fishery products, mussels and fresh vegetables. Among sporadic human cases, contact with live poultry, consumption of poultry meat, drinking water from untreated water sources, and contact with pets and other animals have been identified as the major sources of infection. Raw milk and contaminated drinking water have been causes of larger outbreaks.

Table CA1 presents the countries reporting data for 2008.

Table CA1. Overview of countries reporting data for* Campylobacter*, 2008

Data	Total number of MSs reporting	Countries
Human	25	**All MSs** except GR, PT
		Non-MSs: CH, IS, LI, NO
Food	24	**All MSs** except BG, CY, GR
		Non-MSs: CH, NO
Animal	25	**All MSs** except BE, CY
		Non-MSs: CH, NO
Species	25	**All MSs** except BG, CY
		Non-MSs: CH, NO

Note: In the food and animal chapters, only countries reporting 25 samples or more have been included for analyses.

In the following chapters thermotolerant *Campylobacter* spp. will be referred to as *Campylobacter*.

3.2 *CAMPYLOBACTER*

3.2.1 Campylobacteriosis in humans

In 2008, *Campylobacter* continued to be the most commonly reported gastrointestinal bacterial pathogen in humans in the EU, as in the previous four years (Table CA2). The number of reported confirmed human campylobacteriosis cases in the EU decreased 5.0% in 2008 compared to 2007. The reduction in confirmed reported cases of campylobacteriosis was accompanied by a decrease in the overall EU notification rate from 45.2 per 100,000 population in 2007 to 40.7 per 100,000 population in 2008.

Overall, 13 MSs reported a decrease in the number of confirmed campylobacteriosis cases. This reduction was notable in the Czech Republic where the notification rate decreased from 234.6 per 100,000 population in 2007 to 193.3 per 100,000 population in 2008. Germany and the United Kingdom also reported a marked decrease in the number of human cases in 2008 compared to 2007. These three countries accounted for 65.0% of the reduction.

However, there was an increase in the number of confirmed cases in 11 MSs and four EEA countries compared with 2007. Sweden, Finland, and France had the highest increase in numbers resulting in increases of notification rates from 78.0 to 83.8 per 100,000, 77.8 to 84.0 per 100,000 and 4.8 to 5.4 per 100,000 respectively (Table CA2). Moreover, Romania reported *Campylobacter* cases for the first time as a surveillance system for *Campylobacter* did not exist previously in this country.

Figure CA1 illustrates the geographical distribution of the reported notification rates in the EU. The variation in the notification rates of campylobacteriosis cases among reporting MSs is large and the different sensitivities of the reporting systems and microbiological methods employed by MSs may have influenced these figures; consequently comparison between countries should be carried out with caution. Comparison between years within a country is generally more valid.

No statistically significant EU trend was observed in the notification rates of reported cases of human campylobacteriosis between 2004 and 2008 (Figure CA2a). Altogether, 17 MSs reported consistently during this five-year period and were thus included in the analysis. Statistically significant and increasing trends in campylobacteriosis notification rates were observed in Germany, Finland, France, Poland, Slovakia, Sweden and the United Kingdom, while a statistically significant and decreasing trend was observed in Belgium, the Czech Republic, Hungary, the Netherlands and Spain from 2004 to 2008 (Figure CA2b).

3.2 CAMPYLOBACTER

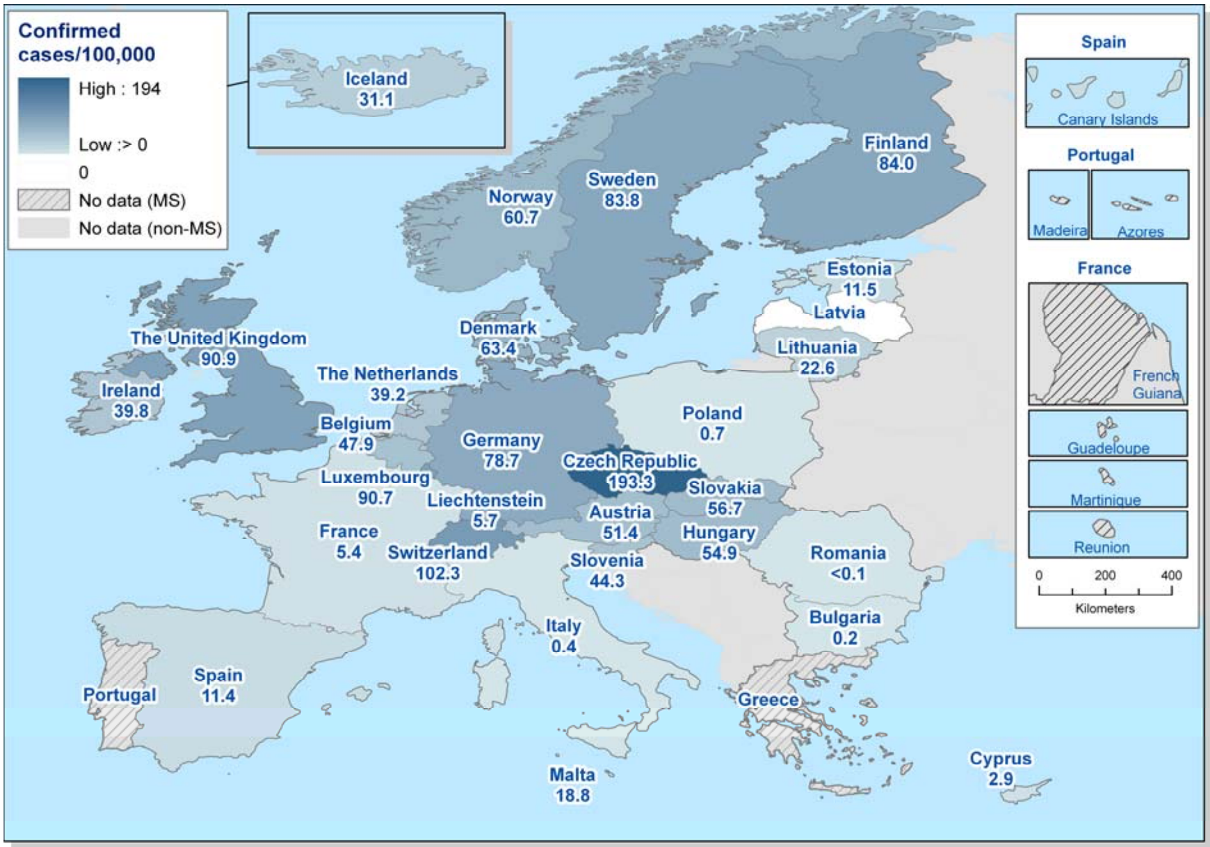
Table CA2. Reported campylobacteriosis cases in humans 2004-2008[1] and notification rates for 2008

Country	2008				2007	2006	2005	2004
	Report Type[2]	Cases	Confirmed Cases	Confirmed cases/100,000	Confirmed cases			Cases
Austria	C	4,301	4,280	51.4	5,821	5,020	5,065	5,365
Belgium	C	5,111	5,111	47.9	5,906	5,771	6,879	6,716
Bulgaria[3]	A	19	19	0.2	38	0		
Cyprus	C	23	23	2.9	17	2		
Czech Republic	C	20,174	20,067	193.3	24,137	22,571	30,268	25,492
Denmark	C	3,470	3,470	63.4	3,868	3,239	3,677	3,724
Estonia	C	154	154	11.5	114	124	124	124
Finland	C	4,453	4,453	84.0	4,107	3,439	4,002	3,583
France	C	3,424	3,424	5.4	3,058	2,675	2,049	2,127
Germany	C	64,731	64,731	78.7	66,107	52,035	62,114	55,796
Greece	–[4]	–	–	–	–			392
Hungary	C	5,563	5,516	54.9	5,809	6,807	8,288	9,087
Ireland	C	1,752	1,752	39.8	1,885	1,810	1,801	1,710
Italy	C	265	265	0.4	676			
Latvia	C	0	0	0.0	0	0	0	0
Lithuania	C	762	762	22.6	564	624	694	797
Luxembourg	C	439	439	90.7	345	285	194	
Malta	C	77	77	18.8	91	54	91	
Netherlands[5]	C	3,341	3,341	39.2	3,289	3,186	3,761	3,273
Poland	C	257	257	0.7	192	156	47	24
Portugal	–[4]	–	–	–	–			
Romania[3]	C	2	2	<0.1	–			
Slovakia	C	3,143	3,064	56.7	3,380	2,718	2,204	1,691
Slovenia	C	898	898	4.3	1,127	944		1,063
Spain	C	5,160	5,160	11.4	5,055	5,889	5,513	5,958
Sweden	C	7,692	7,692	83.8	7,106	6,078	5,969	6,169
United Kingdom	C	55,609	55,609	90.9	57,815	52,134	52,686	50,388
EU Total		**190,820**	**190,566**	**40.7**	**200,507**	**175,561**	**195,426**	**183,479**
Iceland	C	98	98	31.1	93	117	128	
Liechtenstein	C	8	2	5.7	0	10		
Norway	C	2,875	2,875	60.7	2,836	2,588	2,631	
Switzerland	C	7,877	7,877	102.3	6,038	5,429	5,259	5,584

1. Number of confirmed cases for 2005-2008 and number of total cases for 2004.
2. A: aggregated data report; C: case based report; —: No report.
3. EU membership began in 2007.
4. No surveillance system exists.
5. Sentinel system; notification rates calculated on estimated coverage, 52%.

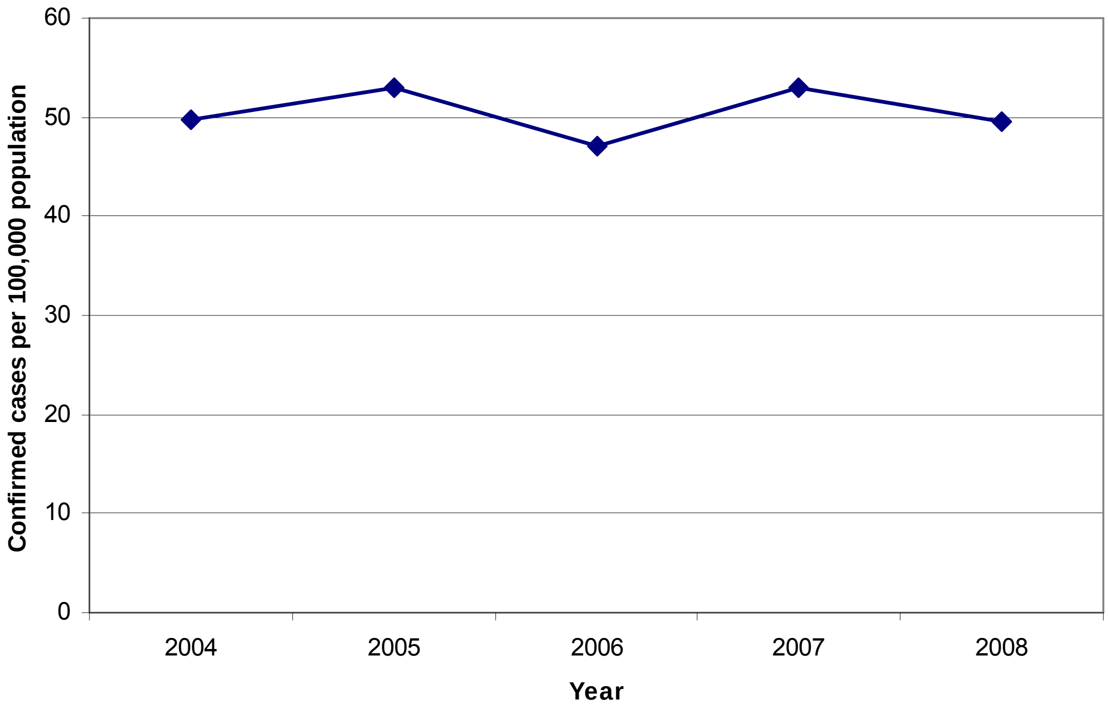
3.2 *CAMPYLOBACTER*

Figure CA1. Campylobacteriosis notification rates in humans in the EU (per 100,000 population), 2008



Note: A graduate colour ramp with class interval of 1 was used for the map symbology.

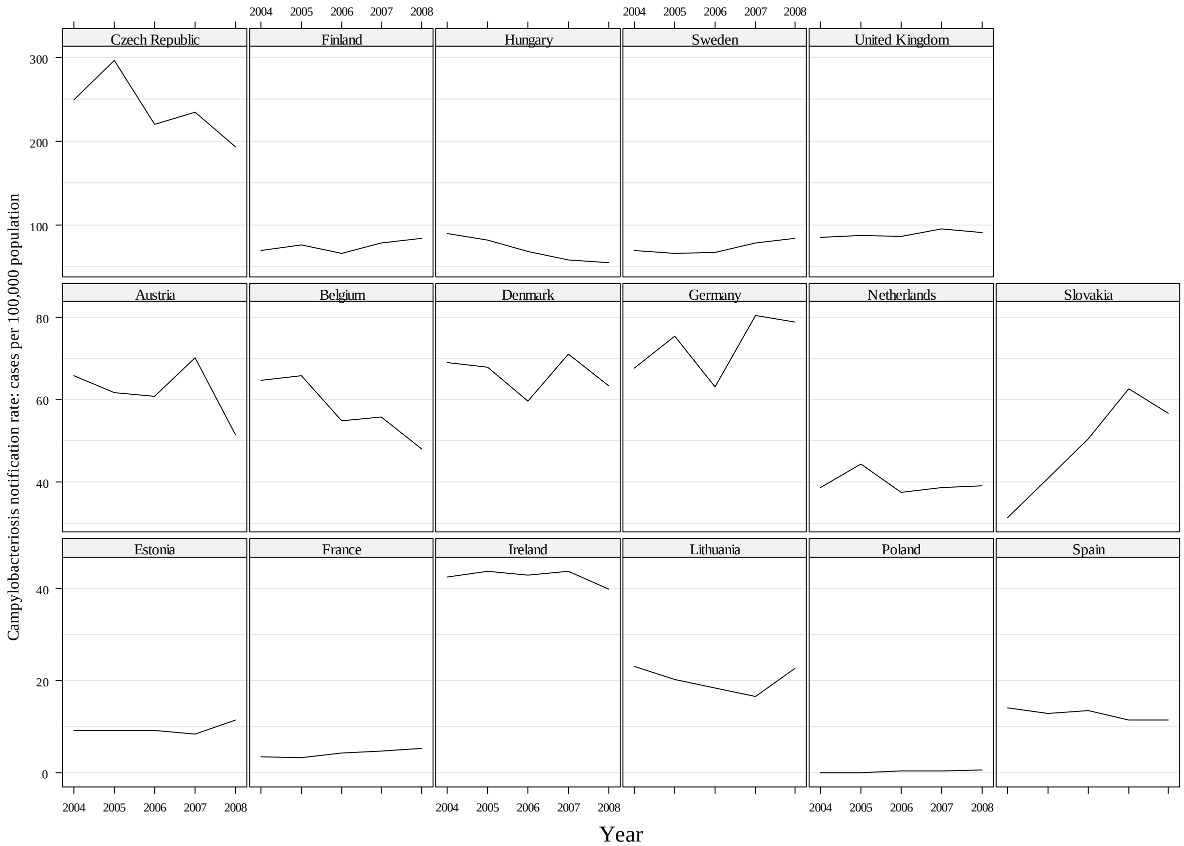
***Figure CA2a. Notification rates of reported confirmed cases of human campylobacteriosis in the EU, 2004-2008*[1]**



Source for EU trend: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Lithuania, Netherlands, Poland, Slovakia, Spain, Sweden, United Kingdom.

1. Includes confirmed cases from 2005-2008 and total cases for 2004.

Figure CA2b. Notification rates of reported confirmed cases of human campylobacteriosis in MSs, 2004-2008[1]



Note: MSs have been ranked according to the maximum value of the notification rate. A unique scale is used for MSs shown in the same row but scales differ among rows.

1. Includes confirmed cases from 2005-2008 and total cases for 2004.

In 2008, a slightly higher proportion of confirmed campylobacteriosis cases in the EU were reported as imported (7.5% in 2008 compared to 6.8% in 2007), but the proportion of domestic cases remained at the same level, 60.7% in 2008 compared with 61.6% in 2007 (Table CA3). The proportion of reported cases of unknown origin remained unchanged (from 31.6% in 2007 to 31.8% in 2008). As in 2007, Sweden, Finland and Norway reported the highest proportions of imported cases (70.4%, 55.7% and 53.8% respectively) while Austria, the Czech Republic, Estonia, Germany, Hungary, Malta, the Netherlands, Poland, Slovakia and Spain reported the majority of confirmed domestically acquired cases. The status of importation was unknown for all or nearly all reported cases of campylobacteriosis in Belgium, Bulgaria, France, Ireland, Italy, Lithuania, Romania, Slovenia and the United Kingdom. However, this may be a reflection of the differences in the reporting systems among MSs.

3.2 CAMPYLOBACTER

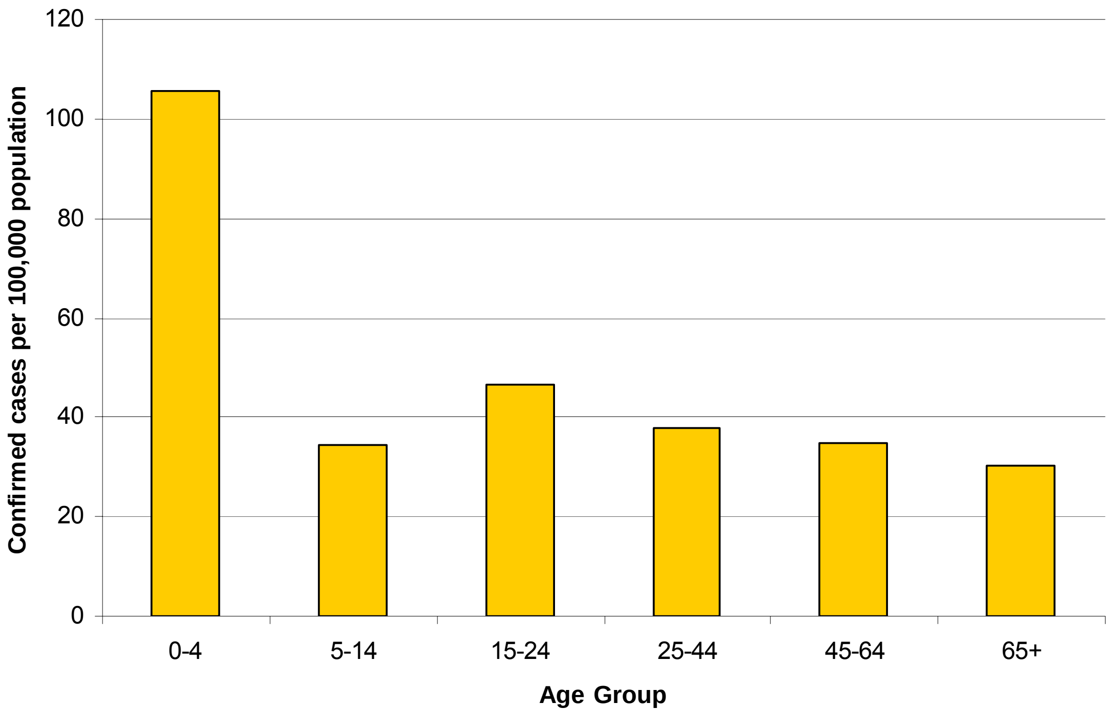
Table CA3. Distribution of confirmed campylobacteriosis cases in humans by reporting countries and origin of case (domestic/imported), 2008

Country	Domestic (%)	Imported (%)	Unknown (%)	Total (n)
Austria	90.8	9.2	0	4,280
Belgium	0	0	100	5,111
Bulgaria	0	0	100	19
Cyprus	39.1	0	60.9	23
Czech Republic	99.0	1.0	0	20,067
Denmark	18.3	16.5	65.3	3,470
Estonia	86.4	13.6	0	154
Finland	16.7	55.7	27.6	4,453
France	23.1	3.7	73.2	3,424
Germany	87.7	6.5	5.8	64,731
Hungary	99.8	0.2	0	5,516
Ireland	16.0	1.0	83.0	1,752
Italy	5.3	3.0	91.7	265
Lithuania	0.0	0	100	762
Luxembourg	25.7	5.2	69.0	439
Malta	100.0	0	0	77
Netherlands	80.5	4.0	15.4	3,341
Poland	97.7	1.2	1.2	257
Romania	0	0	100	2
Slovakia	99.4	0.6	0	3,064
Slovenia	0.2	0	99.8	898
Spain	100.0	0	0	5,160
Sweden	28.6	70.4	0.9	7,692
United Kingdom	24.2	1.3	74.5	55,609
EU Total	**60.7**	**7.5**	**31.8**	**190,566**
Iceland	5.1	4.1	90.8	98
Liechtenstein	0	0	100	2
Norway	39.0	53.8	7.2	2,875

As in 2007, children under the age of five had the highest notification rate in 2008 (105.4 per 100,000 population) although the rate has decreased compared to 2007 (119.7 per 100,000 population). Overall, the notification rates for all age groups decreased compared with 2007. The rates in 2008 ranged from 30.2 per 100,000 population among elderly people over 65 years to 46.5 per 100,000 population in the younger age group of 15-24 years (Figure CA3).

3.2 CAMPYLOBACTER

Figure CA3. Age-specific distribution of the notification rate of reported confirmed cases of human campylobacteriosis per 100,000 population, TESSy data for reporting MSs, 2008

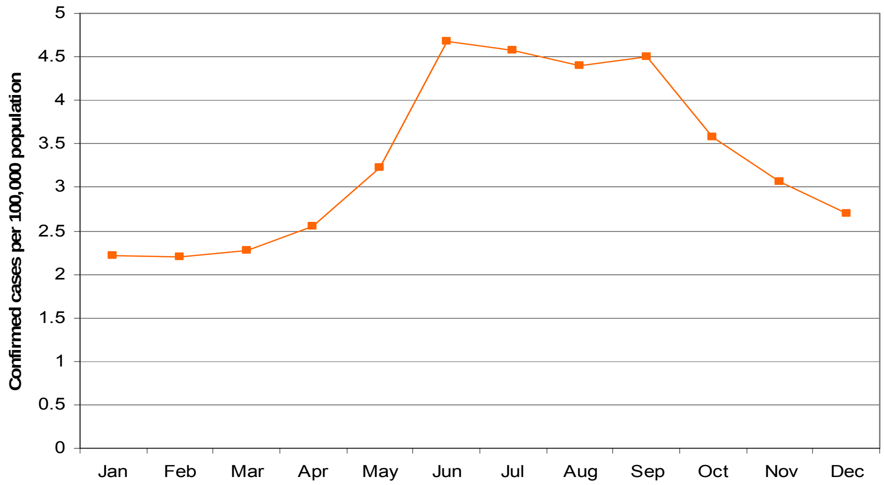


Source: All MSs except Greece, Latvia and Portugal. (N= 189,293).

Highest numbers and notification rates of *Campylobacter* cases in humans were reported during the summer months and early autumn, from June to September (Figure CA4). No remarkable differences were detected in the distribution of confirmed cases occurring per month between northern and southern European countries.

3.2 CAMPYLOBACTER

Figure CA4. Notification rate of reported confirmed campylobacteriosis cases in humans per 100,000 population by month, TESSy data for reporting MSs, 2008



Source: All MSs except Bulgaria, Latvia and Portugal (N=190 547).

The most frequently reported *Campylobacter* species in 2008 was *C. jejuni* (39.5%). However, this was a decrease in the proportion of *C. jejuni* cases compared with 2007 where *C. jejuni* was responsible for 44.3% of cases. *C. coli* accounted for 2.3% of *Campylobacter* cases. The proportion of cases caused by *C.* coli remained almost equal to 2007 with 2.7%. Other species, including *C. lari* (0.26%), accounted for 9.4% of cases. Forty-nine percent of 190,566 confirmed *Campylobacter* cases were not speciated or species were unknown

3.2 CAMPYLOBACTER

3.2.2 *Campylobacter* in food

Several MSs reported data on *Campylobacter* in food in 2008 (Table CA4). The number of samples within food categories tested ranged from a few to several thousand samples. The majority of the samples were from food of animal origin; primarily from poultry meat, which is considered to be one of the major vehicles of *Campylobacter* infections in humans. Compared to 2007, five additional MSs reported data in this category. No data for *Campylobacter* in drinking water was reported in 2008.

Table CA4. Overview of countries reporting data on foodstuffs, 2008

Data	Total number of MSs reporting	Countries
Poultry meat	24	**All MSs except** BG, CY, GR
		Non-MSs: CH, NO
Pig meat	12	**MSs:** AT, BE, CZ, DE, ES, HU, IE, IT, LV, SI, SK, UK
Bovine meat	12	**MSs:** AT, DE, ES, HU, IE, IT, NL, RO, SE, SI, SK, UK

Note: In the following chapter, only countries reporting 25 samples or more have been included for analyses

Sampling and testing methods varied between countries and, as such, the results from the different countries are not directly comparable. Also, it should be taken into consideration that the proportion of positive samples observed may be influenced by the time of year at which the samples were taken, since in many countries *Campylobacter* are known to be more prevalent during the summer than during the winter.

Fresh poultry meat

The occurrence of *Campylobacter* in fresh broiler meat sampled at slaughter, processing and at retail in 2006 to 2008, is summarised in Table CA5. In 2008, as in previous years, the proportions of *Campylobacter* positive broiler meat samples varied widely between MSs (from 3.0% to 86.2%), and six out of ten MSs recorded high or very high levels (>20%) of positive samples.

Compared to 2007, fewer MSs reported data collected at the slaughterhouse in 2008. This may be because of the EU-wide baseline survey on *Campylobacter* in broilers and broiler carcasses carried out in 2008. All MSs were obliged to participate in the survey and due to this, many MSs tested fewer other samples for *Campylobacter* in 2008. The baseline survey data will be analysed and reported in a separate EFSA report.

The data reported in 2008 revealed a large variation in proportions of positive samples at slaughterhouse from 14.7% in Denmark to 86.2% in Spain. In Denmark, a higher proportion of positive samples was reported in 2008 compared to previous years because samples were collected during the high prevalence period. At retail, the proportion of positive poultry meat samples ranged from 8.0% in Austria to 74.6% in Slovenia. The Austrian proportion of 8.0% indicated a decrease compared to 2007 where the proportion of positive samples was 62.6%. Some decrease in the proportion of positive samples was also seen for Denmark, Germany and Spain. All other reporting countries reported an increase in the proportion of positive samples at retail.

Belgium, Denmark, Germany and Spain reported data from two or three stages of the food chain (slaughter, processing or retail). However, only Spain showed a reduced occurrence of *Campylobacter* along the food chain, from 86.2% positive samples at slaughter to 13.3% at retail.

In 2008, five MSs reported data on *Campylobacter* in fresh turkey and poultry meat other than broiler meat sampled at different stages in the production chain (Table CA6). The proportions of positive samples at slaughter were below 10% except in Spain (63.2%). The observed proportions of positive samples in non-broiler poultry meat indicate that poultry in general and not only broiler meat can be an important vehicle for *Campylobacter* infections in humans.

Germany examined turkey meat samples at two stages of the production chain. A small increase in the proportion of positive samples was reported at retail compared to processing (Table CA6).

3.2 CAMPYLOBACTER

Table CA5. Campylobacter *in fresh broiler meat[1], 2006-2008*

Country	Sample unit	Sample weight	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
At slaughter								
Belgium[2]	Single	1g	222	32.0	235	22.6	315	1.9
Denmark[3,4]	Single	10g / 15g	484	14.7	439	8.2	959	7.9
Estonia	Batch	1g	-	-	46	2.2	-	-
France	Batch	10g	-	-	192	86.5	-	-
Hungary	Single	25g	-	-	232	31.9	-	-
Romania	Single	25g	-	-	778	0	-	-
Spain	Single	25g	420	86.2	147	55.8	-	-
At processing plants								
Belgium[2]	Single	1g	523	7.3	257	9.3	326	12.3
Germany	Single	25g	78	33.3	35	40.0	-	-
Ireland	Single	Various	-	-	112	63.4	150	45.3
Latvia	Single	25g	-	-	250	0.8	-	-
Slovenia	Single	$20cm^2$	-	-	295	56.9	336	39.9
Spain	Single	25g	50	58.0	168	29.2	-	-
Norway	Single	25g	-	-	305	9.5	-	-
At retail								
Austria	Single	25g	138	8.0	219	62.6	268	21.6
Belgium[2]	Single	1g	-	-	415	11.1	112	1.8
Denmark[4]	Single	Various	1057	36.6	695	37.6	605	12.4
Estonia	Single	25g	-	-	-	-	50	6.0
Germany	Single	10g	887	36.4	574	40.9	-	-
Italy	Single	25g	-	-	323	11.8	-	-
Latvia[5]	Single	1g	205	9.8	46	4.3	-	-
Luxembourg	Single	10g	122	49.2	182	37.9	44	27.3
Netherlands	Single	25g	1,421	14.1	1,407	10.9	1,302	14.2
Slovenia	Single	25g	315	74.6	343	67.1	100	59.0
Spain	Single	25g	165	13.3	208	30.8	-	-
United Kingdom	Single	25g	-	-	-	-	860	63.0
Sampling stage not stated								
Germany	Single	25g	-	-	-	-	1121	39.0
Italy	Single	Various	26	7.7	-	-	424	19.8
Italy	Batch	Various	66	3.0	-	-	-	-
United Kingdom	Single	25g	-	-	-	-	854	69.7
Switzerland	Single	25g	-	-	202	49.0	-	-
Norway	Single	10g	-	-	-	-	958	0.9
Total (10 MSs in 2008)			**6,179**	**30.1**	**7,598**	**26.0**	**7,826**	**30.4**

Note: Data are only presented for sample size ≥25.

1. Only data specified as fresh or carcass are included. Data on meat products, mechanically separated meat, minced meat, meat preparations and frozen meat are not included.
2. In Belgium in 2007 and 2006, sample weight 0.01g.
3. In Denmark, data include both slaughter and processing.
4. In Denmark, 2008 data are not comparable to previous years as they only represent the high prevalence period.
5. In Latvia in 2007, batch based data.

3.2 CAMPYLOBACTER

Table CA6. Campylobacter in fresh[1], non-broiler poultry meat at slaughter, processing and retail, 2008

Country	Sample level	Sample unit	Sample weight	N	% pos
Turkeys					
Belgium	Slaughter	Single	1g	166	7.8
Germany	Processing	Single	25g	35	8.6
	Retail	Single	25g	384	11.5
Hungary	Slaughter	Single	25g	219	4.6
Slovenia	Retail	Single	25g	69	26.1
Total (turkeys, 4 MSs)				**873**	**10.1**
Other poultry[2]					
Hungary (ducks)	Slaughter	Single	25g	82	1.2
Hungary (geese)	Slaughter	Single	25g	70	1.4
Spain (unspecified)	Slaughter	Single	25g	76	63.2
Total (other poultry, 2 MSs)				**228**	**21.9**

Note: Data are only presented for sample size ≥25.

1. Only data specified as fresh are included. Data on meat products, mechanically separated meat, minced meat, and meat preparations are not included.

2. Slaughter samples are regarded as 'fresh' though not specified.

Fresh pig meat

Data reported by MSs on the occurrence of *Campylobacter* in fresh pig meat sampled at retail for the period 2006 to 2008 are summarised in Table CA7. The data reported in previous years imply that pig meat at retail is only infrequently contaminated with *Campylobacter*, despite few reporting MSs. In 2008, the occurrence of *Campylobacter* in fresh pig meat at retail was very low, except in Spain (6.1%).

In 2008, Germany and Spain reported data from several stages of production. Germany showed a reduced occurrence of *Campylobacter* at retail (0.5%) compared to processing (3.2%). However, Spain reported an increase from 0% at slaughter to 6.1% at retail (Table CA7). At slaughter, Belgium, Hungary and Spain reported positive findings of 16.6% (N=500), 0.5% (N=207) and 0% (N=50) of the samples, respectively. At processing, Germany, Slovenia and Spain found 3.2% (N=31), 1.1% (N=281) and 6.3% (N= 96) positive samples, respectively.

Table CA7. Campylobacter in fresh pig meat[1] at retail[2], 2006-2008

Country	Sample unit	Sample weight	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
Austria	Single	25g	-	-	109	0.9	93	1.1
Germany	Single	25g	212	0.5	123	0.8	290	0.7
Latvia	Single	1g	440	0	-	-	-	-
Netherlands	Single	25g	-	-	269	1.1	397	0.3
Spain	Single	25g	33	6.1	36	0	40	0
United Kingdom	Single	swab	1,693	0.6	-	-	-	-
Total (4 MSs in 2008)			**2,378**	**0.5**	**537**	**0.9**	**820**	**0.5**

Note: Data are only presented for sample size ≥25.

1. Only data specified as fresh are included. Data on meat products, mechanically separated meat, minced meat, and meat preparations are not included.

2. Only data with sampling stage specified as 'retail' are included.

3.2 *CAMPYLOBACTER*

Fresh bovine meat

Three MSs reported findings of *Campylobacter* in fresh bovine meat at retail (Table CA8). This is in contrast to previous years where the majority of MSs reported no or lower levels of findings in bovine meat.

In 2008, no *Campylobacter* positive samples were reported at slaughter by the three reporting MSs. At processing, Romania and Slovenia reported positive findings in none (N=335) and 0.8% (N=265) of samples, respectively.

Table CA8. **Campylobacter** ***in fresh bovine meat[1] at retail[2], 2006-2008***

Country	Sample unit	Sample weight	2008		2007		2006	
			N	% pos	N	% pos	N	% pos
Estonia	Single	25g	-	-	-	-	42	0
Germany	Single	25g	86	4.7	35	0	43	0
Hungary	Single	25g	-	-	-	-	202	2.5
Italy	Single	25g	-	-	334	2.4	241	0.4
Luxembourg	Single	10g	-	-	62	0	37	0
Netherlands	Single	25g	322	0.9	264	0	936	0.4
Romania	Single	-	-	-	-	-	37	0
United Kingdom	Single	swab	3,249	0.1	-	-	-	-
Total (3 MSs in 2008)			**3,657**	**0.3**	**695**	**1.2**	**1,538**	**0.7**

Note: Data are only presented for sample size ≥25.

1. Only data specified as fresh are included. Data on meat products, mechanically separated meat, minced meat and meat preparations are not included.

2. Only data with sampling stage specified as 'retail' are included.

Products of meat origin

Data reported on the occurrence of *Campylobacter* in minced meat, meat preparations and meat products are summarised in Table CA9. In 2008, *Campylobacter* was most frequently isolated from products of poultry meat origin compared to products of pig and bovine meat origin.

From RTE products and products intended to be eaten raw, only Germany and Spain reported *Campylobacter* positive samples at very low levels. Presence of *Campylobacter* in cooked products is unlikely to happen unless cross-contamination has occurred. In non-RTE broiler meat products, *Campylobacter* positive findings ranged from 0% for minced meat samples in Slovakia and up to 50.6% of unspecified monitoring samples of broiler meat at retail in Germany. In non-broiler meat types, the occurrence of *Campylobacter* was low (0%-6.4%) (Table CA9).

3.2 *CAMPYLOBACTER*

Table CA9. Campylobacter *in products of meat origin, 2008*

Country	Description	Sample unit	Sample weight	N	% pos
READY-TO-EAT					
Broiler meat					
Germany	Meat products at retail	Single	25g	55	1.8
Ireland	Meat products at retail	Single	25g	162	0
Slovakia	Meat products	Batch	25g	28	0
Total (broiler meat, 3 MSs)				**245**	**0.4**
Turkey meat					
Ireland	Meat products at retail	Single	25g	26	0
Pig meat					
Germany	Minced meat at processing, intended to be eaten raw	Single	25g	26	0
	Minced meat at retail, intended to be eaten raw	Single	25g	31	0
Ireland	Meat products at retail	Single	25g	66	0
United Kingdom	Meat products at retail	Single	25g	1,096	0
Total (pig meat, 3 MSs)				**1,219**	**0**
Bovine meat					
Germany	Minced meat at processing, intended to be eaten raw	Single	25g	30	0
	Minced meat at retail, intended to be eaten raw	Single	25g	34	0
Ireland	Meat products at retail	Single	25g	36	0
Spain	Minced meat at retail, intended to be eaten raw	Single	25g	61	1.6
United Kingdom	Meat products at retail	Single	25g	134	0
Total (bovine meat, 4 MSs)				**295**	**0.3**
NON-READY-TO-EAT or not specified					
Broiler meat					
Germany	Meat preparation at retail, intended to be eaten cooked	Single	25g	60	18.3
	At processing	Single	25g	72	48.6
	At retail	Single	25g	350	50.6
Ireland	Meat products at retail	Single	25g	209	0.5
Slovakia	Minced meat at processing, intended to be eaten cooked	Batch	25g	34	0
Total (broiler meat, 3 MSs)				**725**	**30.9**
Turkey meat					
Germany	Meat preparation at retail, intended to be eaten cooked	Single	25g	47	6.4
Ireland	Meat products at retail	Single	25g	32	0
Total (turkey meat, 2 MSs)				**79**	**3.8**
Pig meat					
Germany	At retail	Single	25g	145	0
Ireland	Meat products at retail, raw but intended to be eaten cooked	Single	25g	90	0
	Meat products at retail	Single	25g	122	0
Italy	Meat preparation	Single	25g	57	0
	Meat products	Single	25g	31	0
Slovakia	Minced meat, intended to be eaten cooked	Batch	10g	30	0
Total (pig meat, 4 MSs)				**475**	**0**
Bovine meat					
Ireland	Meat products at retail	Single	25g	36	0
Netherlands	Meat preparation at retail	Single	25g	57	1.8
	Minced meat at retail	Single	25g	466	0.4
Slovakia	Meat preparation, intended to be eaten cooked	Batch	25g	26	0
Total (bovine meat, 3 MSs)				**585**	**0.5**

Note: Data are only presented for sample size ≥25.

3.2 *CAMPYLOBACTER*

Other foodstuffs

Several MSs tested food categories other than poultry, pig or bovine meat for the presence of *Campylobacter*. The proportion of positive samples in raw cow's milk and dairy products in 2008 is presented in Table CA10. *Campylobacter* was not detected in pasteurised cow's milk, while the occurrence of *Campylobacter* ranged from 0.2% to 4.0% in other cow's milk samples. In milk from other animal species and dairy products made with various types of milk, *Campylobacter* was detected in Slovakia and Italy, where 3.7% of tested cheeses from pasteurised sheep's milk and 1.1% of tested cheeses from unspecified milk, respectively, were *Campylobacter* positive.

Table CA10. **Campylobacter *in milk and dairy products, 2008***

Country	Description	Sample unit	Sample weight	N	% pos
Cow milk					
Austria	Raw milk 'at retail'	Single	25g	25	4.0
	Pasteurised milk	Single	25g	35	0
Germany	Raw milk, 'intended for direct human consumption'	Single	25g	150	1.3
	Raw milk 'at farm', heating for 10 min recommended	Single	25g	130	0.8
	Raw milk for manufacture of raw or low heat-treated products	Single	25g	861	0.2
Hungary	Raw milk	Single	50ml	80	2.5
Italy	Milk	Single	-	4,256	3.1
	Milk	Batch	-	763	0.3
Total (cow's milk, 4 MSs)				**6,300**	**2.3**
Other milk					
Italy	Milk unspecified	Single	-	401	0
	Milk goats	Single	-	58	0
Dairy products					
Austria	Dairy products unspecified (excluding cheeses)	Single	25g	26	0
Italy	Cheese from cow's milk	Single	-	71	0
	Cheese from sheep's milk	Single	-	69	0
	Cheese from unspecified milk	Single	-	376	1.1
Slovakia	Cheese from pasteurised sheep milk	Batch	25g	107	3.7
	Dairy products unspecified (excluding cheeses)	Single	25g	36	0
Total (dairy products, 3 MSs)				**685**	**1.2**

Note: Data are only presented for sample size ≥25.

For additional data on other food categories, refer to Level 3 tables.

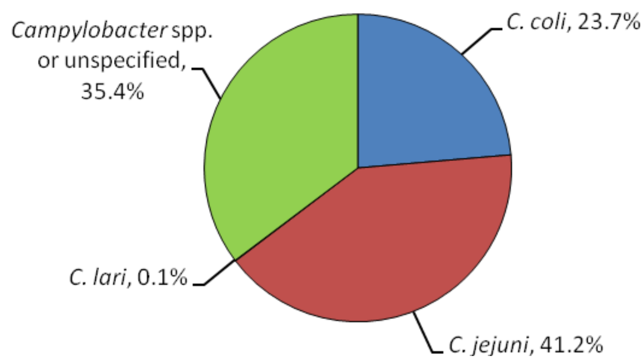
Campylobacter species in fresh broiler meat

The overall *Campylobacter* species distribution in fresh broiler meat at Community level is presented in Figure CA5. *C. jejuni* accounted for approximately twice as many isolates as *C. coli.* Unfortunately, a high proportion of the *Campylobacter* isolates was reported only as *Campylobacter* spp.; only seven of 13 MSs reporting data on *Campylobacter* in broiler meat provided information at species level. Four MSs reported *C. jejuni* as the predominant species (more than 70% of isolates) in fresh broiler meat, while *C. coli* was reported as the predominant species (more than 54%) in three MSs. Slovenia found *C. lari* in fresh broiler meat (1 of 233 speciated isolates).

For information on data reported on other foodstuffs refer to Level 3 tables.

3.2 *CAMPYLOBACTER*

Figure CA5. Species distribution of* Campylobacter *isolates from fresh broiler meat, 2008



Source: Includes data from 13 MSs (Austria, Belgium, Czech Republic, Germany, Denmark, Spain, Ireland, Italy, Latvia, Luxembourg, Netherlands, Slovakia and Slovenia), N=5,183.

Note: Some of the isolates might be positive with more than one species.

3.2 *CAMPYLOBACTER*

3.2.3 *Campylobacter* in animals

In 2008, 24 MSs and two non-MSs reported data on *Campylobacter* in animals (Table CA11); primarily from broiler flocks, but also in pigs, cattle and to some extent in goats, sheep and pets.

Table CA11. Overview of countries reporting animal data, 2008

Data	Total number of MSs reporting	Countries
Poultry	22	**All MSs** except BE, BG, CY, GR, UK
		Non-MSs: CH, NO
Pigs	9	**MSs:** AT, DE, DK, ES, HU, IE, IT, LV, SK
		Non-MS: CH
Cattle	13	**MSs:** AT, BG, DE, DK, ES, HU, IE, IT, LV, NL, SI, SK, UK
		Non-MSs: CH, NO

Note: In the following chapter, only countries reporting 25 samples or more have been included for analyses.

It should be noted that results are not directly comparable between countries due to differences in sampling and testing schemes, as well as to the impact of the season of sampling.

Broilers and other poultry

In 2008, seven MSs and one non-MS provided information on the prevalence of *Campylobacter* in broiler flocks. In five MSs (Table CA12), the recorded prevalence was high or very high (>25%), whereas low levels (<7%) were observed in Finland and Norway. The results from the EU wide baseline survey on *Campylobacter* in broilers that was carried out in 2008 is not included in Table CA12.

Generally, reported data for 2008 was similar to the reports from previous years. However, Germany reported lower prevalence than in 2007, and the Czech Republic reported higher prevalence than in 2007 and 2006.

Campylobacter investigations in turkeys were reported by the Netherlands and Slovenia. The Netherlands reported no positive samples (N=63), and Slovenia found *Campylobacter* in 67.8% of caecum samples (N=87) and in 46.6% of neck skin samples (N=88).

3.2 CAMPYLOBACTER

Table CA12. Campylobacter in broiler flocks[1], 2006-2008

Country	2008		2007		2006	
	N	% pos	N	% pos	N	% pos
Austria	-	-	80	60.0	550	52.2
Czech Republic[2]	422	61.1	246	45.1	189	48.7
Denmark	4,912	25.9	4,527	26.8	4,595	29.9
Estonia	-	-	46	0	224	0
Finland[2]	1,276	6.5	1,538	6.6	1,456	5.4
France	-	-	192	80.2	202	81.7
Germany	345	32.2	111	78.4	365	22.5
Hungary	-	-	-	-	499	10.0
Ireland[3]	-	-	-	-	192	0
Italy	-	-	116	82.8	96	37.5
Italy (Veneto region)	-	-	-	-	155	83.2
Latvia	-	-	265	37.0	70	47.1
Latvia[3]	-	-	75	34.7	62	43.5
Lithuania	374	42.0	-	-	1,337	0.3
Lithuania[3]	-	-	-	-	840	1.2
Poland[2]	420	79.0	-	-	-	-
Slovenia	-	-	372	75.3	311	72.3
Spain	-	-	89	46.1	98	50.0
Sweden	2,398	12.4	2,603	12.6	2,572	13.8
Total (7 MSs in 2008)	**10,147**	**24.7**	**10,260**	**25.2**	**13,813**	**21.7**
Norway	-	-	4,268	5.2	4,035	4.2
Norway[3]	4,675	4.1	4,109	4.4	3,878	4.2
Switzerland	-	-	320	43.4	320	4.1

Note: Data are only presented for sample size ≥25. Clinical investigations not included.

1. Flock based sampling at slaughterhouse if nothing else stated.

2. Batch based data: Czech Republic (2008), Finland (2008) and Poland (2008).

3. At farm. For Norway, maximum four days before slaughter.

3.2 *CAMPYLOBACTER*

Pigs

In 2008, six MSs reported on *Campylobacter* in pigs (clinical investigations not included). The proportion of *Campylobacter* positive samples ranged between 7.7% and 67.8% (Table CA13). The proportion of positive samples decreased markedly in Slovakia from 19.6% in 2007 to 7.7% in 2008, respectively. In Germany, the reported *Campylobacter* prevalence in pigs increased from 29.5% in 2006 to 37.3% in 2008.

Table CA13.* Campylobacter *in pigs and pig herds, 2006-2008

Country	2008		2007		2006	
	N	% pos	N	% pos	N	% pos
Pigs (animal-based data)						
Austria	286	50.0	-	-	-	-
Germany	-	-	-	-	559	19.7
Hungary	225	23.6	-	-	-	-
Luxembourg	-	-	-	-	64	35.9
Slovakia	156	7.7	148	19.6	-	-
Total (animal-based, 3 MSs in 2008)	**667**	**31.2**	**148**	**19.6**	**623**	**21.3**
Pigs (herd-based data)						
Denmark	292.0	67.8	261.0	78.5	295.0	52.2
France	-	-	192.0	64.1	204.0	67.6
Germany	209.0	37.3	224.0	29.5	-	-
Hungary	-	-	-	-	505.0	8.1
Ireland	-	-	-	-	216.0	0.9
Italy	-	-	47.0	66.0	199.0	55.8
Slovakia	-	-	-	-	39.0	56.4
Spain[1]	171	65.5	230	71.3	195	73.8
Total (herd-based, 3 MSs in 2008)	**672**	**57.7**	**954**	**61.7**	**1,653**	**37.0**

Note: Data are only presented for sample size ≥25. Clinical investigations not included.

1. In Spain, slaughter batch based data.

3.2 *CAMPYLOBACTER*

Cattle

Ten MSs and one non-MS provided data on cattle in 2008 (clinical investigations not included). The data on *Campylobacter* findings in cattle populations for the years 2006-2008 are summarised in Table CA14. As in 2007, the proportion of positive samples was below 25% in the majority of the reporting MSs. Higher prevalences of 61.3% and 37.5% were reported in Denmark and Spain, respectively, although this was still a decrease compared to 2007. In general, higher proportions of positive samples were reported for calves less than one year of age compared to dairy cattle.

Table CA14. Campylobacter in cattle and cattle herds, 2006-2008

Country	Description	2008		2007		2006	
		N	% pos	N	% pos	N	% pos
Cattle (animal-based data)							
Austria[1]	Dairy cows	923	28.5	569	20.2	823	14.2
	Calves < 1 year	-	-	-	-	83	24.1
	Meat production animals	-	-	326	34.4	423	28.6
Bulgaria	Dairy cows	218	0	-	-	-	-
Hungary	Dairy cows	234	9.4	5,011	0	456	6.8
Ireland	Unspecified	-	-	-	-	2,048	0.1
	Calves < 1 year	2,549	11.9	1,869	11.1	3,756	6.3
Italy	Dairy cows	-	-	-	-	1,621	0.9
Italy[2]	Unspecified	2,147	1.6	-	-	680	0.6
Luxembourg	Unspecified	-	-	166	13.9	183	20.2
Netherlands	Unspecified	-	-	3,005	0.7	22,532	0
Slovakia	Unspecified	508	6.1	635	0.2	-	-
Slovenia	Unspecified	385	7.8	-	-	-	-
Total (animal-based, 7 MSs in 2008)		**6,964**	**9.8**	**11,581**	**4.1**	**32,605**	**1.8**
Norway	-	-	-	53	30.2	41	36.6
Switzerland	Meat production animals	100	10.0	-	-	-	-
Cattle (herd-based data)							
Denmark	Cattle > 2 years	168	61.3	132	70.5	224	44.2
Germany	Cattle (all)	788	6.7	503	10.7	697	9.8
	Calves < 1 year	206	9.7	70	22.9	128	5.5
	Dairy cows	184	0	57	0	153	-
Italy	Unspecified	-	-	33	6.1	155	15.5
Italy[2] (Veneto Region)	Unspecified	-	-	-	-	67	14.9
Lithuania	Dairy cows	-	-	-	-	461	0
Slovakia	Unspecified	-	-	-	-	434	0.7
Spain[3]	Calves < 1 year	168	37.5	163	46.0	-	-
Total (herd-based, 3 MSs in 2008)		**1,514**	**15.8**	**958**	**25.1**	**2,319**	**9.1**

Note: Data are only presented for sample size ≥25. Clinical investigations not included.

1. In Austria in 2008, cattle unspecified.

2. In Veneto region in 2006, slaughter batch based data.

3. In Spain, slaughter batch based data; in 2007, meat production animals.

3.2 *CAMPYLOBACTER*

Other farm animals

In 2008, five MSs reported *Campylobacter* investigations in goats and sheep (clinical investigations not included, Table CA15). In goats, *Campylobacter* was detected only in clinical samples at low levels by the Netherlands (3.8%). In sheep, the proportion of positive samples ranged from 0% to 13.2%.

Germany, Italy and the Netherlands provided information on *Campylobacter* in horses; all samples were negative. In Switzerland, one of 42 domestic solipeds was *Campylobacter* positive.

Table CA15.* Campylobacter *in goats and sheep, 2007-2008

Country	Sample unit	2008		2007	
		N	% pos	N	% pos
Goats					
Germany	Herd	25	0	-	-
Italy	Animal	-	-	44	0
	Holding	-	-	79	0
Netherlands	Animal	-	-	315	0
Sheep					
Germany	Herd	72	0	62	6.5
Ireland	Animal	17 8	3.4	-	-
Italy	Animal	38	13.2	152	0.7
	Holding	-	-	190	1.6
	Herd	-	-	25	0
Netherlands	Animal	-	-	782	2.8
Slovakia	Animal	69	2.9	-	-

Note: Data are only presented for sample size ≥25. Clinical investigations not included.

3.2 CAMPYLOBACTER

Pets

In 2008, 1,656 cats and dogs were tested for *Campylobacter* mostly from clinical investigations. All countries providing information on *Campylobacter* in cats and dogs reported between 1.2% and 28.9% positive samples (Table CA16). In 2008, Italy, Latvia, the Netherlands, Norway and Switzerland reported results from dogs to be based on diagnostic sampling.

Table CA16.* Campylobacter *in pets, 2006-2008

Country	2008		2007		2006	
	N	% pos	N	% pos	N	% pos
Cats						
Germany	251	2.0	227	7.0	218	1.4
Italy[1]	-	-	286	5.2	35	8.6
Netherlands[2]	214	8.9	225	8.9	226	2.2
Slovakia	25	8.0	-	-	-	-
Total (cats, 3 MSs in 2008)	**490**	**5.3**	**738**	**6.9**	**479**	**2.3**
Norway[2]	85	7.1	34	11.8	-	-
Switzerland[2]	929	1.2	-	-	-	-
Dogs						
Denmark[2]	-	-	-	-	28	46.4
Germany	491	5.9	677	5.5	430	7.0
Ireland[2]	33	27.3	48	14.6	447	0.2
Italy[3]	61	11.5	179	25.1	274	6.6
Latvia[2]	26	3.8	-	-	-	-
Netherlands[2]	418	15.8	376	19.9	71	69.0
Slovakia	137	10.9	55	7.3	56	8.9
Total (dogs, 6 MSs in 2008)	**1,166**	**10.9**	**1,335**	**12.6**	**1,306**	**8.9**
Norway[2]	287	28.9	115	23.5	103	19.4
Switzerland[2]	1,366	3.4	-	-	-	-

Note: Data are only presented for sample size ≥25. Clinical investigations included.

1. In Italy in 2007, sampling unit is holding not single samples.
2. Clinical investigations: Denmark (2006), Ireland (2007), Latvia (2008), the Netherlands (2008), Norway (2006-2008) and Switzerland (2008).
3. In Italy in 2008, clinical investigations and surveillance.

3.2 *CAMPYLOBACTER*

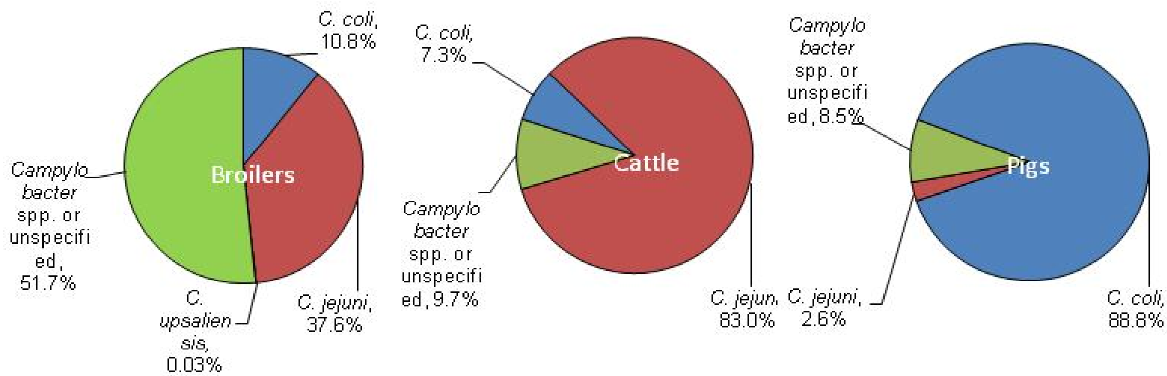
Campylobacter species in animals

Among animal samples tested positive for *Campylobacter*, only about half of the isolates from broilers were speciated (51.7%), while speciation was more common for isolates from pigs (91.5%) and cattle (90.3%). Nevertheless, reported data indicate that *C. jejuni* was the most commonly isolated species in broilers (37.6%) and cattle (83.0%), while the vast majority of isolates from pigs was *C. coli* (88.8%) (Figure CA6). *C. upsaliensis* was reported in one broiler isolate.

In pet cats and dogs, the reported *Campylobacter* species were *C. jejuni*, *C. coli*, and *C. upsaliensis*.

For additional information on speciation of animal isolates, please see Level 3 tables.

Figure CA6. Species distribution of positive samples isolated from broilers, cattle and pigs, 2008



Source:

Broilers: Include data from 12 MSs (Czech Republic, Denmark, Finland, Germany, Hungary, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Poland, Sweden) and one non-Ms (Norway), N = 16,845

Cattle: Include data from 12 MSs (Austria, Bulgaria, Denmark, Germany, Hungary, Ireland, Italy, Latvia, Netherlands, Slovakia, Slovenia, Spain) and two non-MSs (Norway, Switzerland), N =12,068

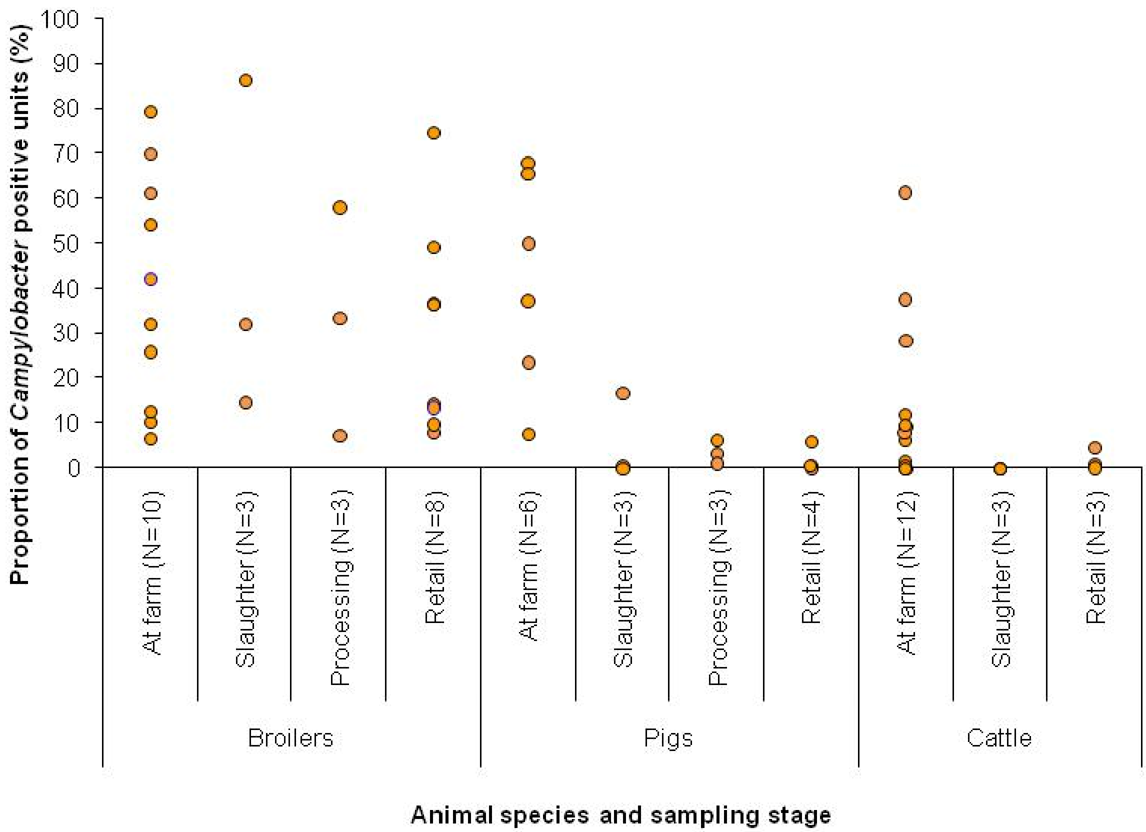
Pigs: Include data from 9 MSs (Austria, Denmark, Germany, Hungary, Ireland, Italy, Latvia, Slovakia, Spain) and one non-MS (Switzerland), N = 1,421

Note: Clinical investigations included.

3.2.4 Overview of *Campylobacter* from farm-to-fork

A general overview of *Campylobacter* data reported by MSs in 2008 from broilers, pigs, bovine animals, and food thereof is presented in Figure CA7. As in previous years, data indicate that the proportion of positive samples is much higher in pig and cattle populations compared to samples of fresh pig and bovine meat at processing and retail. However, the prevalence of *Campylobacter* in broilers does not decrease notably from live animals along the food chain to retail; although this is based on relatively few reporting MSs. Findings are similar to those of 2007. This suggests that pig and bovine carcasses are less contaminated with faecal material during slaughter and/or that *Campylobacter* are not able to survive well on pig and bovine meat during slaughtering and processing operations. MS *Campylobacter* observations are distributed quite evenly between the maximum and minimum observations within the different categories indicating substantial variations within the Community. The observed variation may be due to several reasons; e.g. a true variation between MSs, differences in sampling and testing protocols or seasonal variation in the occurrence of *Campylobacter*.

Figure CA7. Proportions of* Campylobacter *positive samples, by animal species and foodstuff category within the EU, 2008. Each point represents a MS observation



Note: Data are only presented for sample size ≥25.

3.2.5 Discussion

Campylobacteriosis has been the most commonly reported zoonosis in humans in the EU during the last five years; 2004-2008. However, in 2008, the number of reported cases and the notification rate of thermotolerant *Campylobacter* decreased by 5.0% in the EU, compared with 2007.

Due to the sporadic nature of the cases and the high level of under-reporting, this decrease could be an artefact as the number of reported confirmed cases of campylobacteriosis in Europe has fluctuated over the last five years. Moreover, the reduction of cases in the Czech Republic, Germany and the United Kingdom, accounted for 65% of the total decrease in the EU in 2008. Another country that also experienced a marked decrease in the number of reported cases of campylobacteriosis in 2008, compared to 2007, was Italy, with a 16.9% reduction. Although the Czech Republic still had the highest notification rate in the EU in 2008 (193.3 cases per 100,000 population), this was remarkably less than in 2007 (234.6 cases per 100,000 population).

Poultry meat still appears to be the most important food-borne source of *Campylobacter* since the occurrence of the bacteria remained at a high level in fresh poultry meat. Some positive findings were also reported from raw milk and cheeses, and if these products are consumed without further heat-treatment, they will pose a risk for human health. In other foodstuffs, *Campylobacter* was only occasionally detected. Fewer data than in previous years was reported by MSs on *Campylobacter* in fresh broiler meat, which may be due to the baseline survey on *Campylobacter* in broilers and broiler carcasses carried out in the EU in 2008 that had taken a substantial amount of resources in MSs. The results from this baseline survey will be reported in a separate EFSA report.

The importance of poultry meat and milk as sources of human *Campylobacter* infections was supported by the reported food-borne outbreak data from 2008; six and three outbreaks out of 21 verified outbreaks. However, in the majority of the reported food-borne *Campylobacter* outbreaks, the food vehicle remained unknown.

As in previous years, *Campylobacter* prevalence in live poultry and pig populations was generally at very high levels in MSs. However, lower prevalence in broiler flocks was once again reported by some Nordic countries which may imply that there are tools available to reduce *Campylobacter* colonization of broiler flocks. *Campylobacter* was also regularly detected in cattle but the prevalence was somewhat lower compared to levels in broilers and pigs. In addition, *Campylobacter* was present in other investigated animal species but not in equally high levels. Even though a high *Campylobacter* prevalence was observed in cattle and pigs, a strong decrease during the slaughter was observed in a similar manner than in previous years.

The baseline survey on *Campylobacter* carried out in 2008 will provide comparable data on the prevalence in MSs and will assist the European Commission and MSs to consider needs for control options to reduce *Campylobacter* in the broiler production. In addition, during 2008, EFSA received a request from the Commission for a scientific opinion on updating and quantifying the risk posed by *Campylobacter* in broiler meat production. The Scientific Panel on Biological Hazards has started to work on this mandate, and the baseline survey will provide data for this quantitative risk assessment.

3.3 *LISTERIA*

The bacterial genus *Listeria* currently comprises six species, but human cases of listeriosis are almost exclusively caused by the species *Listeria* monocytogenes. *Listeria* are ubiquitous organisms that are widely distributed in the environment, especially in plant matter and soil. The principal reservoirs of *Listeria* are soil, forage and water. Other reservoirs include infected domestic and wild animals. The main route of transmission to both humans and animals is believed to be through consumption of contaminated food or feed. However, infection can also be transmitted directly from infected animals to humans as well as between humans. Cooking destroys *Listeria*, but the bacteria are known to multiply at temperatures down to +2/+4°C, which makes the occurrence in RTE foods with a relatively long shelf life of particular concern.

In humans severe illness mainly occurs in the unborn child, infants, the elderly and those with compromised immune systems. Symptoms vary, ranging from mild flu-like symptoms and diarrhoea to life threatening infections characterised by septicaemia and meningoencephalitis. In pregnant women the infection can spread to the foetus, which may either be born severely ill or die in the uterus and result in abortion. Illness is often severe and mortality is high. Human infections are rare yet important given the associated high mortality rate. These organisms are among the most important causes of death from food-borne infections in industrialised countries.

In domestic animals (especially sheep and goats) clinical symptoms of listeriosis include encephalitis, abortion, mastitis or septicaemia. However, animals may also commonly be asymptomatic intestinal carriers and shed the organism in significant numbers, contaminating the environment.

Table LI1 presents the countries that have reported data on *Listeria* for 2008.

Table LI1. Overview of MSs reporting* Listeria monocytogenes *data, 2008

Data	Total number of MSs reporting	Countries
Human	25	**All MSs** except PT and RO
		Non-MSs: CH, IS, LI, NO
Food	26	**All MSs** except CY
		Non-MSs: CH, NO
Animals	18	**MSs:** AT, BG, DE, EE, FI, GR, IE, IT, LT, LV, NL, PL, PT, RO, SE, SK, SI,UK
		Non-MSs: CH, NO

Note: In the following chapter, only countries reporting 25 samples or more on food and animals have been included for analyses.

3.3.1 Listeriosis in humans

In 2008, twenty-five MSs reported 1,381 confirmed human cases of listeriosis (Table LI2). Almost 200 fewer confirmed cases of listeriosis were reported in 2008 than in 2007. Overall, the total reported number of confirmed listeriosis cases increased between 2004 and 2006, decreased slightly in 2007, and in 2008 decreased by 11.1%.

The overall notification rate in the EU was 0.3 cases per 100,000 population which was similar to 2007. As in 2007, the highest notification rates in 2008 were observed in Denmark, Finland, and Sweden.

3.3 LISTERIA

Table LI2. Reported listeriosis cases in humans 2004-2008[1], and notification rates for confirmed cases in 2008

Country	2008				2007	2006	2005	2004
	Report Type[2]	Cases	Confirmed Cases	Confirmed cases/ 100,000				
Austria	C	31	31	0.4	20	10	9	19
Belgium	C	64	64	0.6	57	67	62	89
Bulgaria[3]	A	5	5	0.1	11	6		–
Cyprus	U	0	0	0	0	1	–	–
Czech Republic	C	37	37	0.4	51	78	15	16
Denmark	C	51	51	0.9	58	56	46	41
Estonia	C	8	8	0.6	3	1	2	2
Finland	C	40	40	0.8	40	45	36	35
France	C	276	276	0.4	319	290	221	236
Germany	C	306	306	0.4	356	508	510	296
Greece	C	1	1	<0.1	10	7	8	3
Hungary	C	19	19	0.2	9	14	10	16
Ireland	C	13	13	0.3	21	7	11	11
Italy	C	75	75	0.1	65	51	51	25
Latvia	C	5	5	0.2	5	2	6	3
Lithuania	A	7	7	0.2	4	4	2	1
Luxembourg	C	1	1	0.2	3	4	0	–
Malta	U	0	0	0	0	0	0	–
Netherlands	C	52	44	0.3	68	64	96	55
Poland	C	33	33	0.1	43	28	22	10
Portugal	–[4]	–	–	–	–	–	–	38
Romania[3]	–	–	–	–	0			
Slovakia	C	8	8	0.1	9	12	5	8
Slovenia	C	3	3	0.1	4	7	3	1
Spain	C	88	88	0.2	81	78	68	100
Sweden	C	60	60	0.7	56	42	35	44
United Kingdom	C	206	206	0.3	261	208	223	232
EU Total		**1,389**	**1,381**	**0.3**	**1,554**	**1,590**	**1,443**	**1,281**
Iceland	U	0	0	0.0	4	0	0	–
Liechtenstein	U	0	0	0	0	0		–
Norway	C	34	34	0.7	49	27	14	23
Switzerland	C	43	43	0.6	60	68	73	58

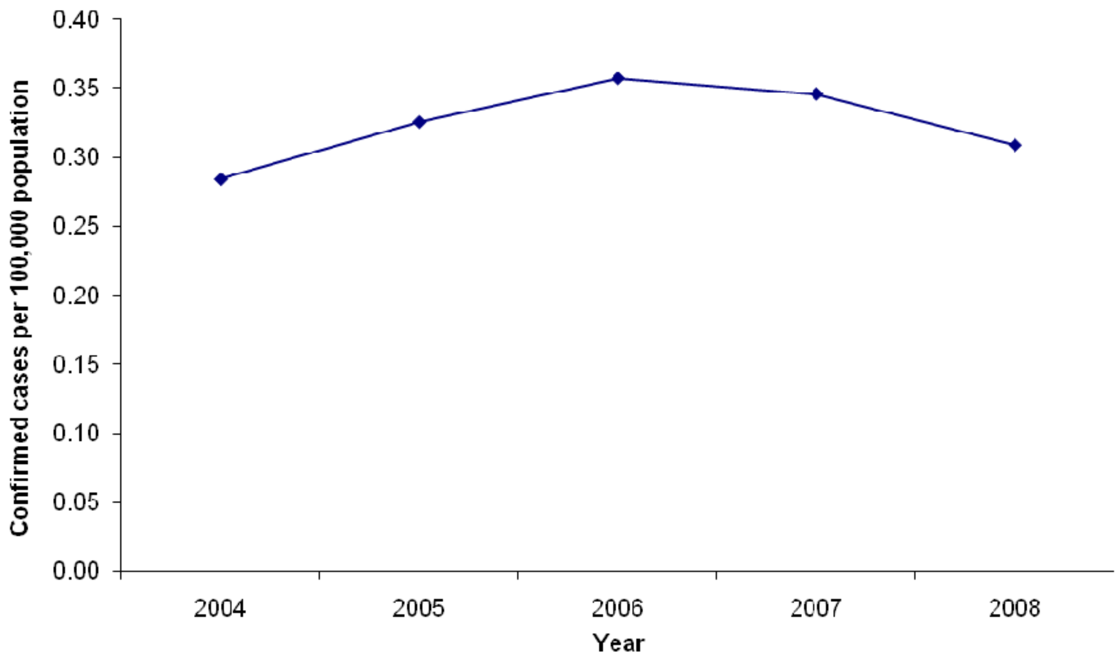
1. Number of confirmed cases for 2005-2008 and number of total cases for 2004.
2. A: aggregated data report; C: Case-based report; —: No report; U: Unspecified.
3. EU membership began in 2007.
4. No surveillance system exists.

3.3 *LISTERIA*

The number of confirmed cases of listeriosis has decreased in 2007 and 2008 after a three-year increasing trend from 2004 to 2006 (Figure LI1a).

Within each reporting MS, the only statistically significant and increasing trends in listeriosis notification rates from 2004 to 2008 were noted in Estonia, Italy, Latvia, Lithuania, Poland and Sweden (Figure LI1b).

Figure LI1a. Notification rates of reported confirmed cases of human listeriosis in the EU, 2004-2008[1]



Source: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland Italy, Latvia, Lithuania, Netherlands, Poland, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

1. Includes confirmed cases from 2005-2008 and total cases for 2004.

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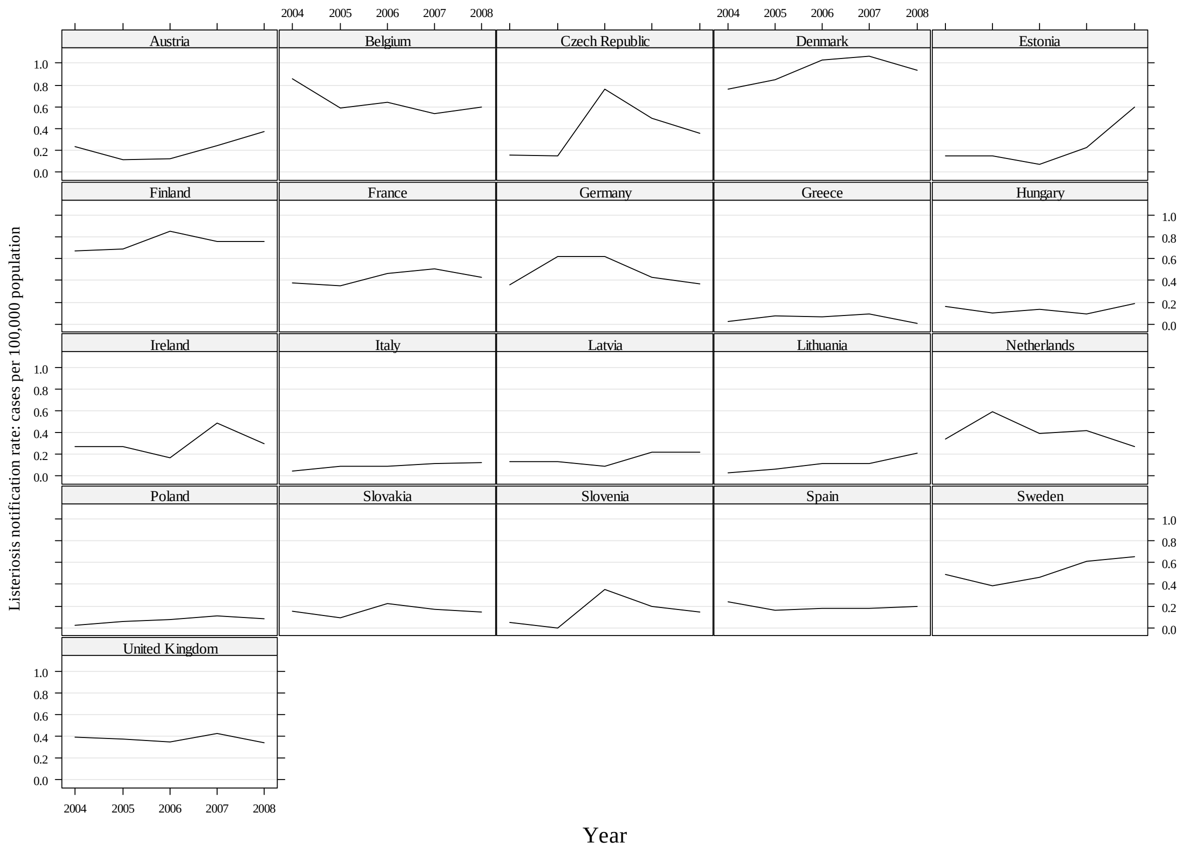
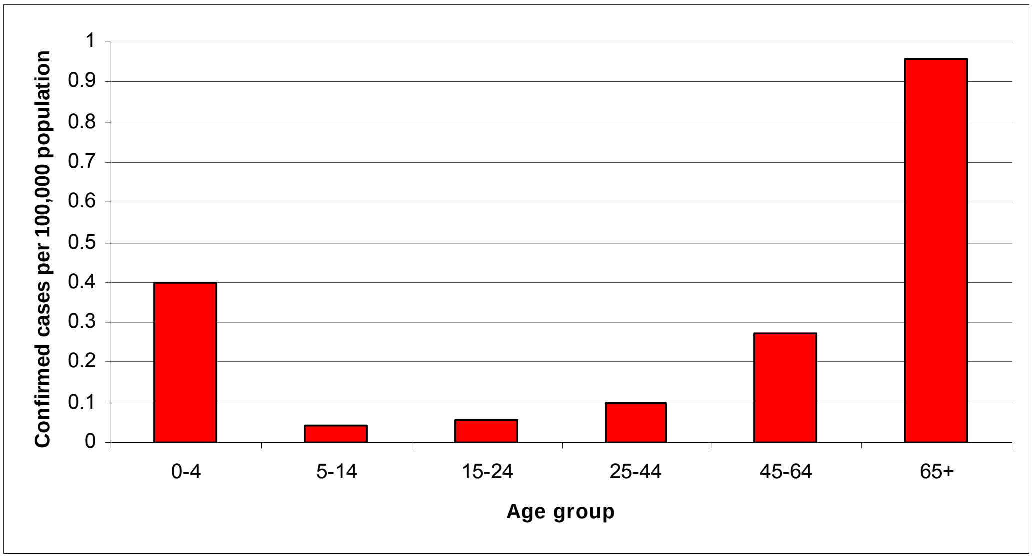
Figure LI1b. Notification rates of reported confirmed cases of listeriosis in human per MS (2004-2008)



The age distribution of listeriosis cases in 2008 was similar to that observed in previous years. The notification rate was highest in those aged over 65 (0.95 cases per 100,000 population) followed by children under the age of five (0.4 cases per 100, 000 population) (Figure LI2). The majority of cases (78.1%) in the 0-4 year old age category was in newborns (age 0). Overall, the majority of cases were reported in those aged 65 and over (representing 55.2% of cases), followed by the age group 45 to 64 (23.7%).

3.3 *LISTERIA*

Figure LI2. Age-specific distribution of reported confirmed cases of human listeriosis, TESSy data for reporting MSs, 2008



Source: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom (N=1,374).

The transmission route was stated for 34 (2.5%) confirmed cases. Thirty-two cases were infected with *Listeria monocytogenes* via food and two cases were pregnancy-associated. The remaining cases were reported of unknown transmission.

The outcome of the disease was known for 653 confirmed cases (47.3%). Of these, 134 cases died (20.5% of cases with known outcome). The majority of fatalities (87 cases) were reported in the over 65 age group. However, this was also the age group with the highest proportion of cases (55.2%).

In total, 60.4% of confirmed *L. monocytogenes* cases were reported to be of domestic origin, though 38.7% of all reported cases were of unknown origin.

3.3 *LISTERIA*

3.3.2 *Listeria* in food

The Community legislation (Regulation (EC) No 2073/2005) lays down food safety criteria for *Listeria* monocytogenes in ready-to-eat foods (RTE). This Regulation came into force in January 2006. According to the legal provisions *L. monocytogenes* must not be present in levels above 100 cfu/g during the shelf life of a product. In addition, products, in which the growth of the bacterium is possible, must not contain *L. monocytogenes* in 25g at the time when they leave the production plant unless the producer can demonstrate, to the satisfaction of the competent authority, that the product will not exceed the 100 cfu/g limit throughout shelf life. The reported data reflect the Regulation, and investigations have focused on testing RTE foods for compliance with these limits.

Data on *L. monocytogenes* in 25 or more samples of food were reported by 26 MSs and two non-MSs. These data cover a substantial number of food samples and food categories. The data presented focus on RTE foods, where *L. monocytogenes* were detected either by qualitative (absence or presence) or quantitative (enumeration) investigations (findings of *L. monocytogenes* with more than 100 cfu/g) or both.

Compliance with microbiological criteria

The *L. monocytogenes* criteria laid down by Regulation No (EC) 2073/2005, cover primarily RTE food products, and require that:

- in RTE products intended for infants and for special medical purposes *L. monocytogenes* must not be present in 25g (n=10, c=0);
- *L. monocytogenes* must not be present in levels above 100 cfu/g during the shelf life of the other RTE products (n=5, c=0);
- for RTE food that support the growth of the bacterium, *L. monocytogenes* should not be present in 25g (n=5, c=0) at the time of leaving the production plant. However, if the producer is able to demonstrate, to the satisfaction of the competent authority, that the product will not exceed the limit 100 cfu/g throughout shelf life this criterion does not apply;
- for foods that support the growth of *L. monocytogenes*, the microbiological criterion to be applied depends on the stage of the food chain and whether the producer has demonstrated that *L. monocytogenes* will not multiply to levels of 100 cfu/g, or above, during shelf life.

For much of the reported data, it was not evident, whether the RTE food tested was able to support the growth of *L. monocytogenes* or not. This information is difficult to collect, as even within the same food category, some products may support growth while others may not, depending on various factors such as the pH, water activity and composition of the specific product. Also, no information was available on the studies done by producers on the growth capacity of *L. monocytogenes* in their products. Furthermore, in some cases it was not possible to establish at which stage in the production chain samples were collected.

Due to the difficulties described above, the following assumptions were applied to the analyses:

For samples reported to be taken at processing, a criterion of absence in 25g was applied. Samples from hard cheeses and fermented sausages are an exception, as these categories are assumed not to be able to support the growth of *L. monocytogenes*. For these samples the limit ≤100 cfu/g was applied at processing.

For all investigations, where the sampling stage was not reported, it was assumed that samples have been taken from products placed on the market, and the criterion ≤100 cfu/g was applied.

For food intended for infants and special medical purposes the criterion absence in 25g was applied throughout the food chain.

Data from all investigations other than HACCP and own check investigations are included. The results from qualitative examinations have been used to analyse the compliance with criterion: absence in 25g, and the results from quantitative analyses have been used to analyse compliance with the limit 100 cfu/g.

The number of samples in non-compliance with the *L. monocytogenes* criteria is shown in Table LI3. For RTE products on the market, very low proportions of samples were generally found to be non-compliant with the criterion of <100 cfu/g. However higher levels non-compliant samples were reported in samples analysed using the detection method (absence in 25g) for RTE products at processing stage.

3.3 *LISTERIA*

The highest levels of non-compliance at retail based on sampling single samples was observed in RTE fermented sausage (0.5%) and RTE fishery products (0.4%) followed by cheeses, RTE meat products and other RTE products (0.2% non-compliance each). For the batch-based sampling at retail the highest non-compliance was reported for soft and semi-soft cheese (2.8%), followed by products of meat origin other than fermented sausage (0.9%) and other RTE products (0.5%) (Table LI3).

For RTE products sampled at the processing stage, the highest level of non-compliance was observed in other RTE products, RTE products of meat origin other than fermented sausage and fishery products.

When the proportions of non-compliance single samples of RTE foods at retail in 2008 are compared to the corresponding results in 2007 and 2006, the proportion of non-compliance units shows a decrease in RTE fishery products. In the case of cheeses, the 2008 results showed more non-compliance than in 2007, but less than in 2006. For RTE meat products and other RTE products the 2008 results are more in line with the results from the two previous years (Figure LI3). The observed decrease in RTE fishery products is interesting and it might be influenced by different sets of MSs reporting in each year. For example the United Kingdom reported two large surveys of smoked fish in 2008 with high sample sizes but few samples over the limit 100 cfu/g (Table LI6) while in 2006 and 2007 the United Kingdom did not report any investigations.

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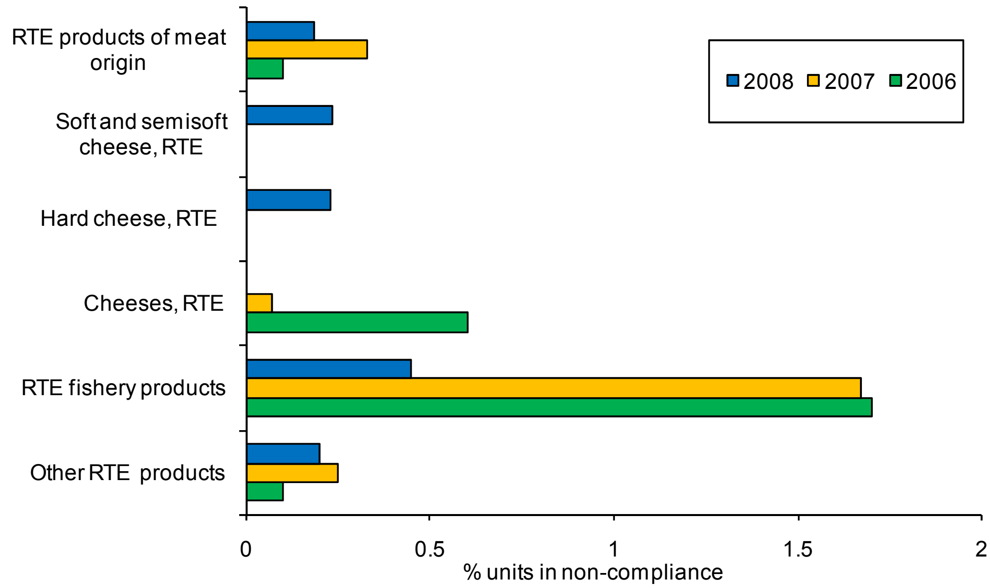
Table LI3. Compliance with the **L. monocytogenes** ***criteria laid down by Regulation (EC) No 2073/2005 in food categories in the EU, 2008***

	Sampling unit	Absence in 25g		≤100 cfu/g	
		Units tested	% in non-compliance	Units tested	% in non-compliance
1. RTE food intended for infants and for medical purposes					
1.1 Hospital or care home	Single	99	0	-	-
1.2 Processing plant	Batch	310	0	-	-
	Single	2	0	-	-
1.3 Retail[1]	Batch	426	0	-	-
	Single	53	0	-	-
2. RTE products of meat origin other than fermented sausage					
2.1 Processing plant	Batch	15,505	2.0	-	-
	Single	1,132	6.2	-	-
2.2 Retail[1]	Batch	-	-	1,290	0.9
	Single	-	-	16,653	0.2
3. RTE products of meat origin, fermented sausage					
3.1 Processing plant	Single	-	-	14	0
3.2 Retail[1]	Batch	-	-	24	0
	Single	-	-	1,828	0.5
4. Milk, RTE					
4.1 Farm	Batch	735	0	-	-
	Single	62	4.8	-	-
4.2 Processing plant	Batch	49	0	-	-
	Single	346	1.7	-	-
4.2 Retail[1]	Single	-	-	130	0
5. Soft and semi- soft cheese, RTE					
5.1 Farm	Single	39	0	-	-
5.2 Processing plant	Batch	4,552	2.4	-	-
	Single	1,708	1.0	-	-
5.3 Retail[1]	Batch	-	-	562	2.8
	Single	-	-	2,116	0.2
6. Hardcheese, RTE					
6.1 Processing plant	Batch	-	-	2,162	0
	Single	-	-	243	0
6.2 Retail[1]	Batch	-	-	260	0
	Single	-	-	1,762	0.2
7. Other dairy products, RTE					
7.1 Farm	Single	2	0	-	-
7.2 Processing plant	Batch	3,212	0	-	-
	Single	312	0.3	-	-
7.3 Retail[1]	Batch	-	-	235	0
	Single	-	-	1,522	0
8. Fishery products, RTE					
8.1 Processing plant	Batch	1,087	4.5	-	-
	Single	544	5.5	-	-
8.2 Retail[1]	Batch	-	-	182	0
	Single	-	-	7,174	0.4
9.Other RTE products					
9.1 Catering	Single	-	-	1	0
9.2 Hospital or care home	Batch	92	0	-	-
9.3 Processing plant	Batch	840	11.1	-	-
	Single	148	1.4	-	-
9.4Retail[1]	-	-	-	109	0
	Batch	-	-	992	0.5
	Single	-	-	11,558	0.2

Note: Including all MS reported data, except data from HACCP and own check. RTE: ready-to-eat products.

1. Retail include data with unspecified sampling stage.

Figure LI3. Proportion of samples[1] at retail in non-compliance with the EU* L. monocytogenes *criteria, 2008



Note: Data are only presented for sample size ≥25.

1. Based on single samples. Excluding HACCP and own check samples.

Ready-to-eat meat products, meat preparations and minced meat

Data on examinations for *L. monocytogenes* in RTE meat products and other RTE products of meat were available from 22 MSs. Data categorised according to the origin of the meat are presented in Tables LI4a-d and Figure LI4.

Data on RTE meat products and meat preparations of bovine origin, reported by 14 MSs, is summarised in Table LI4a. Of a total of 7,510 samples investigated qualitatively, *L. monocytogenes* was detected in 2.6% of the samples. The highest prevalence was reported by France, where 10.2% meat product samples collected at retail were found to contain *L. monocytogenes* in 25g. France also reported that 0.2 % of 566 samples were positive with *L. monocytogenes* in levels above 100 cfu/g. Compared to the previous year the number of samples taken by MSs increased substantially; from 932 samples in 2007 to 7,510 samples in 2008.

Data on RTE products from pig meat was provided by 16 MSs (Table LI4b). *L. monocytogenes* was detected in 1.9% of 21,562 samples investigated qualitatively. Prevalence reported from MSs ranged from 0% to 19.0% for the presence of L. monocytogenes. The highest prevalence was reported from a survey of batches of fermented sausages, reported by Hungary. Spain reported 13.2% of 713 samples of RTE meat products positive in 25g samples, and 4.6% of 131 samples of these products to contain more than 100 cfu/g. In total 0.3% of 8,615 samples contained *L. monocytogenes* in levels above 100 cfu/g.

In red, mixed and unspecified meats the proportions of positive samples from qualitative investigations for *L. monocytogenes* ranged up to 21.4% of samples positive in 25g (Table LI4c). Six out of nine MSs reported findings of *L. monocytogenes* either with the qualitative or quantitative method. RTE meat products sampled at retail found to exceed 100 cfu/g were only reported by Latvia (1.2%) and Germany (0.1% and 0.6%).

In poultry meat *L. monocytogenes* was found by qualitative analysis in 11 of 18 reported investigations from ten MSs (Table LI4d). Prevalence ranged up to 7.6% of samples, which was reported by Germany from an investigation of 118 RTE meat product samples from processing plants. Of ten reported quantitative investigations, *L. monocytogenes* was only detected in levels above 100 cfu/g from two investigations, in which 0.6% and 2.0% of single samples were found in levels above 100 cfu/g.

3.3 *LISTERIA*

L. monocytogenes was isolated from RTE meat products or other RTE products of meat origin using both the detection and enumeration methods. The detection rates in red, mixed or unspecified meat seemed the highest in 2008, whereas pig, bovine and broiler meat and products thereof appeared to have a lower prevalence of *L. monocytogenes* (Figures LI4a-d). In 2008, there was a large increase in the total number of samples in the investigations of bovine meat and mixed red meat compared to 2007. As for pig meat samples, the number of units investigated qualitatively in 2008 was almost unchanged as compared to 2007, whereas the number of samples tested quantitatively was markedly reduced.

3.3 *LISTERIA*

Table LI4a.* L. monocytogenes *in ready-to-eat meat products and meat preparations of bovine meat, 2008

Country	Sampling unit	Details	Units Tested Presence	*L.m.* presence in 25g	Units Tested Enumeration	>detection but = <100cfu/g	*L.m.* >100 cfu/g
			N	%Pos	N	%	%
Belgium	Single	Meat preparation, intended to be eaten raw, RTE, at retail	-	-	150	0	0.7
	Single	Minced meat, intended to be eaten raw, RTE, at retail	-	-	139	1.4	0
Bulgaria	Batch	Meat products, RTE, at processing plant	327	0	-	-	-
Czech Republic	Batch	Meat products, RTE, at processing plant	5,975	2.2	725	0	1.1
Denmark	Single	Meat products, RTE, at processing plant	-	-	81	0	0
	Single	Meat products, RTE, at retail	-	-	161	0	0
France	Single	Meat products, RTE, at retail	566	10.2	566	0.5	0.2
Germany	Single	Meat products, RTE, at retail	-	-	687	0.1	0
Ireland	Single	Meat products, RTE, at processing plant	28	0	-	-	-
	Single	Meat products, RTE, at retail	43	4.7	212	0	0.5
Luxembourg	Single	Meat products, RTE, at retail	-	-	239	28.9	0.4
Netherlands	Single	Meat products, RTE, at retail	-	-	409	1.2	0.5
Poland	Batch	Meat products, RTE, at processing plant	60	1.7	-	-	-
Romania	Batch	Meat products, RTE, at processing plant	43	0	-	-	-
Slovakia	Batch	Meat products, RTE	40	0	-	-	-
Sweden	Single	Meat products, RTE, at retail	67	0	-	-	-
United Kingdom	Single	Meat products, RTE, at retail	361	1.4	361	0.6	0
Total(14MSs)			**7,510**	**2.6**	**3,730**	**2.2**	**0.4**

Note: Data are only presented for sample size ≥25.

3.3 *LISTERIA*

Table LI4b.* L. monocytogenes *in ready-to-eat meat products of pig meat, 2008

Country	Sampling unit	Details	Units Tested Presence	*L. m.* presence in 25 g	Units Tested Enumeration	> detection but =< 100 cfu/g	*L. m.* > 100 cfu/g
			N	% Pos	N	%	%
Austria	Single	RTE, at processing plant	56	3.6	54	0	0
	Single	RTE, at retail	136	9.6	61	0	1.6
Bulgaria	Batch	RTE, at retail	7,983	<0.1	-	-	-
Czech Republic	Batch	RTE, at processing plant	6,355	1.9	2,046	0	<0.1
	Single	RTE, at retail	60	3.3	60	3.3	0
Denmark	Single	RTE, at processing plant	34	0	236	0	0
	Single	RTE, at retail	68	4.4	473	0.4	0.4
Estonia	Single	RTE, at processing plant	101	5.0	-	-	-
Germany	Single	RTE, at processing plant	238	4.6	171	1.8	0.6
	Single	RTE, at retail	694	3.0	1,223	0.7	0.2
Greece	Single	RTE, at retail	122	2.5	-	-	-
Hungary	Batch	Fermented sausages	142	19.0	-	-	-
	Single	RTE, intended to be eaten raw	462	8.7	111	6.3	0
	Single	RTE	316	5.7	52	7.7	0
Ireland	Single	RTE, at processing plant	86	8.1	-	-	-
	Single	RTE, at retail	53	0	257	0	0
Netherlands	Single	RTE, at retail	-	-	774	1.3	0
Portugal	Batch	RTE, at retail	-	-	1,065	0.8	1.0
Romania	Batch	RTE, at processing plant	305	0	-	-	-
	Batch	RTE, at retail	561	0	-	-	-
Slovakia	Batch	RTE	1,206	1.1	30	10.0	0
Slovenia	Single	RTE, at retail	57	7.0	57	7.0	0
Spain	Single	RTE, at retail	713	13.2	131	43.5	4.6
United Kingdom	Single	RTE, at retail	1,814	1.9	1,814	<0.1	0
Total (16 MSs)			**21,562**	**1.9**	**8,615**	**1.3**	**0.3**

Note: Data are only presented for sample size ≥25.

3.3 *LISTERIA*

Table LI4c. **L. monocytogenes** ***in ready-to-eat meat products of red, mixed or unspecified meat, 2008***

Country	Sampling unit	Details	Units Tested Presence	*L. m.* presence in 25 g	Units Tested Enumeration	> detection but =< 100 cfu/g	*L. m.* > 100 cfu/g
			N	% Pos	N	%	%
Austria	Single	Red meat products, fermented sausages, at processing plant	25	0	-	-	-
Belgium	Single	Minced meat from bovine animals and pig, RTE, intended to be eaten raw, at retail	-	-	146	0.7	0
	Single	Meat products from unspecified animals, pâté, at processing plant	58	1.7	-	-	-
	Single	Meat products from unspecified animals, RTE, at retail	-	-	56	0	0
Czech Republic	Batch	Mixed meat products, RTE, at retail	-	-	83	0	0
	Single	Mixed meat products, RTE, at retail	84	6.0	84	6.0	0
Germany	Single	Mixed meat products, RTE, at retail (monitoring)	69	2.9	-	-	-
	Single	Meat products from unspecified animals, RTE, at retail	1,952	2.6	1,952	0.6	0.1
	Single	Red meat products, fermented sausages, at retail	1,728	12.1	1,467	1.0	0.6
Ireland	Single	Meat products from unspecified animals, RTE, at retail	-	-	78	0	0
	Single	Meat products from sheep, RTE, at retail	-	-	34	0	0
Latvia	Single	Mixed meat products, RTE, chilled, at processing plant	-	-	350	0	0
	Single	Mixed meat products, RTE, chilled, at retail	-	-	420	0	1.2
Poland	Batch	Meat products from unspecified animals, RTE, at processing plant	168	21.4	-	-	-
	Batch	Mixed meat products, RTE, at processing plant	1,715	0.8	1,702	0.3	0
Slovenia	Single	Meat products bovine animals and pig, RTE, at retail	46	0.0	46	0.0	0
United Kingdom	Single	Meat products from unspecified animals, fermented sausages, at retail	316	1.9	316	0	0
	Single	Meat products from unspecified animals, pâté, at retail	1,764	0.1	1,764	0	0
	Single	Meat products from unspecified animals, RTE, chilled, at retail	143	0	143	0	0
	Single	Mixed meat products, RTE, at retail	54	1.9	54	0	0
Table (9 MSs)			**8,122**	**4.0**	**8,695**	**0.4**	**<0.1**

Note: Data are only presented for sample size ≥25.

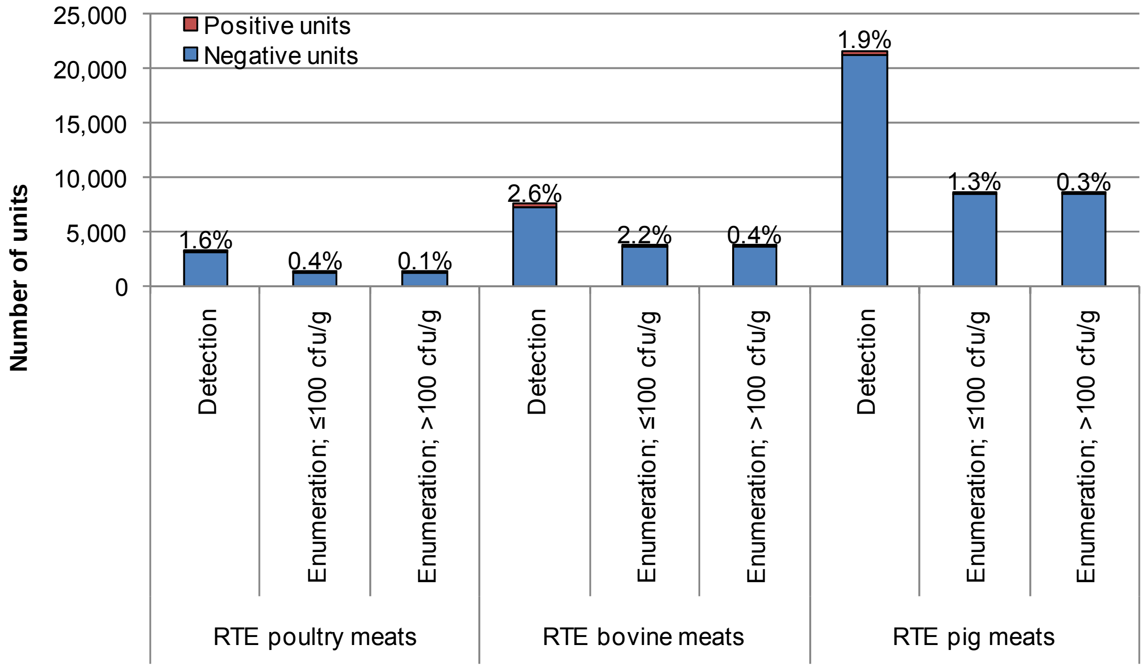
3.3 *LISTERIA*

Table LI4d. **L. monocytogenes** ***in ready-to-eat meat products of poultry meat, 2008***

Country	Sampling unit	Details	Units Tested Presence	*L. m.* presence in 25 g	Units Tested Enumeration	> detection but =< 100 cfu/g	*L. m.* > 100 cfu/g
			N	% Pos	N	%	%
Bulgaria	Batch	Broiler meat products, RTE, at retail	937	0.1	-	-	-
Czech Republic	Batch	Broiler meat products, RTE, at processing plant	399	2.0	40	0	0
	Single	Broiler meat products, RTE, at retail	36	0	36	0	0
Denmark	Single	Broiler meat products, RTE, at processing plant	30	0	-	-	-
	Single	Broiler meat products, RTE, at retail	58	0	-	-	-
Germany	Single	Broiler meat products, RTE, at processing plant	118	7.6	32	3.1	0
	Single	Broiler meat products, RTE, at retail	212	4.2	158	1.3	0.6
Hungary	Single	Broiler meat products, RTE	162	6.8	-	-	-
	Single	Turkey meat products, RTE	80	1.3	-	-	-
Ireland	Single	Broiler meat products, RTE, at processing plant	78	6.4	-	-	-
	Single	Broiler meat products, RTE, at retail	70	4.3	359	0	0
	Single	Turkey meat products, RTE, at processing plant	37	0	-	-	-
	Single	Turkey meat products, RTE, at retail	-	-	53	0	0
Netherlands	Single	Broiler meat products, RTE, at retail	-	-	31	0	0
Romania	Batch	Broiler meat products, RTE, at processing plant	98	0	-	-	-
	Batch	Broiler meat products, RTE, at retail	79	0	-	-	-
Slovakia	Batch	Broiler meat products, RTE	170	0	-	-	-
Slovenia	Single	Broiler meat products, RTE, at retail	49	2.0	49	0	2.0
United Kingdom	Single	Broiler meat products, RTE, at retail	188	1.6	188	0	0
	Single	Poultry meat products, RTE, at retail	402	0.5	402	0	0
Total (11 MSs)			**3,263**	**1.6**	**1,351**	**0.4**	**0.1**

Note: Data are only presented for sample size ≥25.

***Figure LI4. Proportion of* L. monocytogenes *positive units in ready-to-eat meat categories in EU, 2008*[1]**



Note: Test results obtained by detection and enumeration methods are presented separately.

1. Pooled data from MSs cover both single and batch samples, only investigations covering 25 or more samples are included.

Milk and dairy products

In 2008, 11 MSs and one non-MS (Switzerland) reported large amounts of data on *L. monocytogenes* in cheeses (Tables LI5a-d and Figure LI5) and other RTE dairy products.

The presence of *L. monocytogenes* in soft and semi-soft cheese made from raw or low heat treated cow milk was detected in three out of seven qualitative investigations (Table LI5a). For those investigations with positive findings, the proportions of positive samples ranged from 0.5% to 3.6%. Findings of levels above 100 cfu/g were not reported. Data on the presence of *L. monocytogenes* in cheeses made from sheep's or goat's milk was limited. In total, 101 samples were investigated qualitatively, in which *L. monocytogenes* was not detected. Portugal reported that 6.0% of 265 samples of this category contained *L. monocytogenes* in levels above 100 cfu/g.

In addition Austria reported a number of investigations from unspecified cheeses from cow's milk or mixed milk from cows, sheep or goats at processing and retail. *L. monocytogenes* was only detected in 2 samples (N=193) taken from cheeses made from raw cow's milk at processing plant and in four samples (N=67) taken from cheeses made from raw or low heat treated cow's milk at retail.

For soft and semi-soft cheeses made from pasteurised milk a substantial amount of data were reported (Table LI5b). A total of 4,265 samples of cheese made with milk from cows were analysed qualitatively and 1.6% were found to be contaminated with *L. monocytogenes*. The prevalence of the investigations ranged from 0% to 2.6%, the highest reported by the Czech Republic from an investigation in which 2,423 samples were investigated. The Czech Republic also reported that 0.4% of 2,172 samples investigated quantitatively were found to contain *L. monocytogenes* in levels above 100 cfu/g.

Of 1,158 samples of soft and semi-soft cheeses made from pasteurised goat's and sheep's milk investigated qualitatively, and 55 investigated quantitatively, presence of *L. monocytogenes* was not reported.

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Hard cheese has been subjected to a number of reported investigations. The results for hard cheeses made from raw or low heat treated milk are shown in Table LI5c and the result for hard cheese made from pasteurised milk is shown in Table LI5d. It appears that these cheeses may occasionally harbour *L. monocytogenes*, however very rarely in levels above 100 cfu/g. The Czech Republic reported findings of 1.7% contamination of 3,523 samples of hard cheese made from pasteurised cow's milk investigated qualitatively. Germany reported from investigations of hard cheese made from pasteurised cow's milk that 1.3% of 682 samples collected at processing plants, and 0.5% of 3,172 samples collected at retail were positive using the qualitative method, and further, that 0.2% of 1,621 samples collected at retail contained *L. monocytogenes* in levels above 100 cfu/g.

It appears that the presence of *L. monocytogenes* in cheeses is quite seldom detected in EU MSs, and numbers only rarely reach levels above 100 cfu/g. Nevertheless, the bacterium was isolated both from cheeses made from raw or low heat treated milk and pasteurised milk as well as from soft/semi-soft cheeses and hard cheeses (Figure LI5a-d). In data for 2008, *L. monocytogenes* was most often detected in soft and semi-soft cheeses made from pasteurised milk. The same observation was also made for data from 2007.

3.3 *LISTERIA*

Table LI5a. L. monocytogenes *in soft and semi-soft cheeses made from raw or low heat treated milk, 2008*

Country	Sampling unit	Details	Units Tested Presence N	*L. m.*presence in 25 g % Pos	Units Tested Enumeration N	> detection =< 100 cfu/g %	*L. m.* > 100 cfu/g %
Cheeses made from milk from cows							
Bulgaria	Batch	at retail	2,826	0	-	-	-
Czech Republic	Batch	at processing plant	31	0	40	0	0
Germany	Single	at processing plant	28	3.6	-	-	-
	Single	at retail	141	0.7	68	1.5	0
Romania	Batch	at processing plant	214	0	-	-	-
	Batch	at retail	221	0	-	-	-
Total (cheeses made from milk from cows, 4 MSs)			**3,461**	**<0.1**	**108**	**0.9**	**0**
Switzerland	Single	at processing plant	394	0.5	-	-	-
Cheeses made from milk from sheep and goats							
Bulgaria	Batch	goat milk, at retail	25	0	-	-	-
Czech Republic	Batch	goat milk, at processing plant	31	0	40	0	0
Portugal	Batch	sheep milk, at retail	-	-	265	1.9	6.0
Slovakia	Batch	goat milk	45	0	-	-	-
Total (cheeses made from milk from sheep and goats, 4 MSs)			**101**	**0**	**305**	**1.6**	**5.2**
Switzerland			46	0	-	-	-
Cheeses made from mixed milk from cows, sheep and/or goats							
Austria[1]	Single	mixed milk from cows, sheep and/or goats, at retail	71	1.4	71	0	1.4
Slovakia	Batch	mixed milk from cows, sheep and/or goats	130	0	-	-	-
Total (cheeses made from milk from cows, sheep and goats, 2 MSs)			**201**	**0.5**	**71**	**0**	**1.4**

Note: Data are only presented for sample size ≥ 25

1. In Austria, *L. monocytogenes* was in addition detected in 12 (2.9%) of 415 samples of unspecified cheese made from raw or low heat-treated milk, tested at processing and retail

Table LI5b. L. monocytogenes *in soft and semi-soft cheeses made from pasteurised milk, 2008*

Country	Sampling unit	Details	Units Tested Presence	*L. m.* presence in 25 g	Units Tested Enumeration	> detection =< 100 cfu/g	*L. m.* > 100 cfu/g
			N	% Pos	N	%	%
Cheeses made from milk from cows							
Czech Republic	Batch	at processing plant	2,423	2.6	2,172	0	0.4
	Batch	at retail	-	-	88	0	0
	Single	at retail	36	0	36	0	0
Germany	Single	at processing plant	115	0.9	-	-	-
	Single	at retail	288	0.7	158	0	0.6
Greece	Single	at retail	37	0	-	-	-
Hungary	Single		216	0	-	-	-
	Single		168	0	52	3.8	0
Latvia	Single	at processing plant	-	-	35	0	0
	Single	at retail	-	-	60	0	0
Portugal	Batch	at retail	-	-	125	0	0
Romania	Batch	at processing plant	30	0	-	-	-
	Batch	at retail	26	0	-	-	-
Slovakia	Batch		477	0.8	-	-	-
United Kingdom	Single	at retail	449	0	449	0	0
Total (cheeses made from milk from cows, 9 MSs)			**4,265**	**1.6**	**3,175**	**<0.1**	**0.3**
Switzerland			126	0	-	-	-
Cheeses made from milk from sheep and goats							
Bulgaria	Batch	Goat's milk, at retail	145	0	-	-	-
	Batch	Sheep's milk, at retail	329	0	-	-	-
Czech Republic	Batch	Goat's milk, at processing plant	191	0	25	0	0
Greece	Single	Sheep's milk, at retail	467	0	-	-	-
Portugal	Batch	Goat's milk, at retail	0	-	30	0	0
Slovakia	Batch	Sheep's milk	26	0	-	-	-
Total (cheeses made from milk from sheep and goats, 5 MSs)			**1,158**	0	**55**	0	0
Cheeses made from mixed milk from cows, sheep and/or goats							
Slovakia	Batch	Mixed milk from cows, sheep and/or goats	36	0	-	-	-

Note: Data are only presented for sample size ≥25.

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Table LI5c. L. monocytogenes *in hard cheeses made from raw or low heat treated milk, 2008*

Country	Sampling unit	Details	Units Tested Presence	*L. m.* presence in 25 g	Units Tested Enumeration	> detection =< 100 cfu/g	*L. m.* > 100 cfu/g
			N	% Pos	N	%	%
Cheeses made from milk from cows							
Bulgaria	Batch	at retail	1,357	0	-	-	-
Germany	Single	at processing	41	2.4	29	0	0
	Single	at retail	135	0.7	104	1.0	0
Romania	Batch	at processing	36	0	-	-	-
Slovakia	Batch		37	0	-	-	-
Total (hard cheeses made from milk from cows, 4 MSs)			**1,606**	**0.1**	**133**	**0.8**	**0**

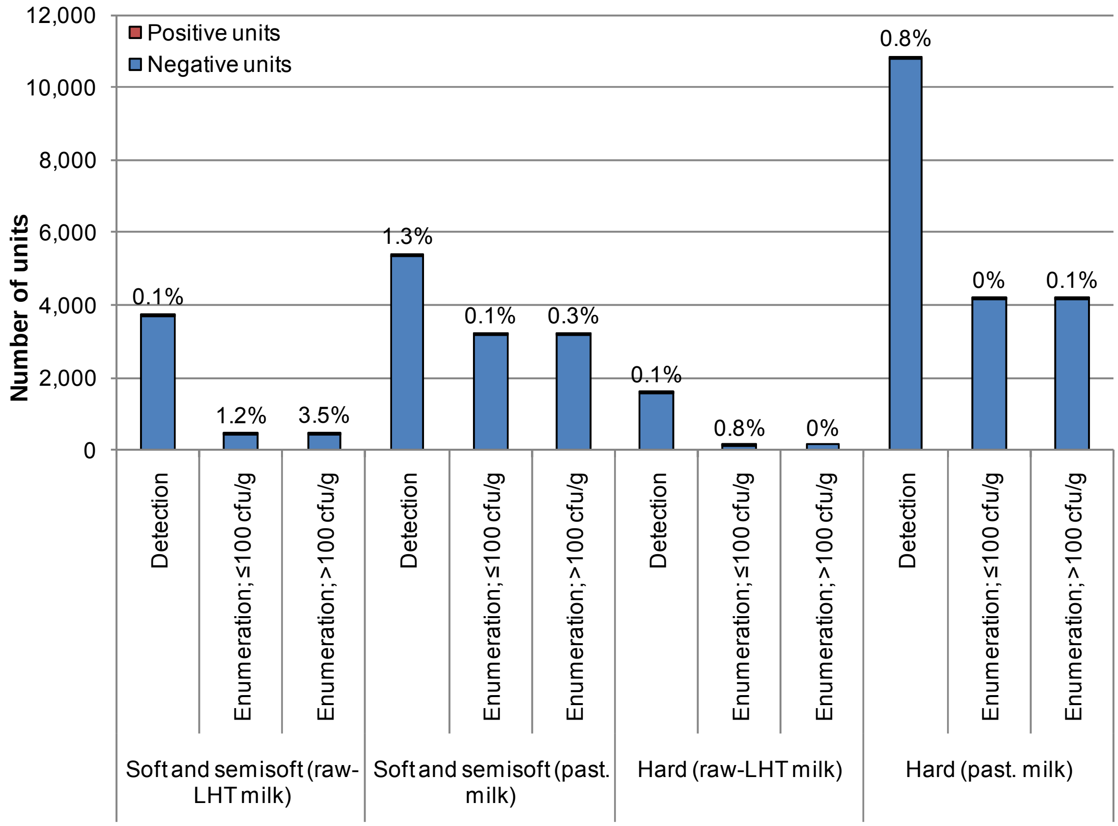
Note: Data are only presented for sample size ≥25.

Table LI5d. L. monocytogenes *in hard cheeses made from pasteurised milk, 2008*

Country	Sampling unit	Details	Units Tested Presence	*L. m.* presence in 25 g	Units Tested Enumeration	> detection =< 100 cfu/g	*L. m.* > 100 cfu/g
			N	% Pos	N	%	%
Cheeses made from milk from cows							
Bulgaria	Batch	at retail	2,502	0	231	0	0
Czech Republic	Batch	at processing	3,523	1.7	2,153	0	0
Germany	Single	at processing	682	1.3	214	0	0
	Single	at retail	3,172	0.5	1,621	0.1	0.2
Greece	Single	at retail	34	0	-	-	-
Romania	Batch	at processing	195	0	-	-	-
	Batch	at retail	58	0	-	-	-
Slovakia	Batch		115	0	-	-	-
Total (hard cheeses made from milk from cows, 6 MSs)			**10,281**	**0.8**	**4,219**	**0.0**	**0.1**
Cheeses made from milk from sheep and goats							
Bulgaria	Batch	at retail	525	0	-	-	-
Greece	Single	at retail	71	1.4	-	-	-
Total (hard cheeses made from milk from sheep, 2 MSs)			**596**	**0.2**	**-**	**-**	**-**

Note: Data are only presented for sample size ≥25.

***Figure LI5. Proportion of* L. monocytogenes *positive units in soft and semi-soft cheeses and hard cheeses made from raw or low heat-treated milk and pasteurised milk in the EU, 2008*[1]**



Note: Test results obtained by detection and enumeration methods are presented separately.
LHT: low heat-treated milk; past. milk: pasteurised milk.

1. Pooled data from MSs cover both single and batch samples, only investigations covering 25 or more samples are included.

3.3 *LISTERIA*

Fishery products

In 2008, 16 MSs and one non-MS (Norway) reported data on findings of *L. monocytogenes* in RTE fishery products (Table LI6). The products tested were mainly smoked fish products. The reported results per product category are illustrated in Figure LI6.

The highest proportions of *L. monocytogenes* positive samples in fishery products (qualitative examinations) were reported by Finland; 33.9% of 192 samples of gravad fish and 33.6% of 149 samples of cold-smoked fish, both sampled at retail (products packaged in a vacuum or modified atmosphere). Units containing the bacteria above the limit of 100 cfu/g were found in 3.1% and 0.7% of the samples, respectively. Previous surveys in Finland have shown, that *Listeria* is more often detected in RTE fish products packaged in a vacuum and modified atmosphere compared to non-packaged RTE fish products. In qualitative investigations of smoked fish, relatively high frequencies of positive samples were also reported by Belgium (7.8%), Germany, (7.4%), the Netherlands (14.3%) and Sweden (13.7%). The United Kingdom reported two large surveys on cold smoked and hot smoked fish at retail. The presence of *L. monocytogenes* was detected in 17.6% and 3.5% of the cold and hot smoked products, respectively. However, units exceeding the limit of 100 cfu/g were only found from hot smoked fish (0.2% of the units tested). Also Belgium, Germany and the Netherlands reported findings of smoked fish units having *L. monocytogenes* over the 100 cf/g limit at retail, at levels of 0.5%, 1.0% and 0.9%, respectively. Furthermore, Germany and Poland found 1.8% and 4.0% of smoked fish samples exceeding the limit of 100 cfu/g at the processing plant. Other fishery products showed lower prevalence as compared to fish products, and detection of samples with more than 100 cfu/g was not reported in 2008 (Table LI6).

In summary of the results from all MSs, RTE fish products were found to contain *L. monocytogenes* in 9.8% of a total of 7,126 samples, using the qualitative technique. The frequency of samples that were found to contain *L. monocytogenes* in levels above 100 cfu/g was very low, as only 0.5% of a total of 7,178 samples were above this limit.

3.3 *LISTERIA*

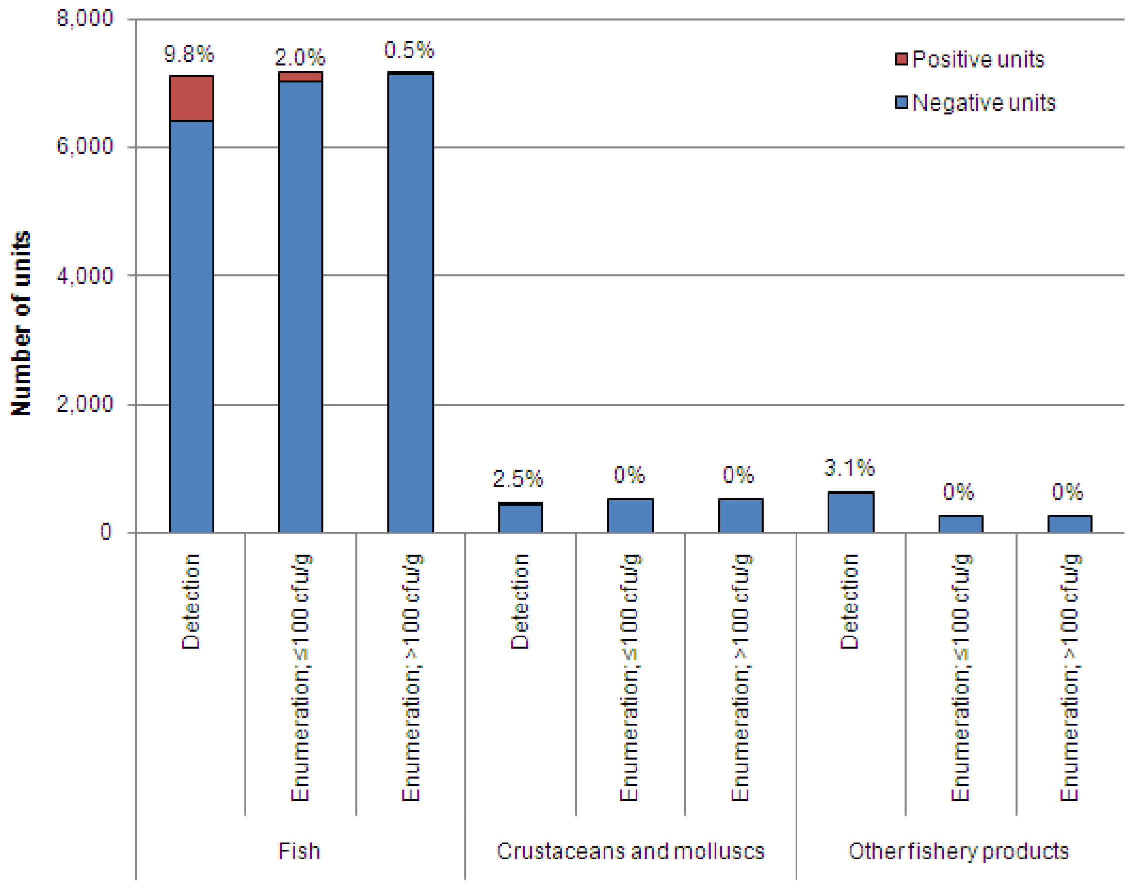
Table LI6. L. monocytogenes *in ready-to-eat fishery products, 2008*

Country	Sampling unit	Details	Units Tested Presence	*L. m.* presence in 25 g	Units Tested Enumeration	> detection but =< 100 cfu/g	*L. m.* > 100 cfu/g
			N	% Pos	N	%	%
Fish							
Belgium	Single	Smoked, at processing plant	90	7.8	-	-	-
	Single	Smoked, at retail	-	-	198	1.0	0.5
Bulgaria	Batch	Smoked, at retail	602	0.5	-	-	-
Czech Republic	Batch	Marinated, at retail	-	-	26	0	0
	Batch	Smoked, at processing plant	277	6.5	201	0	0
Finland[1]	Single	Gravad/slightly salted, at retail	192	33.9	192	7.8	3.1
	Single	Cold-smoked, at retail	149	33.6	149	6.7	0.7
Germany	Single	Smoked, at processing plant	232	5.6	165	3.0	1.8
	Single	Smoked, at retail	701	7.4	1,153	1.2	1.0
Greece	Single	Smoked, at retail	71	1.4	-	-	-
Latvia	Single	Smoked, at processing plant	-	-	250	0	0
	Single	Smoked, at retail	-	-	295	0.7	0
Netherlands	Single	Smoked, at retail	953	14.3	964	0.9	0.9
Poland	Batch	Smoked, at processing plant	256	5.9	25	4.0	4.0
Portugal	Batch	Smoked, at retail	-	-	110	0	0
Sweden	Single	Smoked, at retail	153	13.7	-	-	-
United Kingdom	Single	Smoked, at retail	178	6.7	178	0	0
	Single	Cold-smoked, at retail	1,344	17.6	1,344	0.3	0
	Single	Hot-smoked, at retail	1,878	3.5	1,878	0.2	0.2
	Single	Sushi, at retail	50	2.0	50	0	0
Total (fish, 12 MSs)			**7,126**	**9.8**	**7,178**	**0.9**	**0.5**
Norway	Single	Sushi, RTE, at processing plant	99	7.1	99	7.1	0
Fishery products, unspecified							
Estonia	Single	RTE, at processing plant	44	2.3	-	-	-
Ireland	Single	Cooked, at retail	-	-	173	0	0
Poland	Batch	RTE, at processing plant	513	3.1	-	-	-
United Kingdom	Single	Seafood pâté, at retail	79	3.8	79	0	0
Total (fishery products, 4 MSs)			**636**	**3.1**	**252**	**0.0**	**0**
Crustaceans							
Denmark	Batch	Cooked, at processing plant	-	-	36	0	0
Germany	Single	Cooked, at processing plant	35	0	26	0	0
	Single	Cooked, at retail	263	2.3	248	0	0
Ireland	Single	Cooked, at retail	-	-	34	0	0
Portugal	Batch	Cooked, at retail	-	-	25	0	0
United Kingdom	Single	Cooked, at retail	147	4.1	147	0	0
Total (crustaceans, 5 MSs)			**445**	**2.7**	**516**	**0**	**0**
Molluscan shellfish							
Hungary	Single	Cooked, at retail	30	0	-	-	-

Note: Data are only presented for sample size ≥25.

1. Only samples from vacuum and modified atmosphere packaged products.

***Figure LI6. Proportion of* L. monocytogenes *positive units in ready-to-eat fishery products categories in EU, 2008*[1]**



Note: Test results obtained with detection and enumeration methods are presented separately.

1. Pooled data from MSs, covers both single and batch samples. Only investigations covering 25 or more samples are included.

Other ready-to-eat products

A substantial number of investigations were reported on *L. monocytogenes* in other RTE products. The data presented in Table LI7 is divided into 11 categories.

Thirteen MSs reported results from investigations of sandwiches and other processed foods. Twelve out of 20 qualitative investigations detected *L. monocytogenes*. Six MSs reported investigations of sandwiches, and in four of these investigations *L. monocytogenes* was detected. However, only the United Kingdom found samples exceeding the limit of 100 cfu/g, at the level of 0.2% of the tested units. Also Slovakia reported 1.5% of unspecified RTE food samples having *L. monocytogenes* above the 100 cfu/g limit.

In the categories “RTE salads” and “fruit and vegetables” findings of *L. monocytogenes* were quite commonly reported in most of the investigations using qualitative analyses, but findings of levels above 100 cfu/g were rare. Only the Czech Republic and Slovakia reported findings over the limit of 100 cfu/g, 0.2% and 13.2% of the tested batches, respectively. In total, less than 0.1% of samples from RTE salads and 0.7% of fruit and vegetable samples were positive with *L. monocytogenes* in levels above 100 cfu/g.

3.3 *LISTERIA*

Table LI7. L. monocytogenes *in other ready-to-eat products, 2008*

Country	Sample unit	Details	Units Tested Presence N	*L. m.* presence in 25 g % Pos	Units Tested Enumeration N	> detection but =< 100 cfu/g %	*L. m.* > 100 cfu/g %
Sandwiches and other processed food							
Austria	Single	Unspecified, RTE, at retail	105	2.9	105	0	0
Denmark		Unspecified, RTE, at retail	-	-	109	0	0
	Single	Unspecified, RTE, at processing plant	-	-	54	0	0
Estonia	Single	Unspecified, at retail	44	0	46	0	0
Greece	Single	Sandwiches with meat, at retail	93	0	-	-	-
Hungary	Single	Sandwiches	89	1.1	33	0	0
Ireland	Single	Pasta, at retail	-	-	38	0	0
	Single	Pasta/rice salad, at retail	-	-	90	0	0
	Single	Sandwiches, non-meat, at retail	-	-	107	0.9	0
	Single	Sandwiches with meat, at retail	65	0	395	0	0
	Single	Unspecified, RTE, at retail	157	1.9	1,166	0	0
Lithuania	Single	At retail	60	3.3	-	-	-
Portugal	Batch	At retail	-	-	45	0	0
Romania	Batch	Unspecified, RTE, at catering	1,239	0	-	-	-
	Batch	Unspecified, at hospital or care home	92	0	-	-	-
	Batch	Unspecified, at processing plant	63	0	-	-	-
	Batch	Unspecified, at retail	236	0	-	-	-
Slovakia	Batch	Unspecified	35	14.3	35	0	0
	Batch	Sandwiches	169	8.3	136	10.3	0
	Single	Unspecified	254	12.6	470	5.1	1.5
Slovenia	Single	Sandwiches, RTE, at retail	129	2.3	129	2.3	0
	Single	Unspecified, RTE, at retail	183	3.3	183	3.3	0
Sweden	Single	Unspecified, RTE	497	1.4	-	-	-
United Kingdom	Single	Pasta/ rice salad, at retail	404	3.7	404	0.2	0
	Single	Sandwiches, at retail	1,643	5.2	1,643	0.2	0.2
	Single	Vegetarian pâté, at retail	34	0	34	0	0
Total (sandwiches and other processed food, 13 MSs)			**5,591**	**3.2**	**5,222**	**1.0**	**0.2**
Ready-to-eat salads							
Czech Republic	Batch	With mayonnaise, at processing plant	648	9.9	884	0	0.2
	Batch	With mayonnaise, at retail	-	-	86	0	0
Denmark	Single	With mayonnaise, at processing plant	-	-	82	3.7	0
	Single	With mayonnaise, at retail	-	-	165	1.2	0
Estonia	Single	At retail	27	14.8	37	2.7	0
Hungary	Single		377	4.0	120	0	0
Ireland	Single	At retail	70	4.3	661	0.2	0
Lithuania	Single	At retail	55	7.3	-	-	-
Portugal	Batch	At retail	-	-	165	0	0
Slovakia	Batch		316	7.3	273	7.3	0
United Kingdom	Single	At retail	335	0.9	335	0	0
Total (RTE salads, 9 MSs)			**1,828**	**6.3**	**2,808**	**1.0**	**<0.1**

Note: Data are only presented for sample size ≥25.

3.3 *LISTERIA*

Table LI7 (contd.). L. monocytogenes *in other ready-to-eat products, 2008*

Country	Sample unit	Details	Units Tested Presence	*L. m.* presence in 25 g	Units Tested Enumeration	> detection but =< 100 cfu/g	*L. m.* > 100 cfu/g
			N	% Pos	N	%	%
Fruit and/or vegetables							
Austria	Single	At retail	34	0	-	-	-
Czech Republic	Batch	At processing plant	81	4.9	143	0	0
	Batch	Pre-cut, RTE, at processing plant	-	-	27	0	0
Denmark	Single	Pre-cut, at retail	-	-	48	0	0
Hungary	Single	Pre-cut, at retail	42	4.8	-	-	-
Ireland	Single	At retail	-	-	229	0	0
	Single	Pre-cut, at retail	-	-	58	1.7	0
Portugal	Batch	At retail	-	-	40	0	0
Slovakia	Batch	Pre-cut, frozen vegetables	38	5.3	38	5.3	13.2
Slovenia	Single	Pre-cut, RTE, at retail	47	2.1	47	2.1	0
Spain	Single		49	0	92	48.9	0
Sweden	Single	Vegetables	252	0.4	-	-	-
Total (fruit and/or vegetables, 10 MSs)			**543**	**1.7**	**722**	**6.8**	**0.7**
Bakery products							
Austria	Single	Cakes and pastry, at retail	131	0	121	0	0
Ireland	Single	Cakes, desserts, pastry, at retail	83	0	351	0	0
Romania	Batch	Cakes, at processing plant	36	0	-	-	-
Total (bakery products, 3 MSs)			**250**	**0**	**472**	**0**	**0**
Confectionery products and pastes							
Hungary	Single		431	0.2	59	0	0
Ireland	Single	At retail	-	-	26	0	0
Slovakia	Batch		49	0	-	-	-
Slovenia	Single	At retail	300	1.7	300	1.7	0
Total (confectionery and pastes, 4 MSs)			**780**	**0.8**	**385**	**1.3**	**0**
Cereals and meals							
Denmark	Batch	At processing plant	-	-	31	0	0
Ireland	Single	At retail	-	-	208	0.5	0.5
Total (cereals and meals, 2 MSs)			**-**	**-**	**239**	**0.4**	**0.4**
Sauces and dressings							
Denmark	Single	At retail	-	-	74	0	0
Ireland	Single	Mayonnaise, at retail	-	-	32	0	0
	Single	At retail	30	0	280	0	0
Total (sauce and dressings, 2 MSs)			**30**	**0**	**386**	**0**	**0**
Sweets							
Czech Republic	Single	At processing plant	36	2.8	36	2.8	0
Soups							
Ireland	Single	At retail	-	-	111	0	0
Spices and herbs							
Ireland	Single	At retail	-	-	27	0	0
Seeds							
Portugal	Batch	At retail	-	-	25	0	0

Note: Data are only presented for sample size ≥25.

3.3 *LISTERIA*

3.3.3 *Listeria* in animals

In 2008, 18 MSs and two non-MS (Norway and Switzerland) reported data on *Listeria* in animals (Table LI1). *L. monocytogenes* and *Listeria* spp. were detected by several MSs from different animal species, generally at a relatively low prevalence. The highest prevalences were found in sheep, goats and cattle. The largest proportion of data was delivered by Germany, Ireland and the Netherlands (Table LI8).

Germany reported that 1.2% of 170 flocks of broilers (Gallus gallus), 0.7% of 443 herds of pigs, 9.4% of 854 herds of cattle, 17.1% of 129 herds of goats and 15.8% of 367 herds of sheep were found positive for *L. monocytogenes*.

Ireland reported that 0% of 166 broilers, 0% of 480 pigs, 0.5% of 8,666 cattle, 0% of 106 goats and 0.8% of 1,065 sheep were found positive for *L. monocytogenes*.

The Netherlands reported no *L. monocytogenes* positive findings in the investigation of 1,587 broiler flocks, 3,659 pigs, 3,556 bovine animals, 320 goats and 687 sheep. However, the Netherlands reported findings of *Listeria* spp. (unspecified) in bovine animals, goats and sheep.

3.3 *LISTERIA*

Table LI8. Listeria *in animals*[1], *2008*

Sampling unit	*L. monocytogenes*		*Listeria* spp., unspecified	
	Units tested	% Pos	% Pos	Details
Gallus gallus				
Bulgaria	54	0	0	
Germany	170	1.2	0	Flock
Ireland	166	0	0	
Italy	47	0	0	Herd
Netherlands	1,587	0	0	Flock
Total (*Gallus gallus*, 5 MSs)	**2,024**	**<0.1**	**0**	
Turkeys				
Bulgaria	28	0	0	
Ireland	32	0	0	
Netherlands	63	0	0	
Total (turkeys, 3 MSs)	**123**	**0**	**0**	
Pigs				
Estonia	84	1.2	0	
Germany	443	0.7	0	Herd
Ireland	480	0	0	
Italy	46	6.5	0	Herd
Netherlands	3,659	0	0	
Slovakia	65	0	0	
Total (pigs, 6 MSs)	**4,777**	**0.1**	**0**	
Cattle (bovine animals)				
Bulgaria	30	0	0	
Estonia	80	21.3	0	
Germany	854	9.4	0	Herd
Ireland	8,666	0.5	0.3	
Italy	231	0	1.3	
	147	0.7	0	Herd
Netherlands	3,556	0	1.3	
Slovakia	463	0.6	0	
Total (cattle, 7 MSs)	**14,027**	**1.1**	**0.5**	
Switzerland	26	0	38.5	
Goats				
Germany	129	17.1	0	Herd
Ireland	106	0	0	
Italy	25	4.0	0	
	84	1.2	0	Herd
Netherlands	320	0	6.6	
Total (goats, 4 MSs)	**664**	**3.6**	**3.2**	
Sheep				
Austria	62	30.6	1.6	
Bulgaria	34	2.9	0	
Estonia	34	11.8	2.9	
Germany	367	15.8	0	Herd
Greece	34	26.5	0	
Ireland	1,065	0.8	0.3	
Italy	49	0	0	
	292	0	2.1	Herd
Netherlands	687	0	3.1	
Slovakia	429	2.8	0	
Total (sheep, 9 MSs)	**3,053**	**3.6**	**1.0**	
Switzerland	27	0	85.2	
Sheep and goats				
Italy	33	0	9.1	

Note: Data are only presented for sample size ≥ 25, clinical investigations not included.

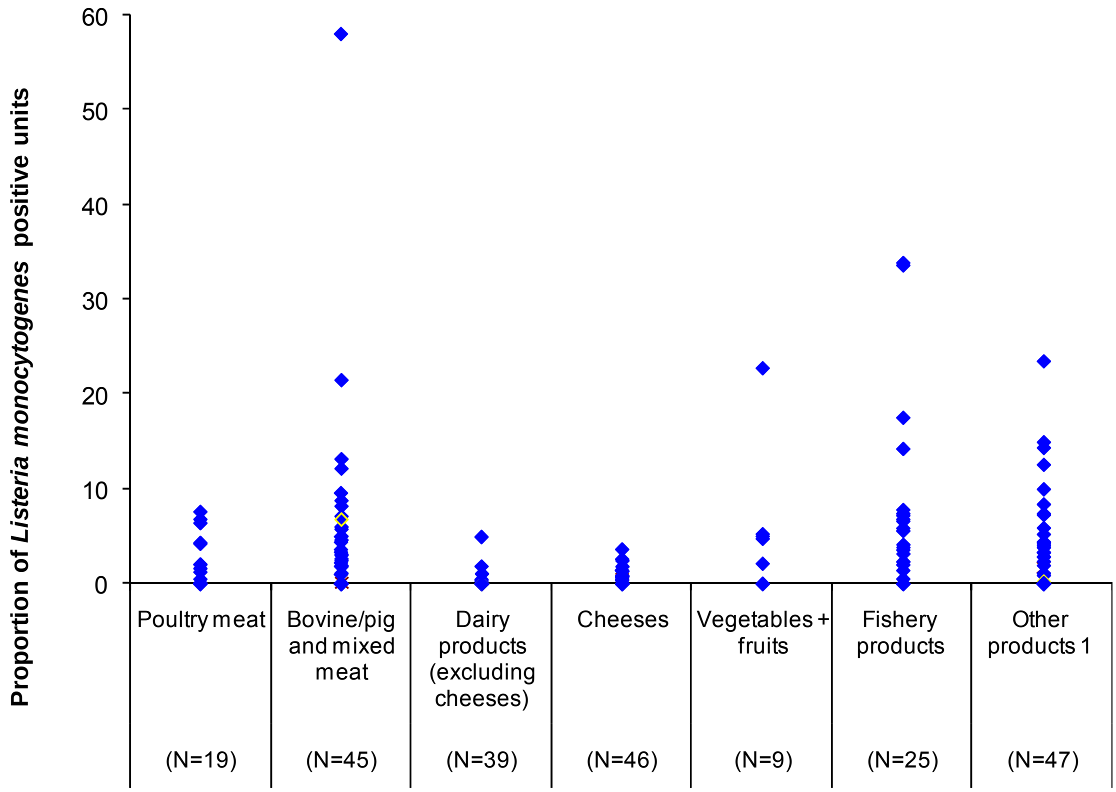
Listeria spp. unspecified, only include positive findings where the *Listeria* species has not been reported.

1. Animal based data if nothing else is stated.

3.3.4 Overview of *Listeria* in food products

Figure LI7 provides an overview of the proportions of positive samples from investigations of different food categories. The majority of samples were collected from meat, cheeses and fishery products, as in previous years.

Figure LI7. Proportion of* L. monocytogenes *positive samples by ready-to-eat food category, 2008. Each point representing a MS observation



Note: Data are only presented for sample size ≥25.

1. Other products include sandwiches and other processed food, RTE salads, bakery products, confectionery products and pastes, cereals and meals, sweets, sauces and dressings, soups, spices and herbs.

3.3.5 Discussion

Human listeriosis is a relatively rare but serious zoonotic disease, transmitted mainly via food, with high morbidity and mortality in vulnerable populations. This is also illustrated by the 1,381 confirmed human cases reported in the EU in 2008 and the reported case-fatality rate of 20.5%, and it especially affected the elderly. Overall, reported cases of listeriosis increased in the EU between 2003 and 2006, but have declined since then (both in 2007 and 2008). However, in several MSs, reported listeriosis cases have increased consecutively over the past five years. Food-borne outbreaks due to *Listeria* are considered rare and in 2008 only one verified outbreak was reported, which may reflect difficulties encountered in linking sporadic cases and the isolation of *L. monocytogenes* in food.

A wide range of different kinds of foodstuffs can be contaminated with the organism. For a healthy human population, foods that contain less than 100 cfu/g are considered to pose a negligible risk, and therefore the Community microbiological criteria for *L. monocytogenes* in ready-to-eat (RTE) food is set as ≤100 cfu/g.

Similar to previous years, MSs reported substantial numbers of food samples tested for *L. monocytogenes* and the results show that the proportion of samples exceeding the legal safety limit of 100 cfu/g was at low levels as was the case in past years. The highest proportion of units over the 100 cfu/g limit (0.4%) was observed once again in RTE fishery products, particularly in smoked fish, even though at a lower level than in 2006 and 2007. The observed decrease might be due to differences in the countries reporting over the years. In cheeses, RTE meat products and other RTE products analysed, such as RTE salads and sandwiches, the proportion of units over the 100 cfu/lg limit was at the same levels as the two previous years, generally at 0.2% or less.

In 2010, an EU-wide survey on *L. monocytogenes* in RTE food will be organised, and the food categories targeted in the survey are smoked and gravad fish, soft and semi-soft cheeses, and heat-treated meat products that have been handled between the heat treatment and packaging. This survey will provide further information on the occurrence of *L. monocytogenes* in these RTE food categories perceived as being at high risk regarding *Listeria* contamination.

L. monocytogenes was also reported from various animal species in 2008, demonstrating that animals, especially ruminants, act as one reservoir of *Listeria* bacteria although they rarely serve as a direct source of human infections.

3.4 TUBERCULOSIS DUE TO *MYCOBACTERIUM BOVIS*

Tuberculosis is a serious disease of humans and animals caused by the bacterial species of the family *Mycobacteriaceae*, more specifically by species in the *Mycobacterium tuberculosis* complex. This group includes *Mycobacterium bovis* responsible for bovine tuberculosis. This agent is also capable of infecting a wide range of warm-blooded animals, including humans. In humans, infection with *M. bovis* causes a disease that is very similar to infections with *M. tuberculosis,* the primary agent of human tuberculosis. Furthermore, the recently defined *M. caprae* also causes tuberculosis among animals, and to a limited extent in humans.

The main transmission routes of *M. bovis* to humans are through contaminated food (especially raw milk and raw milk products) or through direct contact with infected animals. A number of wildlife animal species, such as deer, wild boar, badgers and the European bison, might contribute to the spread and/or maintenance of *M. bovis* infection in cattle.

This chapter focuses on zoonotic tuberculosis caused by *M. bovis.*

Table TB1. Overview of countries that reported data for tuberculosis due to* Mycobacterium bovis *for humans (2007) and animals (2008)

Data	Total number of MSs reporting	Countries
Human[1]	27	**All MSs**
		Non MSs: IS, NO
Animal	27	**All MSs**
		Non MS: NO, CH

Note: In the following chapter, only countries reporting 25 samples or more have been included for analyses

1. Includes 2007 data for *M. bovis* reported to TESSy. Data from 2008 were not available in TESSy at the time of production of this report.

3.4.1 *M. bovis* in humans

Mycobacterium bovis cases in 2008 were not reported to the TESSy database by July 2009. Therefore the figures set out below are based on 2007 data from TESSy.

The number of confirmed cases of human tuberculosis due to *M. bovis* decreased by 11% in 2007 compared with 2006. (Table TB2). As in 2006, the highest proportions of reported and confirmed cases occurred in Germany and the United Kingdom (in total 61%) although the number of confirmed cases in these two countries decreased by 18.0% and 22.6% compared with 2006, respectively. In other countries, there was an increase in reported cases from 2006 to 2007. As in 2006, the highest rate of tuberculosis due to *M. bovis* was in individuals aged 65 and over (Figure TB1).

The majority (36.5%) of confirmed cases of tuberculosis due to *M. bovis* occurred in native individuals of the reporting country. Non-native individuals represented 10.3% of the total confirmed cases (N=107) and in 53.3% of the cases, the nationality of the case was not reported.

Wide variability in reporting exists between reporting countries, thereby limiting meaningful data interpretation.

3.4 TUBERCULOSIS DUE TO *MYCOBACTERIUM BOVIS*

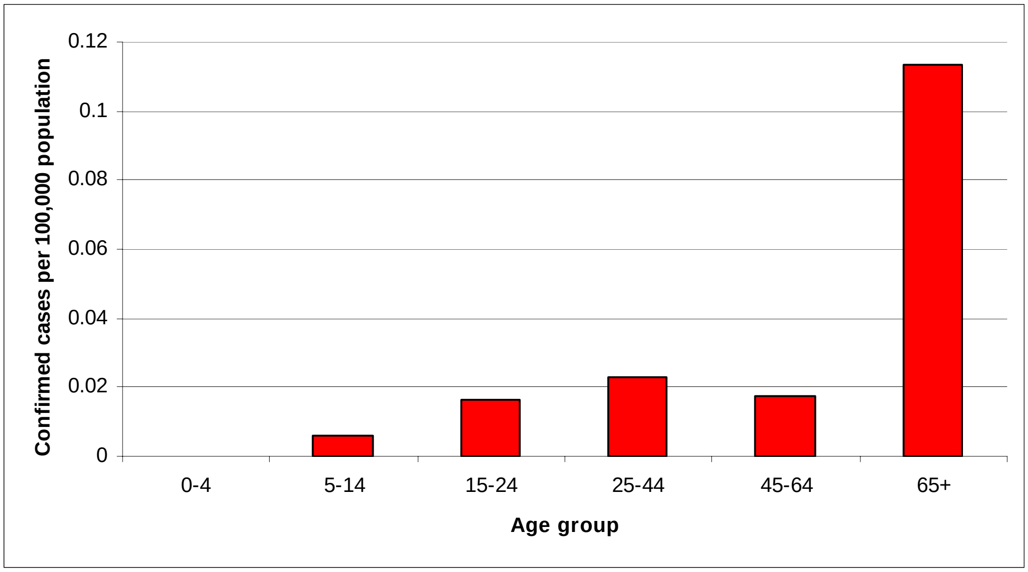
Table TB2. Reported tuberculosis cases due to* M. bovis *in humans and notification rates[1] for confirmed cases in 2007 (TESSy), in 2006 (EuroTB), and reported cases from 2003 to 2005 (CSR and EuroTB). OTF[2] status is indicated

Country	2007 (TESSy)				2006	2005	2004	2003
	Report type[3]	Total cases	Confirmed cases	Confirmed cases/100,000 population	Confirmed Cases EuroTB			Total cases in CSRs (reported to EuroTB)
Austria (OTF)	C	2	2	0.02	4	6	4 (4)	4 (4)
Belgium (OTF)	U	0	0	0	2	3	5 (3)	5 (1)
Bulgaria	U	0	0	0	-	-	-	-
Cyprus	U	0	0	0	0	0	1 (1)	-
Czech Republic (OTF)	C	1	1	0.01	0	2	- (2)	- (1)
Denmark (OTF)	C	1	1	0.02	3	0	2 (2)	1 (0)
Estonia	U	0	0	0	0	0	0	-
France (OTF)	U	0	0	0	-	-	-	-
Finland (OTF)	U	0	0	0	0	0	0	0
Germany (OTF)	C	43	41	0.05	50	53	51 (54)	- (43)
Greece	C	1	1	0.01	-	-	0	0
Hungary	U	0	0	0	0	-	0	-
Ireland	C	5	5	0.11	5	4	5	4
Italy[4]	C	6	6	0.01	9	7	5 (6)	1 (4)
Latvia	U	0	0	0	0	0	0	-
Lithuania	U	0	0	0	-	-	0	0
Luxembourg (OTF)	U	0	0	0	1	0	-	-
Malta	U	0	0	0	0	1	-	-
Netherlands (OTF)	C	9	9	0.05	13	-	- (13)	- (11)
Poland	U	0	0	0	-	-	-	-
Portugal	U	0	0	0	0	0	0	0
Romania	U	0	0	0	0			
Slovakia (OTF)	C	0	0	0	0	0	0	0
Slovenia	C	2	2	0.10	0	-	0 (1)	0
Spain	C	11	11	0.02	-	4	4	6
Sweden (OTF)	C	4	4	0.04	2	4	4 (4)	5 (5)
United Kingdom	C	24	24	0.04	31	39	21	21
EU Total		**109**	**107**	**0.02**	**120**	**123**	**102 (90)**	**47 (69)**
Iceland	U	0	0	0	1	0	-	-
Norway (OTF)	C	2	2	0.04	0	-	0 (0)	0 (0)

1. EU total is based on population in reporting countries.
2. OTF: Officially Bovine Tuberculosis Free.
3. C: case-based report, U: Unspecified, -: No report.
4. In Italy, four regions and 16 provinces are OTF.

3.4 TUBERCULOSIS DUE TO *MYCOBACTERIUM BOVIS*

Figure TB1. Age-specific notification rates of confirmed tuberculosis* M. bovis *cases in humans, 2007*



Source: Austria, Czech Republic, Denmark, Germany, Greece, Ireland, Italy, Netherlands, Slovenia, Spain, Sweden and the United Kingdom (N=107).

* TESSy data updated by MS (2009).

3.4 TUBERCULOSIS DUE TO *MYCOBACTERIUM BOVIS*

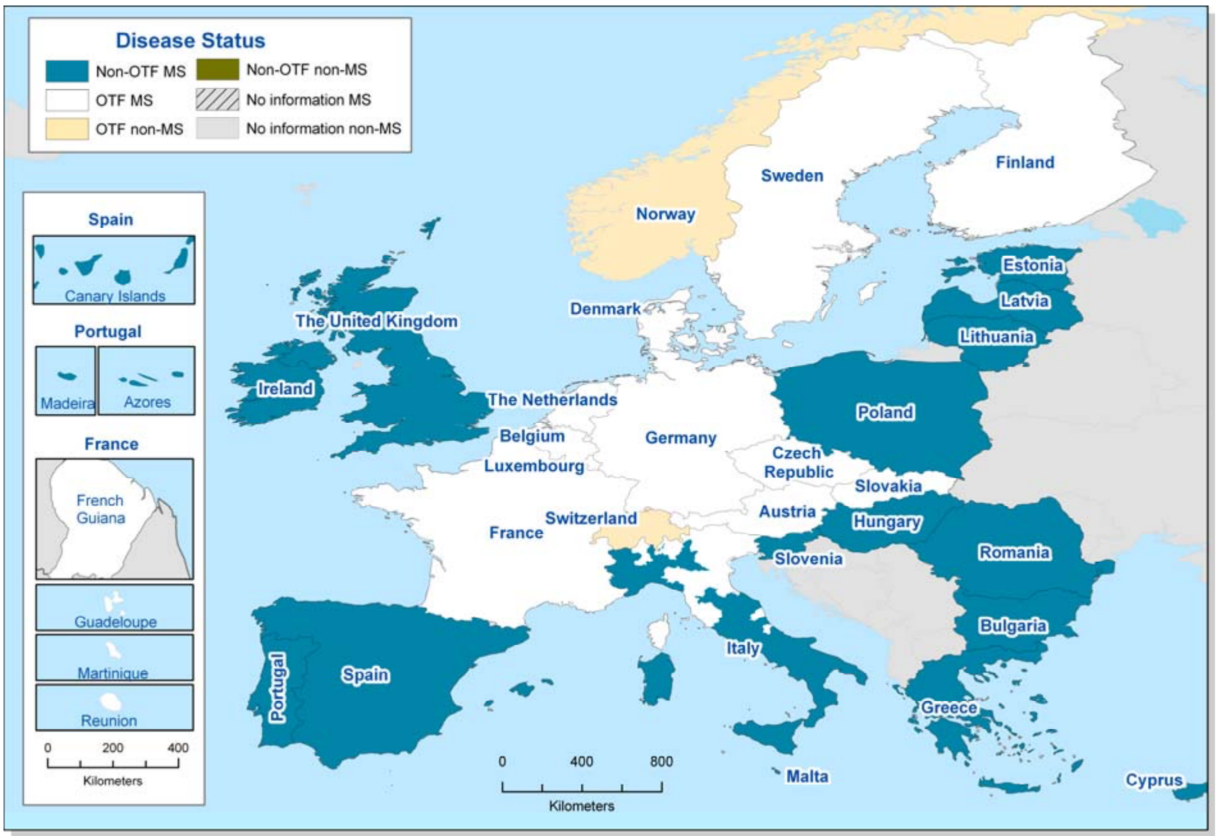
3.4.2 Tuberculosis due to *M. bovis* in cattle

The status regarding freedom from bovine tuberculosis (officially bovine tuberculosis-free, OTF) and the occurrence of the disease in MSs and non-MSs in 2008 are presented in Figures TB2 and TB3. As in 2007, Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Slovakia, Sweden, Norway and Switzerland were officially bovine tuberculosis-free (OTF) in accordance with Community legislation. In 2008, the Italian region of Veneto (Decision 2008/404/EC) and three provinces (Vercelli, Pisa and Pistoia) (Decision 2008/97/EC) were declared to be OTF. Italy now has four OTF regions and 16 OTF provinces.

Vaccination of cattle against bovine tuberculosis is prohibited in all MSs and in reporting non-MSs.

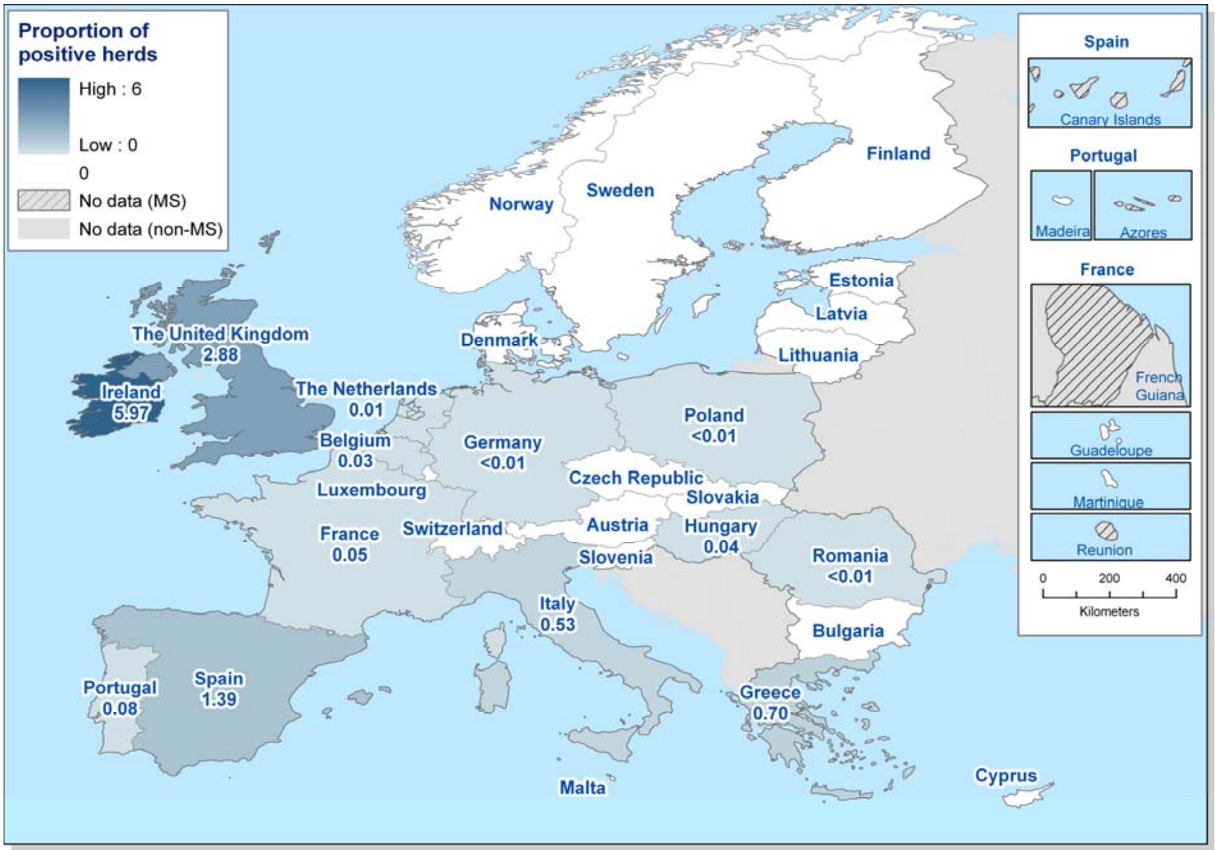
All data submitted by MSs are presented in the Level 3 tables of the report.

Figure TB2. Status of bovine tuberculosis, 2008



3.4 TUBERCULOSIS DUE TO *MYCOBACTERIUM BOVIS*

Figure TB3. Proportion of **M. bovis** *infected/positive cattle herds, country based data, 2008*



Trend indicators for tuberculosis

To assess the annual Community trends in bovine tuberculosis and to complement the MS specific figures, two epidemiological trend indicators have been used since 2005.

The first indicator **"% existing herds infected/positive"** is "the number of infected herds" (or "the number of positive herds") divided by "the number of existing herds in the country". This indicator describes the situation in the whole country during the reporting year.

A second indicator **"% tested herds positive"** is "the number of test positive herds" divided by "the number of tested herds". This indicator gives a more precise picture of the testing results and also estimates herd prevalence period during the whole reporting year. This information is only available from countries with Community co-financed eradication programmes.

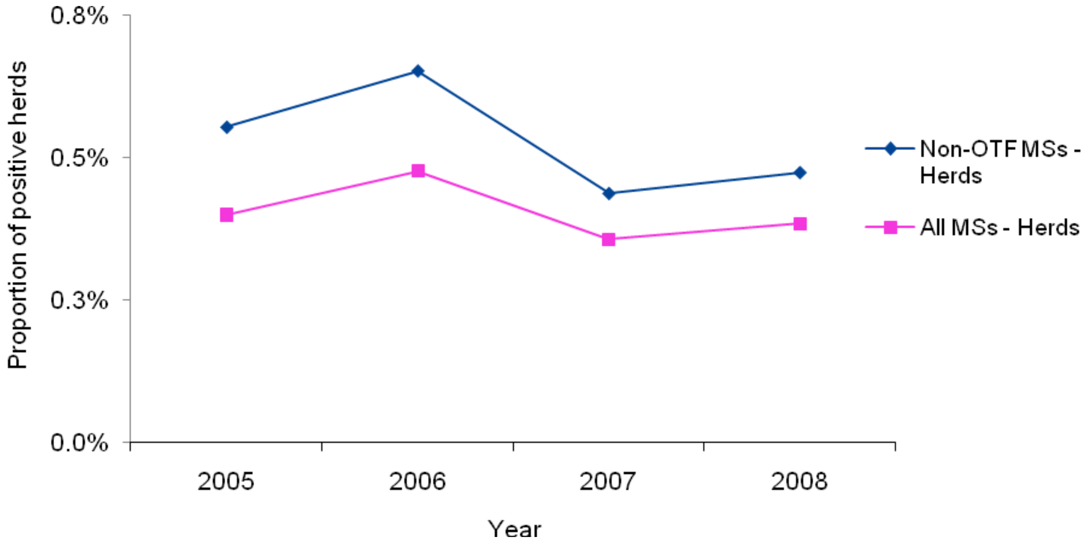
Infected herds means all herds under control, which are not officially tuberculosis free at the end of the reporting period. This figure summarises the results of different activities (tuberculin testing, meat inspection, follow-up investigations and tracing). Data for infected herds are reported from countries and regions that do not receive Community co-financing for eradication programmes.

Positive herds are herds with at least one positive animal during the reporting year, independent of the number of times the infection status of each herds have been checked (for example, using tuberculin tests). Data for positive herds are reported from countries and regions that receive Community co-financing for eradication programmes.

3.4 TUBERCULOSIS DUE TO *MYCOBACTERIUM BOVIS*

During the years 2005 to 2008, the proportion of existing tuberculosis positive cattle herds in the EU has been fluctuating around 0.4%, with a slightly higher level in 2006. In 2008 the EU-proportion increased very slightly as compared to 2007 (0.39% and 0.36%, respectively). The same development was observed in the proportion of existing positive herds in the non-OTF MSs. For these MSs, a very slight increase from 2007 (0.44%) to 2008 (0.47%) was observed (Figure TB4).

Figure TB4. Proportion of existing cattle herds infected with or positive for* M. bovis*, 2005-2008



Source: All reporting countries that are MSs during the current year are included.

Data from Bulgaria only for 2008, Romania for 2007 and 2008. Data missing from Hungary (2005), Lithuania (2007), Malta (2006).

Officially Tuberculosis Free (OTF) Member States and non-Member States

With the exception of Belgium, France, Germany and the Netherlands, bovine tuberculosis was not detected in cattle herds in the 11 OTF MSs, Norway and Switzerland, during 2008. In total, out of the 752,859 existing herds in these countries, 151 herds were positive for *M. bovis*, in Belgium (12 herds), France (110 herds), Germany (23 herds) and the Netherlands (6 herds). These findings do not jeopardise the officially free status of these MSs.

Non-Officially Tuberculosis Free Member States

All reporting non-OTF MSs have national eradication programmes for bovine tuberculosis in place. Table TB3 shows the reported results from MSs that did not receive Community co-financing for their eradication programmes in 2008, while Table TB4 shows results from those MSs with eradication programmes co-financed by the Community. In 2008, Estonia, Italy, Poland, Portugal, and Spain received co-financing (Decision 2007/782/EC as amended by Decision 2008/920/EC).

Seven non-OTF MSs: Bulgaria, Cyprus, Estonia, Latvia, Lithuania, Malta and Slovenia, did not report positive tested herds during 2008 (Table TB3 and Table TB4).

Slovenia, with no positive herds since 2004, was declared OTF in 2009 as well as Poland, which has had less than 0.1% test positive herds from 2004 to 2008 (Decision 2009/342/EC).

In total, the 16 non-OTF MSs reported 2,801,354 existing bovine herds. In 2008, 0.47% of them were reported infected or positive compared to 0.44% in 2007.

When comparing reported data from non-OTF MSs, it is worthwhile mentioning that Bulgaria and Lithuania reported almost no data for 2007. When 2008 data from these two MSs is excluded, there was a greater increase from 2007 to 2008 in the proportion of existing positive herds in the 14 remaining non-OTF MSs (0.44% and 0.73%, in 2007 and 2008, respectively). Ireland was responsible for the majority of this increase, reporting 4.37% and 5.97% existing herds positive in 2007 and 2008, respectively. The inclusion of the Romanian data since 2007 has reduced the overall proportion of infected herds at both the EU-level (Figure TB4), and within the group of non-OTF MSs since Romania has around 1 million cattle herds of which very few are infected. Further, Romania represented 77% and 64% of existing herds in non-co-financed non-OTF MSs in 2007 and 2008, respectively. Therefore the proportions of existing positive herds in 2007 and in 2008 are not comparable with 2006 (Table TB3).

Compared to 2007, all non-co-financed non-OTF MSs, except Greece and Ireland, reported approximately the same level or a decreased proportion of infected herds (Table TB3). Greece and Ireland reported an increase of 20% and 33% respectively in their number of infected herds. As in previous years, Ireland and the United Kingdom reported the highest proportions of existing herds infected with bovine tuberculosis (5,97% and 2,88%, respectively) among the non-OTF MSs in 2008. In the United Kingdom, the proportion of existing infected herds has decreased during the last couple of years.

Table TB3. Tuberculosis due to* M. bovis *in cattle herds in non-co-financed non-OTF MSs, 2006-2008

Non-officially free MSs	2008			2008	2007	2006
	No. of existing herds	No. of officially free herds	No. of infected herds	% Existing herds infected		
Bulgaria	138,999	0	0	0	0	-
Cyprus	343	159	0	0	0	0
Greece	20,054	13,218	140	0.70	0.43	0.44
Hungary	18,869	18,851	8	0.04	0.03	0.03
Ireland	118,030	0	7,042	5.97	4.37	3.04
Latvia	43,199	0	0	0	0	0
Lithuania	118,421	118,421	0	0	-	0
Malta	150	150	0	0	0	-
Romania[1]	1,065,390	1,054,547	45	<0.01	0.03	-
Slovenia	38,628	38,628	0	0	0	0
Great Britain (UK)[2]	85,585	77,956	2,463	2.88	3.45	3.61
Northern Ireland (UK)[2]	26,676	22,920	769	2.88	2.67	5.46
Total (11 MSs in 2008)	**1,674,344**	**1,344,850**	**10,467**	**0.63**	**0.58**	**1.56**

1. In 2006, Romania was not yet an EU MS, but reported 137 infected herds (0.01%).

2. For UK in 2008, the overall % of existing positive herds was 2.88% (3,232 herds out of 112,261 herds).

3.4 TUBERCULOSIS DUE TO *MYCOBACTERIUM BOVIS*

Compared to 2007, all co-financed non-OTF MSs reported lower percentages for both indicators (the proportions of positive herds among the existing herds and among the tested herds), except Spain which reported a very slight increase in the proportion of positive herds among the existing herds. All these differences are, in absolute terms, at low to very low levels (Table TB4), leading to an overall indicator of 0.25% for tuberculosis positive existing cattle herds and 0.64% for tuberculosis positive tested herds for these five MSs.

As in previous years, Estonia had no positive herds in 2008. In Poland, tuberculosis positive herds has been a rare event (<0.1%) since 2006. In Portugal, the percentage of tuberculosis positive herds has been at very low levels since 2006 and bovine tuberculosis has been rare since 2008. In Italy, during the years 2006 to 2008 the proportions of positive herds among the tested herds has been low and the proportion of positive herds among existing herds always very low, and decreasing. In Italy, the proportion of herds tested positive only include non-OTF regions, and as several provinces and regions have become OTF from 2006 to 2008, this indicator is not fully comparable between years for Italy. In Spain, both indicators were at low levels since 2006.

The overall percentage of OTF herds in the co-financed MSs has increased from 45% in 2007 to 49% in 2008, despite the inclusion in 2008 of data from Estonia, which was not co-financed in 2007 and had no OTF herds in 2008. In Italy, Poland and Spain, the percentage of OTF herds increased in 2008 compared to 2007 while in Portugal it remained stable at a very high level (99%).

Table TB4. Tuberculosis due to* M. bovis *in cattle herds in co-financed non-OTF MSs[/], 2006-2008

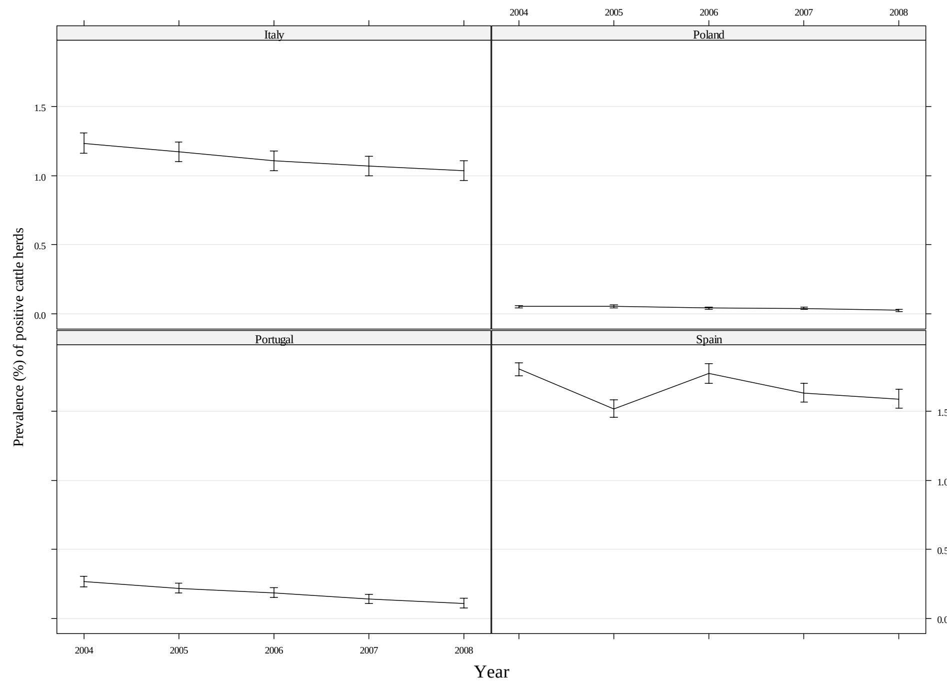
Non-officially free MS	2008					2007		2006	
	No. of existing herds	No. of tested herds[1]	No. of positive herds[1]	% existing herds positive	% tested herds positive	% existing herds positive	% tested herds positive	% existing herds positive	% tested herds positive
Estonia[2]	6,144	6,144	0	0	0	-	-	0	0
Italy[3]	152,516	78,765	815	0.53	1.03	0.57	1.07	0.58	1.11
Poland	789,455	204,674	52	<0.01	0.03	0.01	0.04	0.01	0.04
Portugal[4]	55,784	40,274	43	0.08	0.11	0.10	0.14	0.14	0.18
Spain	142,731	124,956	1,984	1.39	1.59	1.17	1.63	1.46	1.76
Total (5 MSs in 2008)	**1,146,630**	**454,813**	**2,894**	**0.25**	**0.64**	**0.25**	**0.65**	**0.27**	**0.66**

1. Includes only positive herds from regions that have co-financed eradication programmes. No. of existing herds includes all herds in MSs.
2. Estonia did not receive co-financing in 2007, but reported no infected herds among the 7,224 existing herds in 2007.
3. In Italy four regions and 16 provinces are officially tuberculosis free. In the provinces that are OTF or do not have a co-financed eradication programme, a total of 28 of 37,661 existing herds were found infected. In 2006, the number of existing herds is based on data provided in the animal population table.
4. In Portugal, Madeira does not have a co-financed eradication programme, and none of the 1,524 existing herds were found infected.

The MS specific trends in test positive herds in four co-financed non-OTF MSs from 2004 to 2008 are shown in Figure TB5a. The trends seem slightly decreasing in all four MSs. Moreover, a logistic regression analysis showed that overall for this MS-group the slightly decreasing trend during 2004 to 2008 was statistically significant (Figure TB5b). See section 4.2 in the Materials and Methods chapter for a description of the statistical methodology.

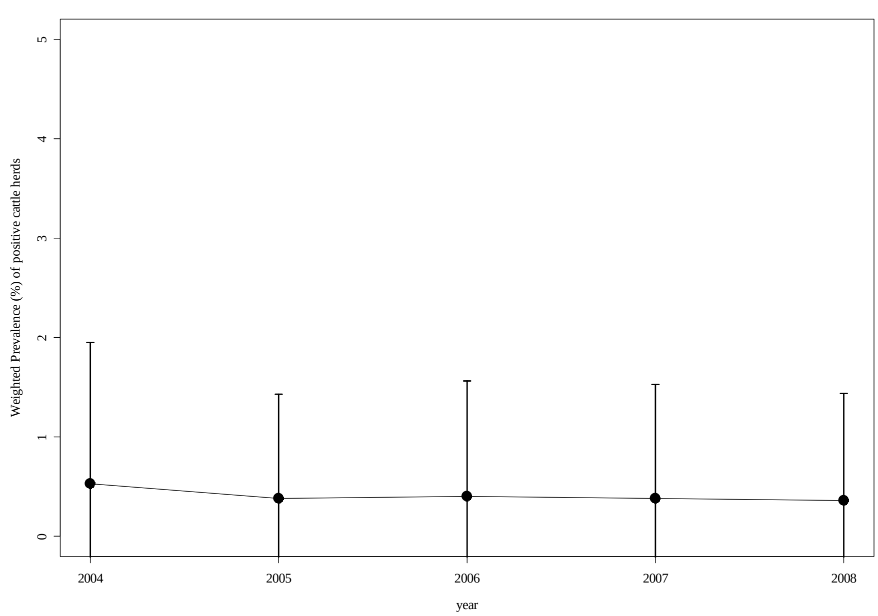
3.4 TUBERCULOSIS DUE TO *MYCOBACTERIUM BOVIS*

Figure TB5a. Prevalence and 95% CI of* M. bovis *test positive cattle herds, at MS-level, in four co-financed non-OTF MSs, 2004-2008



Note: Vertical bars indicate exact binomial 95% confidence intervals

Figure TB5b. Weighted prevalence[1] and 95% CI of* M. bovis *test positive cattle herds, overall for four co-financed non-OTF MSs[2], 2004-2008



Note: Vertical bars indicate exact binomial 95% confidence intervals

1. The prevalence is estimated using weights. The MS-specific weight is the ratio between the number of existing herds and the number of tested herds, per year.
2. Data included from: Italy, Poland, Portugal and Spain.

3.4.4 Discussion

In 2007, data on human tuberculosis due to *Mycobacterium bovis* was reported to TESSy for the first time. The number of reported cases decreased by 11% compared with 2006, however, this could be due to changes in the reporting system. As in 2006, the majority of reported human cases occurred in people that were 65 years old or older, in both OTF and non-OTF countries. Reasons for this observed pattern could include occupational exposure and long incubation periods before clinical onset.

Eleven MSs are officially free of bovine tuberculosis (OTF) and four of these reported few infected cattle herds. However, due to the very low number of these positive herds their status as OTF countries is not jeopardised.

Seven out of the 16 non-OTF MSs reported no infected cattle herds in 2008. Of the nine non-OTF MSs reporting positive herds, Ireland and the United Kingdom accounted for the highest prevalence.

Compared to 2007, the prevalence of bovine tuberculosis remained at a comparable level or decreased slightly in most of the non-OTF MSs, except three MSs that reported an increase in the number of positive herds. However, from 2004 to 2008 a significant slightly decreasing trend in the prevalence of cattle herds tested positive for tuberculosis in the Community co-financed MSs (Italy, Poland, Portugal and Spain) was observed. Thus, the Community co-financing seems to have a positive impact on the overall situation.

3.5 *BRUCELLA*

Brucellosis is an infectious disease caused by some bacterial species of the genus *Brucella*. There are six species known to cause human disease and each of these has a specific animal reservoir: *B. melitensis* in goats and sheep, *B. abortus* in cattle, *B. suis* in pigs, *B. canis* in dogs and *B. ceti* and *B. pinnipedialis* in marine animals. Transmission occurs through contact with animals, animal tissue contaminated with the organisms, or through ingestion of contaminated products.

In humans, brucellosis is characterised by flu-like symptoms such as fever, headache and weakness of variable duration. However, severe infections of the central nervous system or endocarditis may occur. Brucellosis can also cause long-lasting or chronic symptoms that include recurrent fever, joint pain, arthritis and fatigue. Of the six species known to cause disease in humans, *B. melitensis* is the most virulent and causes the most severe illness in the EU. Humans are usually infected from direct contact with infected animals or via contaminated food, typically raw milk.

In animals, the organisms are localised in the reproductive organs causing sterility and abortions, and are shed in large numbers in urine, milk and placental fluid.

Table BR1 presents the countries reporting data for 2008.

Table BR1. Overview of countries reporting* Brucella *data, 2008

Data	Total number of MSs reporting	Countries
Human	26	**All MSs** except DK
		Non MSs: CH, IS, LI, NO
Food	6	**MSs:** BE, DE, IT, PL, PT, ES
Animal	27	**All MSs** **Non MSs:** NO

Note: In the food and animal chapters, only countries reporting 25 samples or more have been included for analyses.

3.5.1 Brucellosis in humans

In 2008, 26 MSs provided information on brucellosis in humans; eight MSs (Cyprus, Estonia, Finland, Hungary, Latvia, Lithuania, Luxembourg and Malta) reported no human cases. In total, 709 cases of human brucellosis were reported in the EU in 2008, of which 87.3% were reported as confirmed cases. MSs with the status as officially free of brucellosis in cattle (OBF), as well as in sheep and goats (ObmF), reported low numbers of cases, whereas the non-OBF/non-ObmF MSs: Greece, Italy, Portugal and Spain, accounted for 85.1% of all confirmed cases reported in 2008 (Table BR2). Greece accounted for 48.8% of the total confirmed cases, including one food-borne outbreak with 111 of the cases. In 2008, Spain was the country which had the largest decrease (53.2%) in confirmed cases compared with 2007.

In the EU, the notification rate of brucellosis in 2008 remained similar to 2007 (0.1 cases per 100,000 population). A statistically significant decreasing trend was observed during a five-year period, 2004-2008, at EU level. This was based on data received from 18 MSs that reported consistently during these years and were included in the trend analysis (Figure BR1). Despite the slight increase in the number of reported confirmed cases in 2008 compared to 2007, there is still an overall decreasing trend in human brucellosis in the EU. Sweden was the only country that had a significant increase in the number of reported confirmed cases. A statistically significant decrease in the number of reported cases was observed in Belgium, Cyprus, Germany, Italy, Spain and the UK.

3.5 *BRUCELLA*

Table BR2. Reported brucellosis cases in humans, 2004-2008[1] and notification rates for confirmed cases in 2008, OBF and ObmF status* is indicated

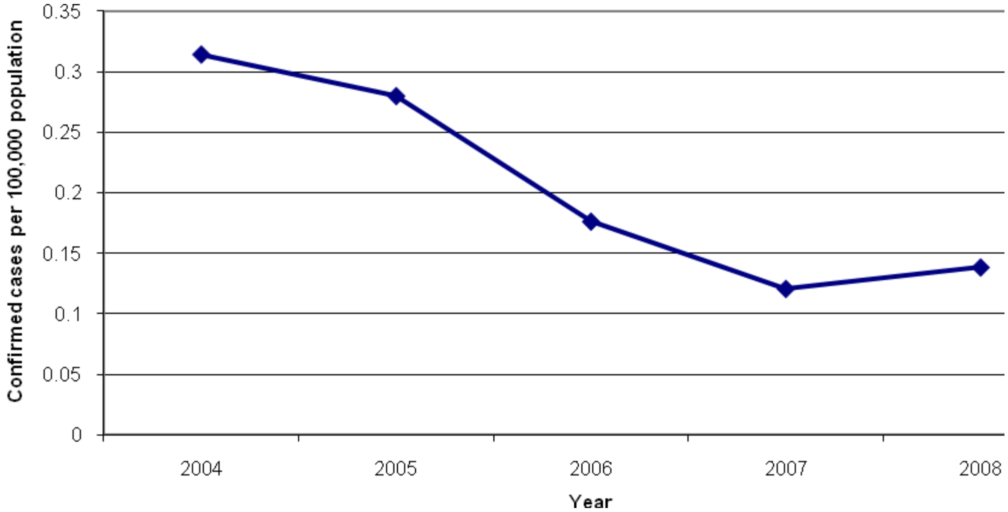
Country	2008				2007	2006	2005	2004
	Report Type[2]	Cases	Confirmed Cases	Confirmed cases/ 100,000	Confirmed cases			Cases
Austria (OBF/ObmF)	C	5	5	0.1	1	1	2	2
Belgium (OBF/ObmF)	A	1	1	<0.1	3	2	2	8
Bulgaria[3]	A	19	8	0.1	9	3		
Cyprus	U	0	0	0	0	0	2	1
Czech Republic (OBF/ObmF)	C	1	1	<0.1	0		1	0
Denmark[4] (OBF/ObmF)	-	–	–	–	–		-	4
Estonia	U	0	0	0	0	0	0	0
Finland (OBF/ObmF)	U	0	0	0	2	0	1	1
France[5](OBF)	C	21	21	<0.1	14	24	35	19
Germany (OBF/ObmF)	C	24	24	<0.1	21	37	31	32
Greece	C	343	302	2.7	100	119	127	210
Hungary (ObmF)	U	0	0	0	1		1	0
Ireland (ObmF)	C	3	2	<0.1	7	4	7	2
Italy[6]	C	75	75	0.1	76	318	632	398
Latvia	U	0	0	0	–	0	0	0
Lithuania	A	0	0	0	0	0	0	1
Luxembourg (OBF/ObmF)	U	0	0	0	–		0	-
Malta	U	0	0	0	0	0	0	-
The Netherlands (OBF/ObmF)	C	8	3	0	5	0	2	8
Poland (ObmF)	C	4	1	<0.1	1	0	3	1
Portugal[7]	C	56	56	0.5	74	76	147	39
Romania[3] (ObmF)	C	2	2	<0.1	4	1		
Slovakia (OBF/ObmF)	C	1	1	<0.1	0	0	0	0
Slovenia (ObmF)	C	2	2	0.1	1	0	0	0
Spain[8]	C	123	94	0.2	201	162	196	589
Sweden (OBF/ObmF)	C	8	8	<0.1	8	4	6	3
United Kingdom (OBF/ObmF)[9]	C	13	13	<0.1	13	16	12	31
EU Totals		**709**	**619**	**0.1**	**541**	**767**	**1,207**	**1,349**
Iceland	U	0	0		0	0	0	-
Liechtenstein	U	0	0		0	0		
Norway (OBF/ObmF)	U	0	0		0	3	0	2
Switzerland (OBF/ObmF)	C	5	5	0.1	1	3	8	10

* OBF/ObmF: Officially Brucellosis-free/Officially *B. melitensis*-free in cattle or sheep/goat population.

1. Number of confirmed cases for 2005-2008 and number of total cases for 2004.
2. A: aggregated data report; C: case based report; –-: No report; U: Unspecified.
3. EU membership began in 2007.
4. No surveillance system exists.
5. In France, 64 departments are ObmF and no cases of brucellosis in small ruminants have been reported since 2003.
6. In Italy, eight regions and 13 provinces are OBF and nine regions and seven provinces are ObmF.
7. In Portugal, four islands in the Azores are OBF and all the Azores are ObmF.
8. In Spain, two provinces of the Canary Islands are ObmF.
9. In the United Kingdom, only Great Britain is OBF.

3.5 *BRUCELLA*

Figure BR1. Notification rate of reported[1] confirmed cases of human brucellosis in the EU[2], 2004-2008



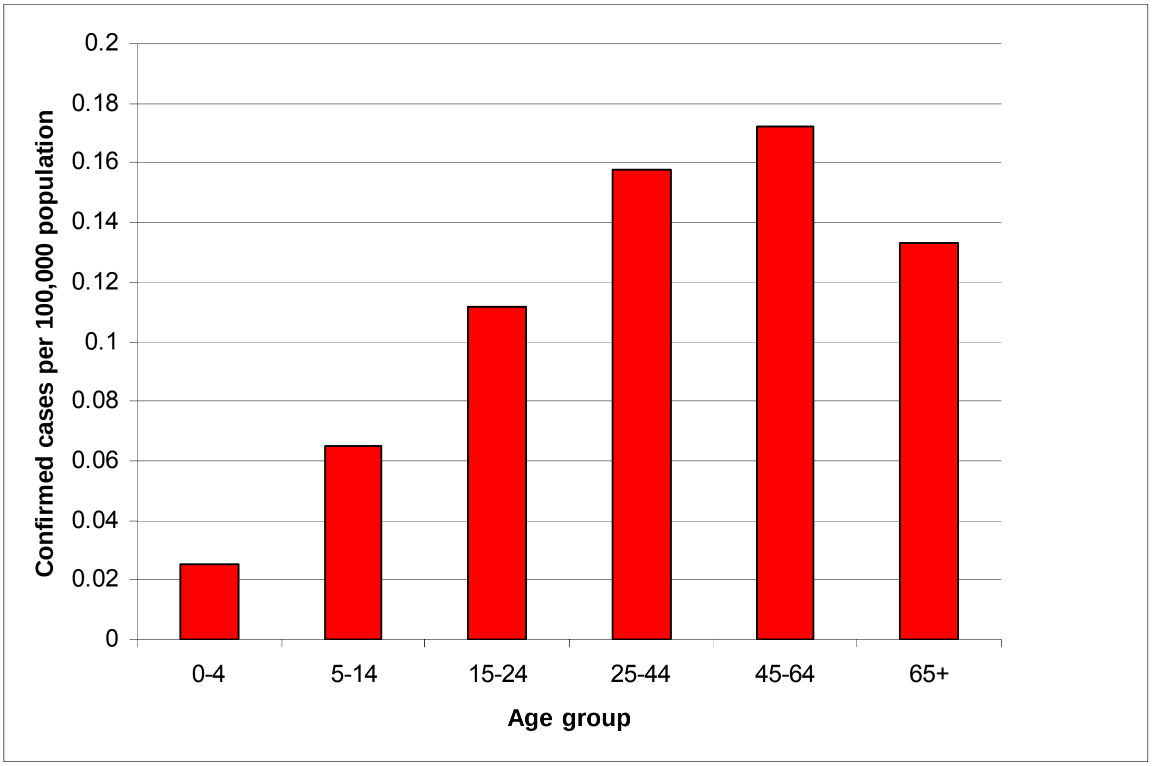
1. Includes total cases for 2004 and confirmed cases from 2005-2008.
2. Includes data from: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Spain, Slovakia, Sweden, United Kingdom.

The highest notification rate of human brucellosis was noted in the age group 45 to 64, followed by the age group 25 to 44, although the number of confirmed cases was slightly higher in the 25 to 44 year old age group (201 cases) compared to the 45 to 64 year old age group (208 cases). This discrepancy between rate and proportion of confirmed cases in those age groups is mainly due to the total population numbers of reporting MSs being smaller for people aged between 45 and 64 years old than for people aged between 25 and 44 years old (Figure BR2).

Brucellosis exhibited a seasonal pattern in 2008 with more cases occurring in the late spring (May) followed by a smaller peak of cases occurring in mid-summer (July) (Figure BR3).

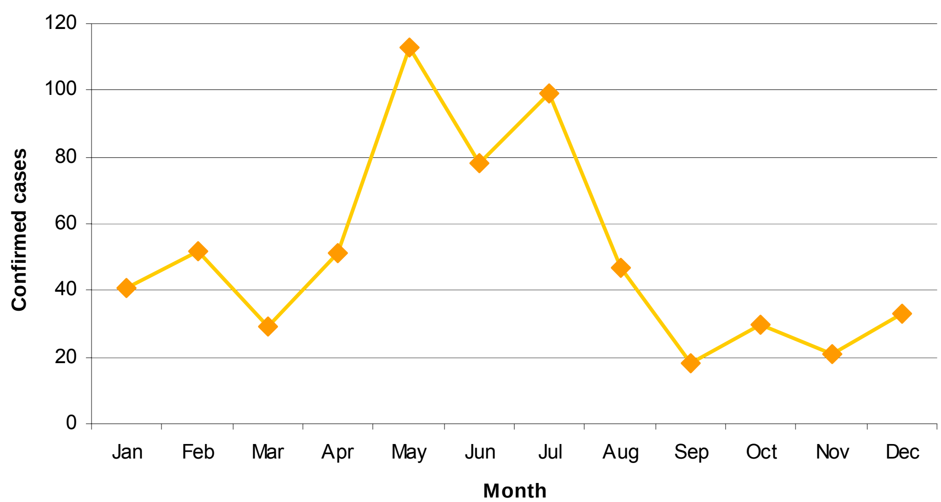
3.5 *BRUCELLA*

Figure BR2. Age-specific notification rate of reported confirmed human cases of brucellosis, TESSy data for reporting MSs, 2008



Note: Includes data from Austria, Czech Republic ,France, Germany, Greece, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, United Kingdom (N=612).

Figure BR3. Seasonal distribution of reported confirmed human cases of brucellosis in reporting MSs, 2008



Note: Includes data from Austria, Czech Republic, France, Germany, Greece, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, United Kingdom (N=612).

3.5 *BRUCELLA*

Seventeen MSs providing information on confirmed human cases reported whether the cases were imported or domestically acquired and in total 63.0% were domestically-acquired. Slovakia and Spain reported all cases to be acquired domestically and France, Germany and Sweden reported most of their cases as imported. Austria, the Czech Republic, the Netherlands and Poland reported all cases as imported (Table BR3). In 2008, more than one in four cases of confirmed brucellosis was of unknown geographical origin. However, compared with 2007, the percentage of confirmed brucellosis cases of unknown geographical origin reported decreased by 17%.

Brucella melitensis and B. abortus were responsible for 11.3% of confirmed cases while B. suis accounted for only 0.2% of reported cases in the EU. However, for 51.2% of confirmed cases, the species was reported as unknown (N=613).

The suspected vehicle of transmission was reported for 612 of confirmed cases, however in 91.8% (562) of these cases, the vehicle was reported as unknown. The suspected known vehicles reported were contact with farm animals (31 cases), consumption of cheese (15 cases), milk (two cases), dairy products (one case) and sheep meat (one case). Portugal contributed with the most information, as in 2007.

Table BR3. Reported confirmed brucellosis cases in humans by reporting countries and origin of case (imported/domestic), 2008

Country	Domestic (%)	Imported (%)	Unknown (%)	Total (N)
Austria	0	100	0	5
Belgium	0	0	100	1
Czech Republic	0	100	0	1
France	9.5	90.5	0	21
Germany	25.0	75.0	0	24
Greece	92.8	2.6	4.6	304
Ireland	0	0	100	2
Italy	0	0	100	75
Netherlands	0	100	0	3
Poland	0	100	0	1
Portugal	0	0	100	56
Romania	50.0	50.0	0	2
Slovakia	100	0	0	1
Slovenia	0	0	100	2
Spain	100	0	0	94
Sweden	0	87.5	12.5	8
United Kingdom	0	38.5	61.5	13
EU Total	**63.0**	**10.8**	**26.3**	**613**

3.5 *BRUCELLA*

3.5.2 *Brucella* in food

Six MSs provided information on *Brucella* in milk, cheese and dairy products in 2008. The majority of samples was of raw cow's milk and none of these samples were found positive (Table BR4). *Brucella* was only reported to be isolated in Italy from raw milk from other animals and from two samples of dairy products.

All data on *Brucella* in food submitted by MSs are presented in Level 3 of the report.

Table BR4. Milk and cheese samples tested for* Brucella*, 2008

Country	Description	Units	N	% Pos
Raw milk from cows				
Belgium	Milk for manufacture	Batch	65,572	0
Italy[1]	-	Single	58	0
Poland	-	Single	340	0
Spain	-	Single	34	0
Raw milk from sheep				
Italy[1]	-	Single	171	0
Raw milk from other animals/unspecified				
Italy[1]	-	Single	440	4.1
Cheese made from milk from cows				
Italy[1]	-	Batch	95	0
Italy[1]	-	Single	35	0
Cheese made from milk from other animals/unspecified				
Italy[1]	-	single	104	0
Dairy products, unspecified				
Italy[1]	-	Single	528	0.4
Total (4 MSs)			**67,377**	**<0.1**

Note: Data are only presented for sample size ≥25.

1. Not indicated whether the milk was raw or pasteurized. It is assumed, that all milk samples were from raw milk.

3.5 *BRUCELLA*

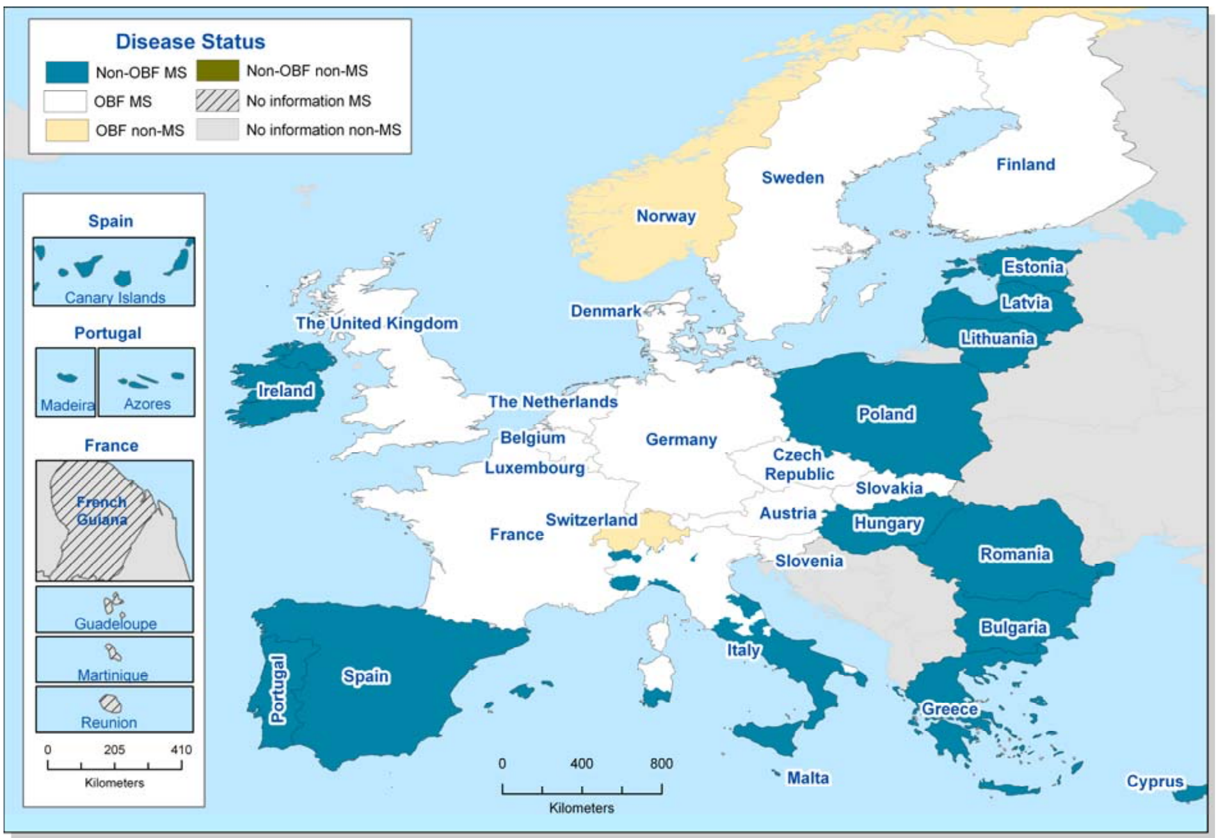
3.5.3 *Brucella* in animals

Cattle

The status regarding freedom of bovine brucellosis (OBF) and the occurrence of the disease in MSs and non-MSs in 2008 are presented in Figures BR4 and BR5. As in 2007, Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Slovakia, Slovenia, Sweden and Norway and Switzerland, were officially free of brucellosis in cattle (OBF). In addition, some new officially free areas were recognised in Italy (one province, Brindisi, and one region, Toscana) and there are now eight regions and 13 provinces OBF in Italy. In the United Kingdom, Great Britain is OBF. In Portugal, four islands of the Azores are OBF.

All data submitted by MSs are presented in Level 3 of the report.

Figure BR4. Status of bovine brucellosis, 2008



3.5 *BRUCELLA*

Figure BR5. Proportion of* Brucella *infected/positive cattle herds, country based data, 2008

Note: Germany provided animal level data only.

Trend indicators for brucellosis

To assess the annual Community trends in bovine and ovine/caprine brucellosis and to complement the MS specific figures, two epidemiological trend indicators have been used since 2005.

The first indicator "% existing herds infected/positive" is "the number of infected herds" (or "the number of herds positive") divided by "the number of existing herds in the country". This indicator describes the situation in the whole country during the reporting year.

The second indicator "% tested herds positive" is "the number of herds test positive" divided by "the number of tested herds". This indicator gives a more precise picture of the testing results and also estimates the period herd prevalence during the whole reporting year. This information is only available from countries with Community co-financed eradication programmes.

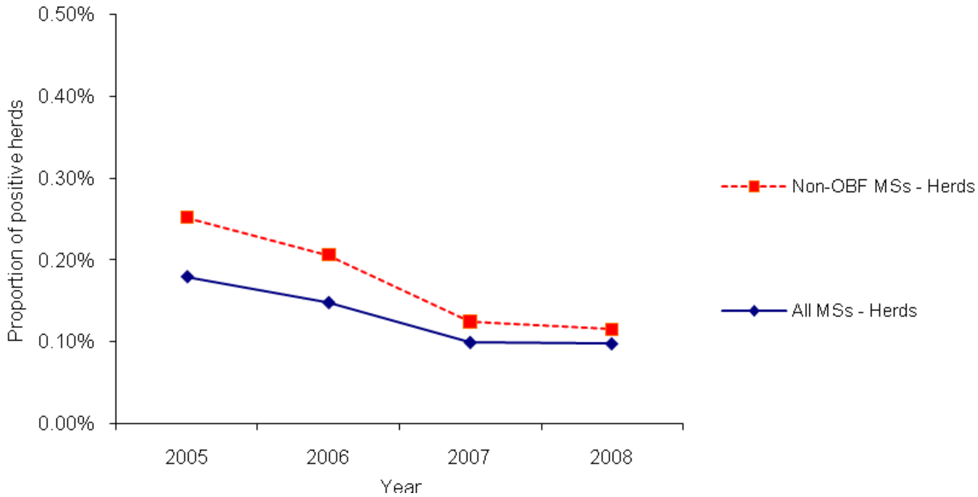
Infected herds are all herds under control, which are not free or officially free at the end of the reporting period. This figure summarises the results of different activities (notification of clinical cases, routine testing, meat inspection, follow-up investigations and tracing). Infected herds are reported from countries and regions that do not receive Community co-financing for eradication programmes.

Positive herds are herds with at least one positive animal during the reporting year, independent of the number of times the herds have been checked. Positive herds are reported from countries and regions that receive Community co-financing for eradication programmes.

3.5 *BRUCELLA*

During the years 2005 to 2008, the proportion of existing bovine brucellosis positive cattle herds has been steadily decreasing to very low levels, and in 2007 and 2008 it became a rare event with proportions of 0.10% (Figure BR6). During the same period, a decreasing trend was observed for the proportion of existing positive herds in the non-OBF MSs. For this group of MSs, the proportion slightly decreased from 0.12% in 2007 to 0.11% in 2008.

***Figure BR6. Proportion of existing cattle herds infected with or positive for* Brucella *2005-2008*[1]**



1. Missing data from OBF MSs: Germany (2008) and non-OBF MSs: Hungary (2005), Malta (2006), Bulgaria (2007), Lithuania (2007). Romania included for the first time in 2007 and Bulgaria in 2008.

Officially Bovine Brucellosis Free (OBF) MSs, non-MSs

With the exception of one herd in Austria, infection was not detected in any cattle herd in the 12 OBF MSs, Norway and Switzerland, during 2008. Germany provided only animal level data, reporting 5 out of 462,206 units positive for *Brucella* spp.

Non-OBF Member States and non-MSs

In 2008, the 15 non-OBF MSs reported a total population of 2,587,376 bovine herds, of which 0.12% was found infected or positive for bovine brucellosis, which was equal to the 2007 proportion.

When comparing data from non-OBF MSs (Figure BR6) it is worthwhile to mention that the observed decrease from 2006 to 2007 was mainly due to the inclusion of data from Romania in 2007, which joined the EU in 2007 and had more than 1.2 million cattle herds (35% of all herds in the EU) and none of these herds were reported infected with bovine brucellosis. When excluding the Romanian data from the 2007 and 2008 dataset, no difference in the EU proportion of existing herds positive was observed in 2007 and 2008 compared to 2006.

Five non-OBF MSs: Estonia, Hungary, Latvia, Lithuania and Romania, reported no positive cattle herds out of 1,262,440 existing bovine herds in 2008. These MSs joined the Community in 2004 and in 2007 Romania joined.

In 2008, positive herds were detected in Bulgaria, Greece, Malta and Poland, which were non-OBF MSs without Community co-financed eradication programmes. The percentages of positive existing cattle herds for these MSs were 0.003%, 0.94%, 0.85% and 0.002%, respectively.

The six non-OBF MSs with Community co-financed eradication programmes reported positive cattle herds in 2008 (Table BR5). Overall, the percentage of positive tested herds decreased from 0.85% to 0.78%, whereas the percentage of existing positive herds remained unchanged (0.60%). An increase in both indicators was observed in the United Kingdom (Northern Ireland), whereas for Ireland, Italy, Portugal and Spain both indicators decreased. Cyprus, which reported no positive herds last year, had one herd tested positive this year. The highest proportion of positive existing herds was reported by Italy although still considered to be low. Cyprus, Portugal, Spain, Ireland and Northern Ireland all reported a very low prevalence below 1%.

Table BR5.* Brucella *in cattle herds in six co-financed non-OBF MSs[1], 2006-2008

Non-officially free MSs	2008					2007		2006	
	No. of existing herds	No. of tested herds[1]	No. of positive herds[1]	% existing herds positive[1]	% tested herds positive[1]	% existing herds positive[1]	% tested herds positive[1]	% existing herds positive[1]	% tested herds positive[1]
Cyprus	343	284	1	0.29	0.35	0	0	0.29	0.32
Greece	-	-	-	-	-	-	-	0.94	2.89
Ireland	118,030	116,184	111	0.09	0.10	0.13	0.14	0.11	0.11
Italy[2]	136,802	56,872	1,758	1.29	3.09	1.30	3.18	0.81	1.93
Poland	-	-	-	-	-	-	-	<0.01	<0.01
Portugal[3]	57,320	50,685	351	0.61	0.69	0.63	0.79	0.82	1.00
Spain	142,339	123,584	495	0.35	0.40	0.39	0.57	0.71	0.84
UK - Northern Ireland	26,780	23,396	192	0.72	0.82	0.58	0.65	0.43	0.49
Total (6 MSs in 2008)	**481,614**	**371,005**	**2,908**	**0.60**	**0.78**	**0.60**	**0.85**	**0.25**	**0.55**

1. Include only positive herds from regions that have co-financed eradication programmes.
2. In Italy, eight regions and 13 provinces are officially brucellosis free. In the provinces that are OBF or do not have a co-financed eradication programme, three of the 62,839 existing herds were found infected. In 2006, the number of existing herds is based on data provided in the animal population table.
3. In Portugal, four islands in the Azores are OBF and Madeira does not have a co-financed eradication programme. In these areas, none of the 3,060 existing herds, were found infected.

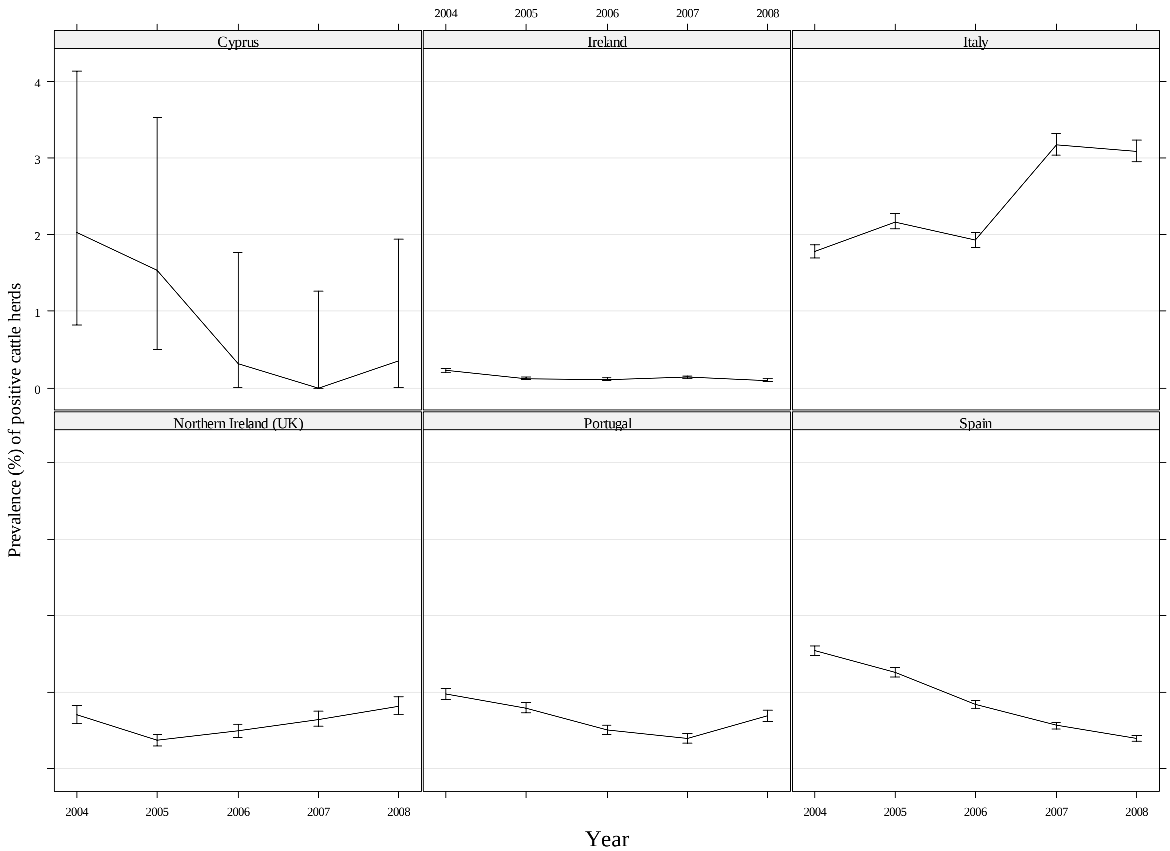
In all the co-financed non-OBF MSs with no OBF regions, the majority (82%-100%) of the existing cattle herds were under control programmes. In Italy, where several regions and provinces are OBF, 77.7% of the existing herds in the non-OBF regions were under control programmes. For further details see Level 3.

The MS-specific trends in test positive herds in six co-financed non-OBF MSs from 2004 to 2008 are shown in Figure BR7a.

Since 2004, the prevalence of brucellosis test positive cattle herds (the second epidemiological indicator) appears to have decreased or remained at a low level in most of the co-financed non-OBF MSs (Cyprus, Ireland, Portugal and Spain). The exceptions are Italy, who observed a considerable increase of the prevalence from 2006 to 2007, but in 2008 remained at a level comparable to 2007, and the United Kingdom (Northern Ireland), where an increase since 2005 was observed, albeit a very low prevalence level. However, in Italy several provinces were declared OBF in 2004 to 2008, and in some other provinces the occurrence was so low that they did not receive co-financing for eradication programmes. Therefore, Italian data reflects the results of regions having the highest prevalence instead of the situation in the whole country. A logistic regression analysis indicated that overall for this MS-group there was no significant trend in the weighted prevalence of brucellosis test positive cattle herds from 2004 to 2008 (Figure BR7b). See section 4.2 in the Materials and Methods chapter for a description of the statistical methodology.

3.5 *BRUCELLA*

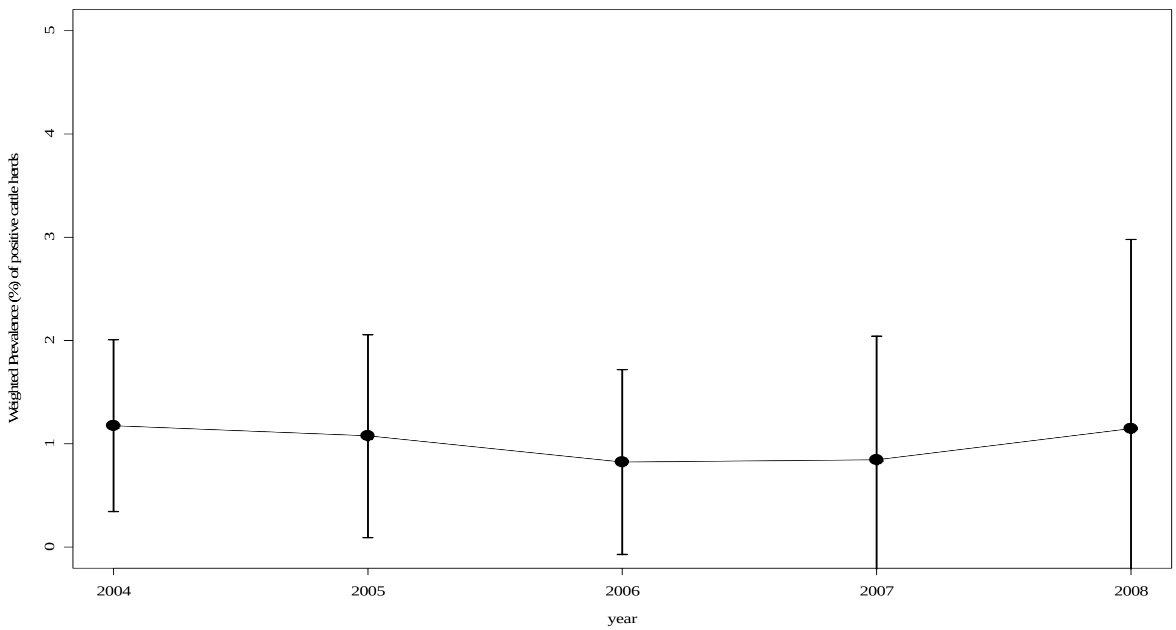
Figure BR7a. Prevalence and 95% CI[1] of* Brucella *test positive cattle herds, at MS-level, in six non-OBF co-financed MSs, 2004-2008



1. Vertical bars indicate exact binomial 95% confidence intervals.

3.5 *BRUCELLA*

Figure BR7b. Weighted prevalence[1] and 95% CI2 of* Brucella *test positive cattle herds, overall for six co-financed non-OBF MSs3, 2004-2008



1. The EU-prevalence is estimated using weights. The MS-specific weight is the ratio between the number of existing herds and the number of tested herds per MS per year.
2. Vertical bars indicate exact binomial 95% confidence intervals.
3. Includes data from: Cyprus, Ireland, Italy, Portugal, Spain, United Kingdom (Northern Ireland).

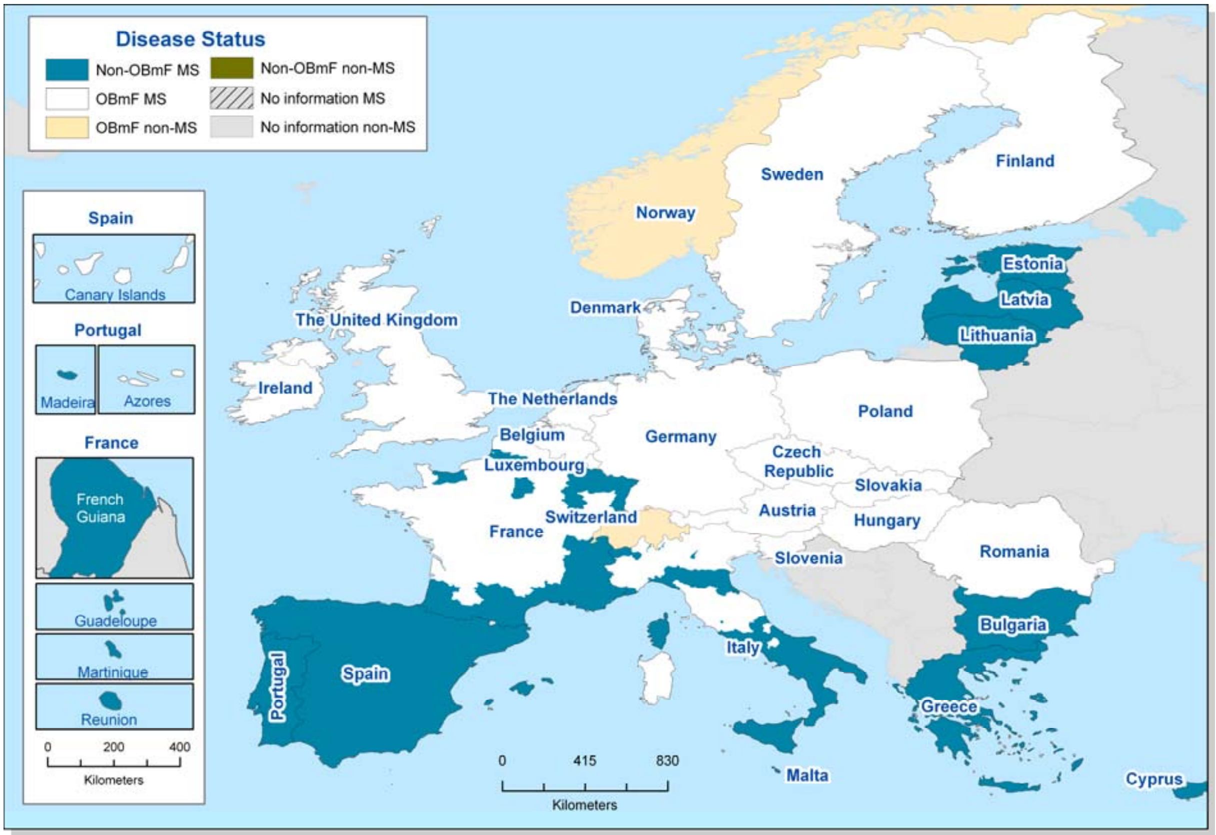
Sheep and goats

The status of the countries regarding freedom of ovine and caprine brucellosis caused mainly by *B. melitensis* (ObmF) and occurrence of the disease in MSs and non-MSs in 2008 are presented in Figures BR8 and BR9.

All data submitted by MSs are presented in Level 3 of the report.

3.5 *BRUCELLA*

Figure BR8. Status of ovine and caprine brucellosis, 2008

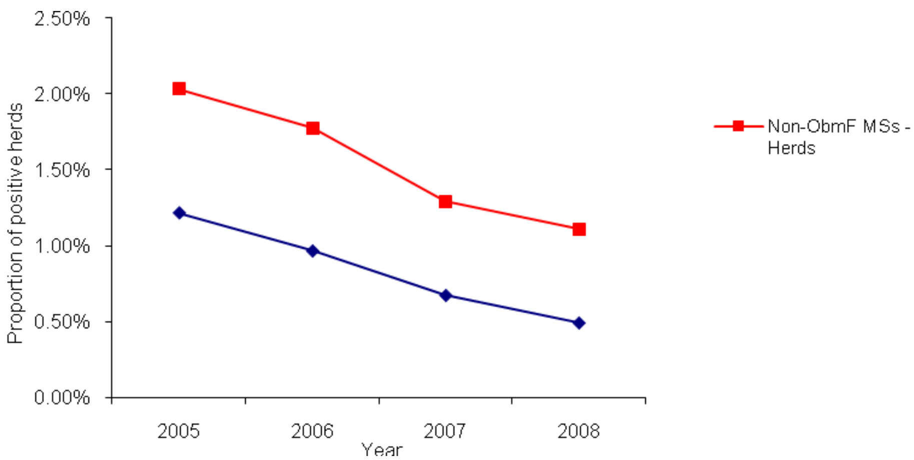


3.5 *BRUCELLA*

Figure BR9. Proportion of* Brucella *infected/positive sheep and goat herds, country based data, 2008

During the years 2005 to 2008, the proportion of existing positive sheep and goat herds infected with *B. melitensis* has been decreasing from 1.2.% in 2005 to a very low level of 0.5% in 2008. An analogous general decreasing trend can be observed for the proportion of existing positive herds in the non-ObmF MSs from 2.0% in 2005 to 1.1% in 2008 (Figure BR10).

***Figure BR10. Proportion of existing sheep and goat herds infected with or positive for* Brucella*, 2005-2008*[1]**



Note: Missing data from Bulgaria (2007), Germany (2005-2007), Hungary (2005), Lithuania (2005, 2007), Luxembourg (2005, 2006, 2008), Malta (2005-2006), Romania (2008). Romania reported data on animal level in 2008.

Officially *B. melitensis* Free (ObmF) Member States, non-MSs and regions

In 2008, 16 MSs (Austria, Belgium, Czech Republic, Denmark, Finland, Germany, Hungary, Ireland, Luxembourg, the Netherlands, Poland, Romania, Slovenia, Slovakia, Sweden and the United Kingdom) and Norway and Switzerland, were ObmF. In the ObmF MSs no positive herds were detected, except in Austria where one herd tested positive serologically, although the result could not be confirmed by isolation of the bacterium.

ObmF regions have been declared in France (64 departments), Italy (nine regions and seven provinces), Portugal (all the Azores Islands) and Spain (the two provinces of the Canary Islands). Italy reported 18 positive herds in some regions with ObmF provinces (the whole region was not ObmF). However, these findings do not jeopardise the ObmF status of the provinces.

Non-ObmF Member States

In 2008, 11 non-ObmF MSs reported a total population of 466,407 sheep and goat herds, of which 1.1% were found infected with or positive for *B. melitensis*. This was a substantial decrease compared to 2007 (1.7%). (Figure BR10).

When comparing data from non-ObmF MSs it is worthwhile to mention that the observed decrease from 2006 to 2007 was mainly due to the inclusion of data from Romania (ObmF) in 2007, who joined the EU in 2007. Romania had more than 0.5 million sheep and goat herds (39% of all herds in the EU) of which very few were infected (0.6%). On the contrary, data for Romania were not included in the EU-proportion in 2008, because data were not reported for herds but only for 2,029,095 animals, of which none tested positive. In 2008, data from Bulgaria were included for the first time (85,656 herds, corresponding to 19% of all herds in the EU, of which only two herds were infected).

In 2008, three non-ObmF MSs without Community co-financed eradication programmes (Estonia, Latvia and Lithuania), reported no infected herds out of 24,094 existing ovine and caprine herds. *B. melitensis* has never been detected in Latvia and has not been detected in Estonia since the 1960s.

Among the non-ObmF MSs with Community co-financed eradication programmes in 2008, the overall proportion of existing positive herds increased compared to 2007, whereas the proportion of tested positive herds decreased (Table BR6). However, the overall increase in the first indicator is mainly due to the exclusion of data from France and Greece in 2008, since they no longer have community co-financed eradication programmes. In 2008, the proportion of existing positive herds was at a very low level in Cyprus and at low levels in Italy, Portugal and Spain.

Table BR6. **Brucella** ***in sheep and goat herds in co-financed non-ObmF MSs[1], 2006-2008***

Non-officially free MSs	2008					2007		2006	
	No. of existing herds	No. of tested herds[1]	No. of positive herds[1]	% existing herds positive[1]	% tested herds positive[1]	% existing herds positive	% tested herds positive[1]	% existing herds positive	% tested herds positive[1]
Cyprus	3,482	2,803	4	0.11	0.14	0.08	0.10	0.21	0.25
France[2]	-	-	-	-	-	0	0	0	0
Greece	-	-	-	-	-	0.15	3.04	0.23	4.66
Italy[3]	112,000	45,314	1,690	1.51	3.73	1.92	4.23	1.49	4.23
Portugal[4]	73,647	68,245	1,028	1.40	1.51	1.42	1.60	2.13	2.25
Spain[5]	119,851	110,444	2,331	1.94	2.11	2.50	2.82	2.93	3.20
Total (4 MSs in 2008)	**308,980**	**226,806**	**5,053**	**1.64**	**2.23**	**1.32**	**2.59**	**1.53**	**2.94**

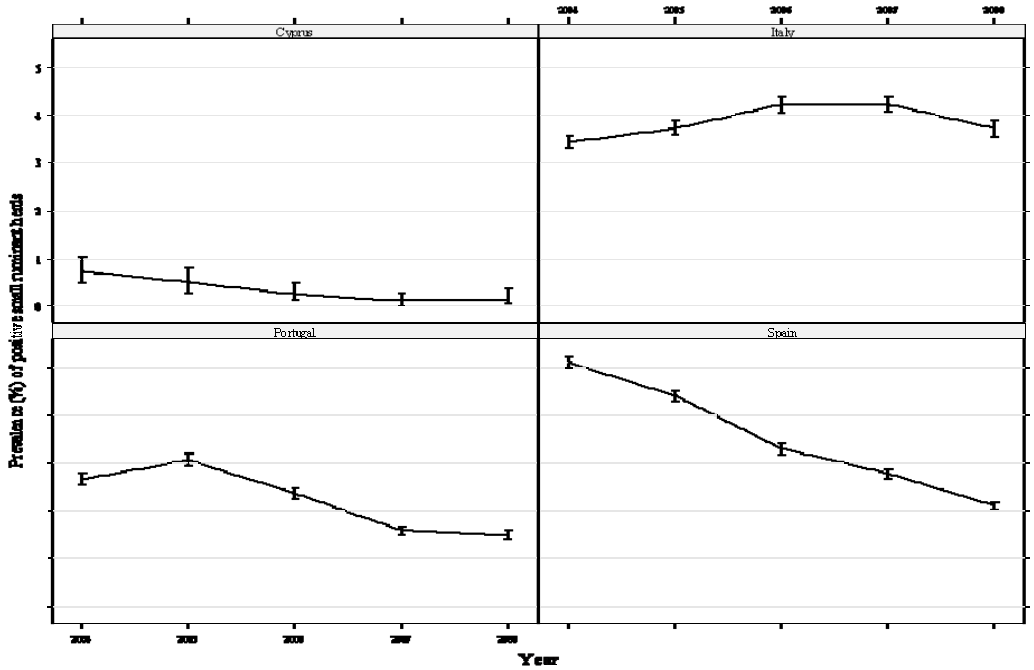
1. Include only tested and positive herds from regions that have co-financed eradication programmes.
2. In France, 64 departments are officially free of *B. melitensis*. In 2007, in the ObmF departments, none of the 127,503 existing herds were found infected. In the rest of France, no infected herds have been reported since 2004.
3. In Italy, 9 regions and 7 provinces are officially free of *B. melitensis*. In the provinces that are ObmF or do not have a co-financed eradication programme, 18 of the 61,496 existing herds were found infected.
4. In Portugal, the Azores are ObmF and Madeira is not co-financed. In these areas none of the 4,098 existing herds were found infected.
5. In Spain, the two provinces of the Canary Islands are OmbF, and none of the 4,272 existing herds at the Canary Islands were found infected.

During 2004 to 2008 a decreasing trend in the overall weighted prevalence was observed in the MS-group of four reporting co-financed non-ObmF, but the logistic regression analysis indicated that this trend was not statistically significant (Figure BR11b). See Appendix 1 and notes to Figure BR11b for statistical descriptions.

Since 2004, the prevalence of sheep and goat herds positive for B. melitensis has decreased in Cyprus, Portugal and Spain. In Italy, an increase has been observed from 2004 to 2007 followed by a small decrease in 2008 (Figure BR11a). The increase in Italy in 2004 to 2006 in positive tested herds is due to progress made in the eradication programme where the declared ObmF provinces and regions are no longer counted in co-financed programmes. Therefore, Italian data reflects the results of regions having the highest prevalence instead of the situation in the whole country.

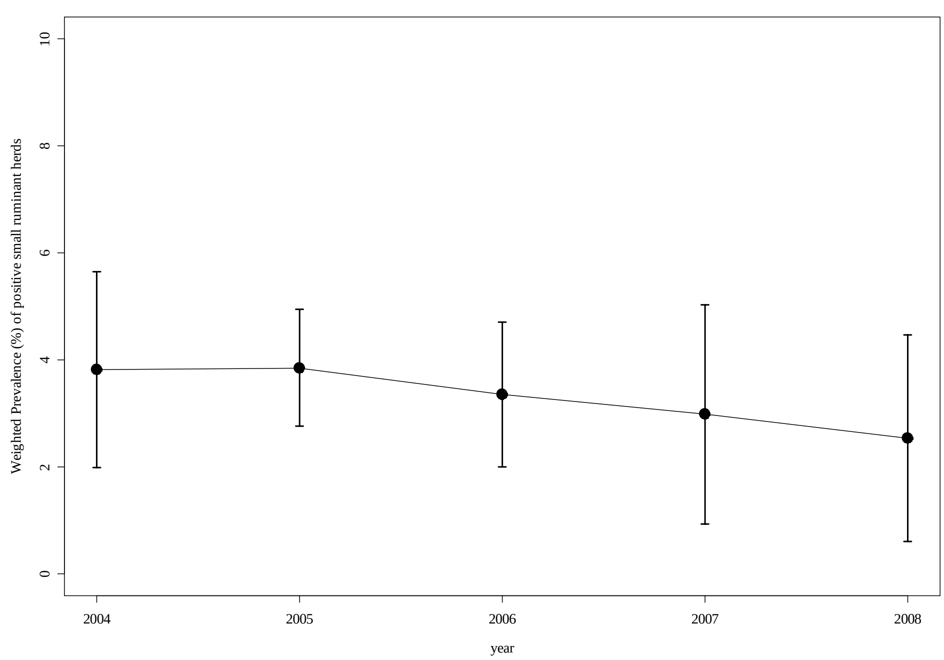
3.5 BRUCELLA

Figure BR11a. Prevalence and 95% CI[1] of Brucella *test positive sheep and goat herds, at MS-level, in four non-ObmF co-financed MSs, 2004-2008*



1. Vertical bars indicate exact binomial 95% confidence intervals.

Figure BR11b. Weighted prevalence[1] and 95% CI[2] of Brucella *test positive sheep and goat herds, overall for four co-financed non-Obmf MSs[3], 2004-2008*



1. The prevalence is estimated using weights. The MS-specific weight is the ratio between the number of existing herds and the number of tested herds per MS per year.
2. Vertical bars indicate exact binomial 95% confidence intervals. 3. Includes data from: Cyprus, Italy, Portugal, Spain.

3.5 *BRUCELLA*

3.5.4 Discussion

In 2008, the number of reported cases of human brucellosis in the EU increased by 14% compared to 2007. This is mainly due to an outbreak of *Brucella melitensis* that occurred in Greece affecting more than one hundred people and was caused by the consumption of contaminated cheese of sheep's and goat's milk. However, despite this slight increase, the overall trend of human brucellosis for the last five years has been decreasing at EU level. As in previous years, the main vehicles of transmission were contact with farm animals and consumption of contaminated cheese and milk.

In the EU, existing cattle herds were only rarely found positive for *B. abortus* in 2008, and the proportion of positive herds stayed at the same level as in 2007 (0.1% of EU herds). In the Community co-financed MSs that were not free of bovine brucellosis (non-OBF), the proportion of positive tested herds decreased compared to 2007, whereas the proportion of positive existing herds remained unchanged compared to 2007. An increase in these two indicators was observed only in Northern Ireland (the United Kingdom). Overall, in the Community co-financed non-OBF MSs no significant trend was observed in the cattle herds tested positive from 2004 to 2008.

For small ruminants, sheep and goats, the total proportion of existing herds positive for *B. melitensis* has decreased since 2005 in the EU and was at a level of 0.5% in 2008. In the Community co-financed MSs that were not free from *B. melitensis* (non-ObmF), the proportion of positive existing herds increased compared to 2007, whereas the proportion of herds that tested positive decreased. However, the former increase was mainly because two MSs with very low prevalence were excluded since they no longer received co-financing. The trend over the last five years in the co-financed non-ObmF MSs is decreasing, although not statistically significant.

The data reported during the last couple of years indicate that the prevalence of small ruminant brucellosis is decreasing in the EU, while the situation seems to stay more stable as regards bovine brucellosis. This may illustrate the difficulties MSs encounter in eradicating the diseases from their national herds when a low prevalence has already been reached.

Infected herds of both bovine and small ruminant brucellosis are geographically concentrated in southern European MSs, and for bovine brucellosis on the island of Ireland as well.

One MS reported findings of *Brucella* in raw milk and in other dairy products and another MS reported a food-borne outbreak of brucellosis caused by cheese. This indicates that the health risk related to such foodstuffs is still relevant in the Community.

3.6 RABIES

3.6 RABIES

Rabies is a disease caused by a rhabdovirus of the genus *Lyssavirus*. This virus can infect all warm-blooded animals and is transmitted through contact with saliva from infected animals, typically from foxes and stray dogs, e.g. via animal bites. The disease causes swelling in the central nervous system of the host and is usually fatal. The majority of rabies cases in Europe are caused by the classical rabies virus (genotype 1). In addition, two *Lyssavirus* genotypes (five and six), also known as European Bat *Lyssavirus* type 1 and 2 (EBLV-1 and -2, respectively), are detected in bats in Europe. In rare cases, the infection from bats can be transferred to other mammals, including humans.

Symptoms in humans include a sense of apprehension, headache, fever and death. Human cases are extremely rare in industrialised countries. However, those working with bats and other wildlife are encouraged to seek advice on preventive immunisation.

In animals, pathogenicity and infectivity of the classical rabies virus vary greatly among different species. Infected animals may exhibit a wide range of symptoms, including drooling, difficulty in swallowing, irritability, strange behaviour, alternating rage, apathy and increasing paralysis of lower jaw and hind parts. Animals may excrete the virus during the incubation period, up to 14 days prior to the onset of clinical symptoms. For EBLV infections such data is very limited.

Table RA1 presents countries reporting data in 2008.

Table RA1. Overview of countries reporting data on* Lyssavirus*, 2008

Data	Total number of MSs reporting	Countries
Human	27	**All MSs**
		Non-MSs: IS, LI, NO
Animal	25	**All MSs** except for CY, MT
		Non-MSs: CH, NO

3.6 RABIES

3.6.1 Rabies in humans

Generally, very few rabies cases in humans are reported in the EU, and most MSs have not had any indigenous cases for decades. In 2008, four cases were reported. Two of the cases were infected while travelling abroad (Table RA2). It can be noted that the number of cases of human rabies in the EU have increased from an average of one or two cases per year during 2001 to 2006, to three cases in 2007, and four cases in 2008.

Table RA2. Human rabies cases, 2001-2008

Year	Country	Case
2001	United Kingdom	1 visitor from Philippines.
2002	United Kingdom	1 registered bat handler died from EBLV[1.]
2003	France	1 visitor from Gabon.
2004	Austria	1 case imported from Morocco.
	Germany	1 imported case.
2005	Germany	4 cases in total: 3 patients became ill after receiving organs from a rabies infected donor. The donor was infected during a trip to India.
2006	-	No cases
2007	Finland	1 case from the Philippines who was bitten by a dog in his home country, fell ill with rabies when working on a ship in the Baltic Sea and was hospitalised in Finland and died there.
	Germany	1 case imported from Morocco.
	Lithuania	1 case imported from India after contact with dog.
2008	France	1 case in the overseas department of French Guiana.
	Netherlands	1 case imported from Kenya.
	Romania	1 case.
	United Kingdom	1 imported case.

Note:. EBVL: European Bat *Lyssavirus*

3.6 RABIES

3.6.2 Rabies in animals

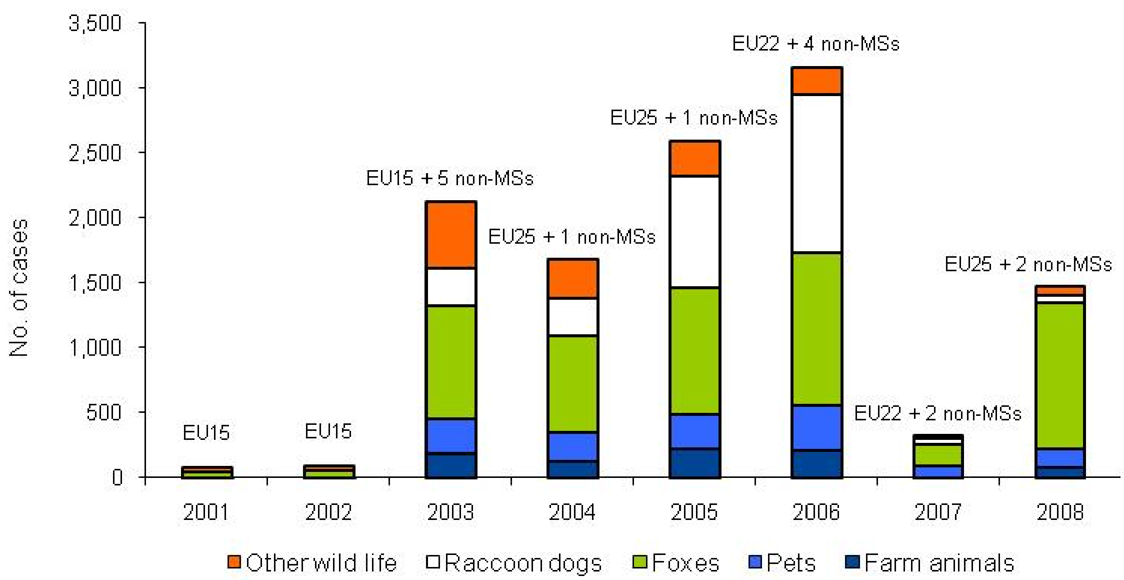
All MSs, except Cyprus and Malta, reported information on rabies cases in animals. Belgium, Cyprus, Finland, Greece, Luxembourg, Malta, Portugal, Sweden, and Norway have had no reports of indigenous rabies in animals since at least 2001 (either classical rabies or European Bat *Lyssavirus* (EBLV)). Denmark, France and the United Kingdom have not reported indigenous cases of classical rabies for many years, but have reported EBLV in bats several times. Denmark reported EBLV in a sheep in 2002 and France reported EBLV in cats in 2007.

According to Directive 64/432/EC rabies is notifiable in bovine animals and pigs in all MSs. In 2008, all MSs with animal cases of classical rabies, except Bulgaria and Romania, have implemented rabies eradication programmes focusing on foxes, and in some MSs also on raccoon dogs. Within the frame of these eradication programmes, oral vaccinations for wildlife are performed through the distribution of baits. The Czech Republic, Estonia, Finland, Germany, Latvia and Slovenia had multi-annual eradication programmes and Bulgaria, Lithuania, Austria, Hungary, Poland, Romania and Slovakia had annual eradication programmes approved and co-financed by the European Commission in 2008 (Decision 2007/782/EC). Vaccination of carnivorous pets, such as dogs and cats, against rabies is compulsory in 14 MSs including six MSs with co-financed vaccination programmes for foxes. For more detailed information on vaccination programmes see Appendix Table RA1.

Samples from farm animals and pets, and in many cases from wildlife, are collected based on suspicion of a potential rabies infection in the framework of rabies surveillance programmes. In addition, Austria, the Czech Republic, Greece, Luxembourg, Poland and Slovenia provided information on rabies monitoring programmes in wildlife. Most of these programmes focus on measuring the antibody response in vaccinated animal populations from areas where eradication programmes are carried out.

In 2008, a higher number of cases of classical rabies or unspecified *Lyssavirus* in animals was reported compared to the previous year. In 2007, however, the number of positive cases was markedly reduced only due to missing reporting from Lithuania and Romania. When comparing the results from 2008 with the years prior to 2007 there has been a general decrease in the total number of positive animals (Figure RA1). In particular, Lithuania reported a large decrease in the proportion of positive samples from all animal categories, most likely due to the eradication programmes implemented. In Lithuania, rabies prevalence in sampled foxes decreased from 83.4% in 2006 to 4.1% in 2008 and in raccoon dogs it decreased from 89.0% in 2006 to 7.4% in 2008.

Figure RA1. Reported cases[1] of classical rabies or unspecified* Lyssavirus *in animals in EU and other reporting countries, 2001-2008



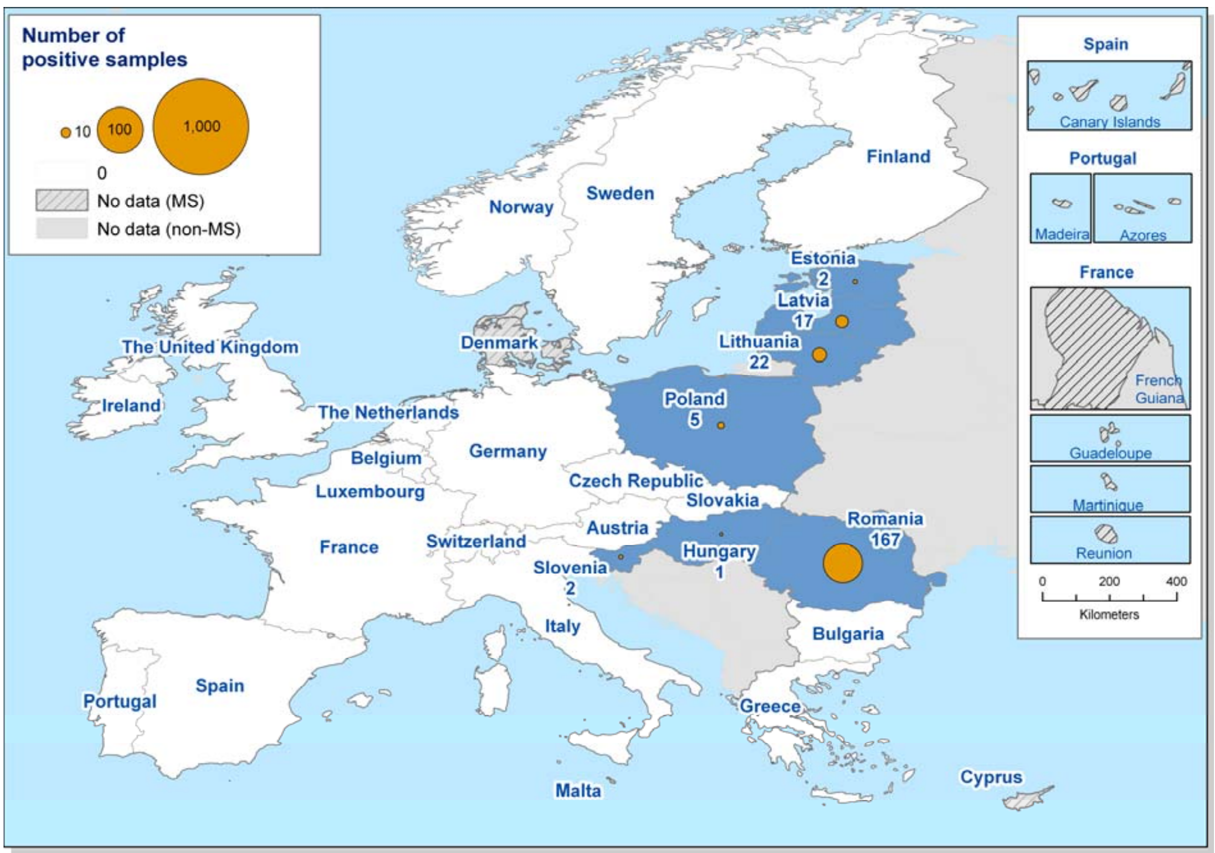
Note: the number of reporting MSs and non-MSs are indicated at the top of each bar. 1. Imported cases are not included.

3.6 RABIES

In 2008, most of the cases in terrestrial animals were reported from foxes (76.5%) (Figure RA1). Nine MSs reported positive cases of classical rabies in foxes; and only these MSs reported indigenous cases in other wild and/or domestic animal species including farm animals and pets. Six MSs: Estonia, Latvia, Lithuania, Poland, Romania and Slovenia, reported rabies cases in each of the animal categories of farmed animals, pets and wildlife in 2008. France and Germany reported only cases in illegally imported dogs, while the United Kingdom had only one legally imported case in dog. Six MSs reported EBLV or unspecified *Lyssavirus* in bats (Table RA3).

In total, 80 cases of classical rabies in farm animals (from cattle, goats, sheep, solipeds, and pigs) were reported from six MSs, and 141 cases of classical rabies or unspecified *Lyssavirus* in pets were reported by ten MSs (Figure RA2). Romania reported the highest number of rabies cases in cattle and pet animals, 58 and 109, respectively. Additionally, France reported two cases from illegally imported dogs from Morocco and Gambia, and one secondary case, epidemiologically linked to one previously reported case of a dog illegally imported from Morocco. Germany reported one rabies case in dog illegally imported from Croatia. Further, one legally imported dog from Sri Lanka died of rabies in a quarantine premises in the United Kingdom (Table RA3).

Figure RA2. Classical rabies or unspecified* Lyssavirus *cases in domestic animals, 2008



Note: All data provided were based on suspicious sampling or other convenience type sampling. Findings in the following species are included: pigs, cattle (bovine animals), goats, sheep, solipeds, hamsters (pet animals), rabbits (pet animals), rats (pet animals), cats (not stray cats) and dogs (not stray dogs). Rabies cases in imported dogs are not included.

3.6 RABIES

Table RA3. Number of tested animals and positive cases of rabies in domestic animals and wildlife, 2008

Country	Classical rabies virus or unspecified *Lyssavirus*												Unspecified European Bat *Lyssavirus* or unspecified *Lyssavirus*	
	Farm animals[1]		Cats (pets)		Dogs (pets)[2]		Foxes		Raccoon dogs		Other		Bats[3]	
	N	Pos	N	Pos	N	Pos	N	Pos	N	Pos	N	Pos	N	Pos
Austria	67	0	-	-	57	0	8,244	0	-	-	1,098	0	68	0
Belgium	328	0	24	0	12	0	245	0	-	-	79	0	25	0
Bulgaria	34	0	-	-	-	-	74	34	-	-	95	18	-	-
Czech Republic	5	0	270	0	156	0	8,259	0	9	0	204	0	13	0
Denmark	-	-	-	-	-	-	-	-	-	-	0	0	16	0
Estonia	38	1	67	0	32	1	80	1	66	0	24	0	1	0
Finland	5	0	10	0	36	0	437	0	270	0	80	0	-	-
France	33	0	843	0	1,042	0	228	0	8	0	71	0	223	4
Germany	191	0	211	0	83	0	12,561	0	584	0	850	0	76	10
Greece	-	-	1	0	12	0	1	0	-	-	1	0	1	0
Hungary	53	0	564	0	323	1	8,542	6	2	0	133	0	6	0
Ireland	-	-	-	-	1	0	-	-	-	-	0	0	-	-
Italy	3	0	154	0	324	0	1,865	8	-	-	549	1	11	0
Latvia	34	6	116	5	92	6	397	44	159	41	179	8	-	-
Lithuania	67	11	177	6	199	5	314	13	285	21	240	13	-	-
Luxembourg	7	0	4	0	-	-	20	0	-	-	0	0	-	-
Netherlands	-	-	4	0	4	0	7	0	-	-	2	0	124	11
Poland	79	3	945	1	500	1	21,293	19	89	2	875	0	73	3
Portugal	-	-	1	0	5	0	12	0	-	-	1	0	-	-
Romania	615	58	85	63	604	46	2,350	951	-	-	26	24	-	-
Slovakia	10	0	205	0	280	0	3,422	0	-	-	90	0	2	0
Slovenia	38	1	89	0	74	1	2,329	51	-	-	86	2	260	0
Spain	-	-	21	0	-	-	-	-	-	-	103	0	45	1
Sweden[4]	-	-	2	0	11	0	-	-	-	-	2	0	138	0
United Kingdom[4]	-	-	18	0	19	0	5	0	-	-	0	0	1,308	2
EU Total	**1,607**	**80**	**3,811**	**75**	**3,866**	**61**	**70,685**	**1,127**	**1,472**	**64**	**4,788**	**66**	**2,390**	**31**
Switzerland	-	-	-	-	-	-	46	0	-	-	-	-	-	-

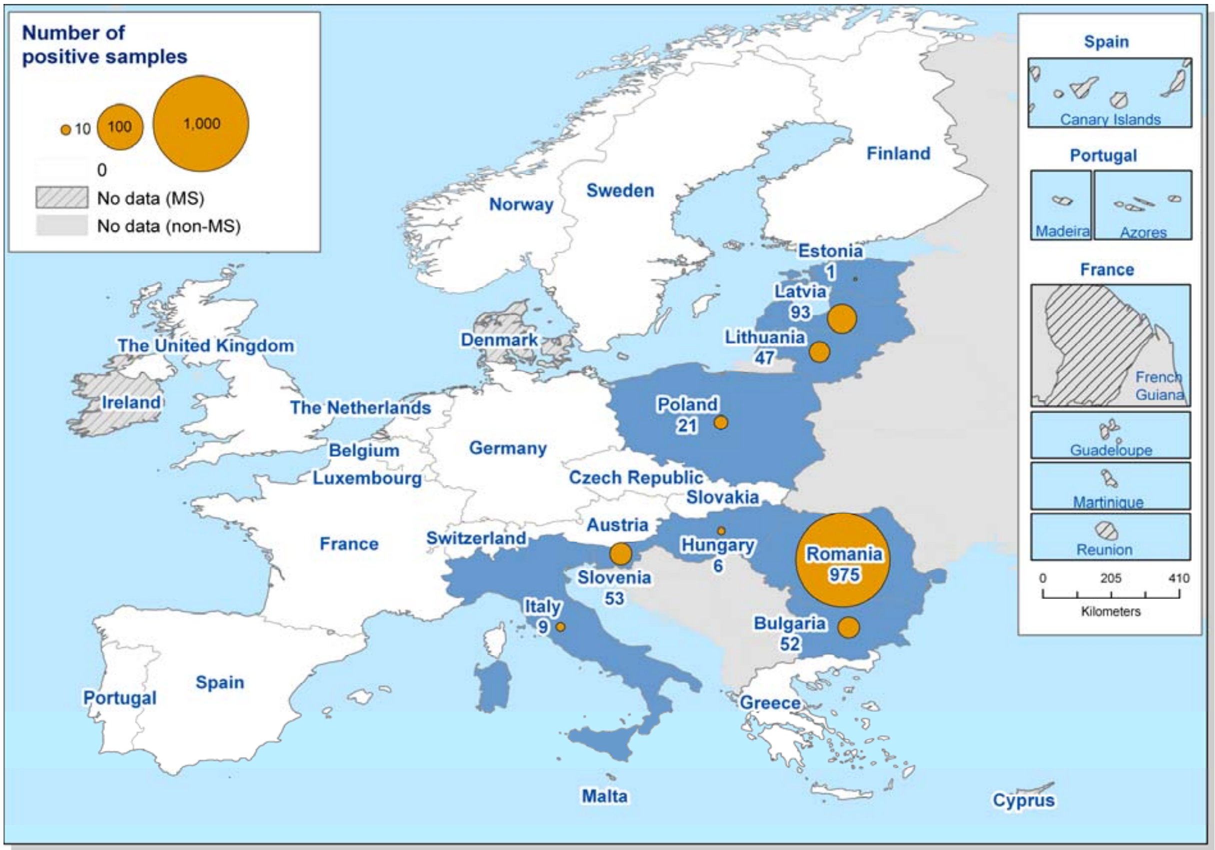
1. Cattle, sheep, goats, solipeds, and pigs are included.
2. Additionally, France reported two illegally imported dogs positive for rabies from Morocco and Gambia. A third dog was a secondary case infected in France and epidemiologically linked with a previously reported index case infected in Morocco and illegally imported into France. Germany reported one positive dog for rabies illegally imported from Croatia. The United Kingdom reported one legally imported dog from Sri Lanka positive in a quarantine premises.
3. In France, three infected bats were positive for EBVL-1a and one bat for EBVL-1b. In Germany the infected bats were positive with EBVL-1. In the Netherlands, the infected bats were positive with unspecified EBLV. In Spain, the infected bat was positive with EBLV-1. In Poland, the infected bats were positive with unspecified *Lyssavirus*. In the United Kingdom, the infected bats were positive with EBLV-2.
4. Sweden and the United Kingdom (since 1987) have a surveillance programme for EBLV in bats.

3.6 RABIES

In 2008, rabies cases in foxes represented 89.7% of all positive findings from wildlife other than bats compared to 71.4% in 2007. The majority of cases were reported from Romania in 2008. Figure RA3 shows the number of classical rabies and unspecified *Lyssavirus* positive cases in wild animal species other than bats in reporting countries. Also in 2008, MSs other than the eastern European MSs, reported rabies cases in wildlife contrary to previous years. Italy reported rabies cases in animals for the first time in many years when eight foxes and one badger tested positive at the northeast border of the country in late 2008.

In 2008, 21 MSs reported data on rabies in foxes (Table RA3); 15 of these MSs have consistently reported data on rabies in foxes (Table RA4). Belgium, the Czech Republic, Finland, France, Portugal and Switzerland found no rabies positive animals during 2004 to 2008. Italy only had rabies cases in 2008. Slovenia reported an increase in rabies cases among foxes in 2008, and Italy also reported its rabies cases in late 2008 in the region bordering Slovenia. Estonia, Latvia, Lithuania and Poland have reported substantial numbers of positive samples in previous years, although at decreasing levels. In these MSs, reductions in the proportion of rabies positive samples in foxes have been observed after the introduction of the vaccination campaigns against rabies.

Figure RA3. Classical rabies or unspecified* Lyssavirus *cases in wild animals other than bats, 2008



Note: All cases were sufficiently typed to exclude EBLV infections.

Most data provided were based on suspicious sampling or other convenience type sampling, except Austria, Czech Republic, Greece, Luxembourg, Poland, and Slovenia, who also provided data from a monitoring programme on foxes.

Findings in the following species are included: badgers, beavers, cats (stray cats), deer, dogs (stray dogs), ferrets (not pets), foxes, hamsters (not pets), hares, hedgehogs, jackals, lynxes, marine mammals, martens, mice, minks, moles, moose, muskrats, other carnivores, other mustelides, otters, polar bears, polecats, rabbits (not pets), raccoon dogs, raccoons, rats, squirrels, weasels, wild animals, wild boar, wild cats, wolves.

3.6 RABIES

Table RA4. Number of tested animals and positive cases of rabies from countries providing continuous data from foxes, 2006-2008

Countries	2008		2007		2006	
	N	Pos	N	Pos	N	Pos
Austria[1]	8,244	0	8,190	0	7,215	1
Belgium	245	0	141	0	94	0
Czech Republic	8,259	0	4,424	0	7,066	0
Estonia	80	1	83	0	111	38
Finland	437	0	261	0	230	0
France	228	0	220	0	336	0
Germany	12,561	0	14,845	0	13,763	3
Hungary	8,542	6	4,496	3	3,601	2
Italy	1,865	8	2,143	0	2,303	0
Latvia	397	44	5,124	95	336	187
Lithuania	314	13	-	-	824	687
Poland	21,293	19	16,044	42	21,908	43
Portugal	12	0	53	0	41	0
Slovakia	3,422	0	3,747	0	3,630	4
Slovenia	2,329	51	1,884	3	1,645	2
Total (15 MSs in 2008)	**68,228**	**142**	**61,655**	**143**	**63,103**	**967**
Switzerland	46	0	41	0	52	0

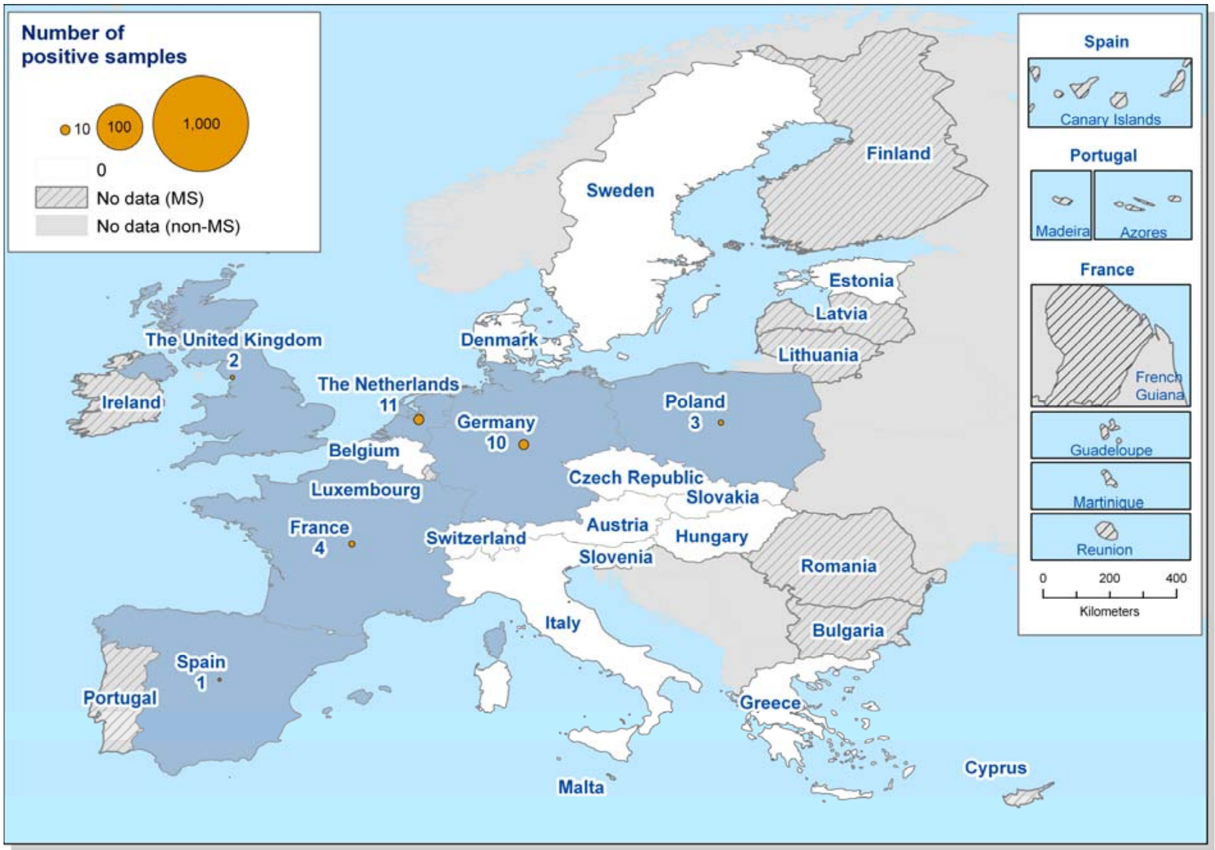
1. In Austria in 2006, one fox tested positive with the vaccine strain not with the wild strain

In 2008, EBLV was reported from bats in France, Germany, the Netherlands, Spain, and the United Kingdom (Table RA3). Additionally, Poland reported unspecified *Lyssavirus* in bats. The Netherlands reported unspecified EBLV, while France, Germany and Spain specified the cases to be EBLV type 1, and the United Kingdom specified the cases to be EBLV type 2. EBLV was not reported in other animal species in 2008. Generally, EBLV cases are reported in MSs with no or very little classical rabies cases in the other animal species (Figure RA4). Sweden and the United Kingdom were the only MSs to report data from a specific passive monitoring programme on bats.

For additional information on data on rabies in animals and the historical overview of findings, please refer to Level 3 tables.

3.6 RABIES

Figure RA4. European Bat* Lyssavirus *(EBLV) or unspecified* Lyssavirus *cases in bats*[1]*, 2008



Note: Most data provided were based on suspicious sampling or other convenience type sampling, except for Sweden and the United Kingdom where passive surveillance is carried out.

1. In France, Germany and Spain, the infected bats were positive with EBLV type 1. In the United Kingdom, the infected bats were positive with EBLV type 2. In the Netherlands, the infected bats were positive with unspecified EBLV. In Poland, the infected bats were tested positive for unspecified *Lyssavirus*.

3.6.3 Discussion

Rabies in humans is a rare zoonosis in Europe and vaccine-preventable in humans. However, the burden of disease is high as rabies is invariably fatal in unvaccinated infected humans. In 2008, four cases of rabies in humans were reported by four EU MSs, of these two were indigenous; one case occurred in the French overseas department of French Guiana and the other in Romania. No further details on the epidemiology of these two cases were provided. This is the first time in the last eight years that an indigenous case of human rabies has occurred in EU's mainland territory and would be related to the fact that rabies is still prevalent in wildlife in Romania.

In animals, most MSs have reported no or very few cases of classical rabies for a number of years. The Baltic and some south-eastern European MSs are a exception where sylvatic rabies is still endemic in wildlife and where rabies cases also occurred in farm and pet animals. In wildlife, the majority of rabies cases were reported in foxes and raccoon dogs.

The higher total number of rabies positive animals in the EU observed in 2008, compared to 2007, is mainly due to two MSs that did not provide any data in 2007. When results from 2008 are compared with results reported for 2006, the total number of rabies cases has decreased by 53.5%. In particular, there was a marked decrease in the number of rabies positive raccoon dogs probably reflecting the effect of the eradication programmes. The level of rabies positive foxes remained unchanged in 2008 compared to 2006, 1,127 and 1,174 reported positive cases, respectively.

It is also important to notice that Estonia, Latvia, Lithuania and Poland have reported a considerable decrease in the number of rabies positive animals during the past years, especially in foxes and raccoon dogs. These four MSs have implemented oral vaccination programmes in the wildlife with Community co-financing, and the results achieved by the programmes are monitored in the wildlife population. The observed reductions are likely to result from these successful oral vaccination campaigns.

In 2008, Slovenia recorded an increased number of rabies positive foxes and other wildlife cases, and Italy reported rabies cases in foxes and a badger for the first time in many years. This indicates a high rabies infection pressure from the western Balkan Peninsula.

Generally, MSs provide very sporadic information on European Bat *Lyssavirus* (EBLV) infection and only Sweden and the United Kingdom reported data from a specific passive monitoring programme. It is possible that MSs, who are not testing bats for EBLV, may also have the infection in their bat population, but it remains undetected. EBLV is known to infect humans and more information on the distribution of the disease in wildlife population in Europe would be desirable.

In order to eradicate classical rabies from animal populations throughout the EU, and to avoid the reintroduction of rabies from countries bordering the MSs east of the EU, continuous surveillance and vaccination programmes are important in high-risk areas.

This year, an increasing number of MSs reported cases of rabies in illegally or legally imported dogs. Therefore, information campaigns for the public about the risk related to importing pets without proper rabies vaccination are also important in preventing the introduction of the disease in the EU. Some MSs have carried out such campaigns regularly, e.g. France and Spain.

3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

Verotoxigenic *Escherichia coli* (VTEC) are a group of *E. coli* that are characterised by the ability to produce toxins that are designated verocytotoxins[1]. Human pathogenic VTEC usually harbour additional virulence factors that are important for the development of the disease in man. A large number of serogroups of *E. coli* have been recognised as verocytotoxin (VT) producers. Human VTEC infections are, however, most often associated with a minor number of O:H serogroups. Of these, the O157:H7 and the O157:H- serogroups (VTEC O157) are the ones most frequently reported to be associated with the human disease.

The majority of reported human VTEC infections are sporadic cases. The symptoms associated with VTEC infection in humans vary from mild to bloody diarrhoea, which is often accompanied by abdominal cramps, usually without fever. VTEC infections can result in haemolytic uraemic syndrome (HUS). HUS is characterised by acute renal failure, anaemia and lowered platelet counts. HUS develops in up to 10% of patients infected with VTEC O157 and is the leading cause of acute renal failure in young children.

Human infection may be acquired through the consumption of contaminated food or water, or by direct transmission from person to person or from infected animals to humans.

Animals are the reservoir for VTEC, and VTEC (including VTEC O157) have been isolated from many different animal species. The gastrointestinal tract of healthy ruminants seems to be the foremost important reservoir for VTEC and foods of bovine and ovine origin are frequently reported as a source for human VTEC infections. Other important food sources include faecally contaminated vegetables and drinking water. The significance of many VTEC serogroups that can be isolated from animals and foodstuffs for infections in humans is, however, not yet clear.

Table VT1 presents the countries reporting data for 2008.

Table VT1. Overview of countries reporting data for 2008

Data	Total number of MSs reporting	Countries
Human	25	**All MSs** except CY, PT
		Non-MSs: CH, IS, LI and NO
Food	18	**MSs:** AT, BE, BG, CZ, DE, EE, ES, FR, HU, IE, IT, LV, NL, PL, PT, RO, SI, UK
		Non-MS: CH
Animal	14	**MSs:** AT, BG, DE, DK, EE, ES, FI, IT, LV, NL, PL, PT, SE, SI
		Non-MS: NO

Note: In the food and animal chapter, only countries reporting 25 samples or more have been included in the analyses.

[1]. VTEC and verocytotoxin are also known as Shiga toxin producing *E. coli* (STEC) and Shiga toxin.

3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

3.7.1. VTEC in humans

Twenty-five MSs reported data on human VTEC infections in 2008. The total number of confirmed VTEC cases in the EU reported to TESSy was 3,159, representing an 8.7% increase compared to 2007 (Table VT2). The overall notification rate of VTEC infection reported by the 25 MSs was 0.7 cases per 100,000 population. Although the United Kingdom and Germany accounted for 64.6% of all confirmed cases in the EU in 2008, the notification rates were highest in Ireland (4.8 per 100,000 population) and Sweden (3.3 per 100,000 population).

When interpreting VTEC data, it is important to note that data from different investigations are not directly comparable, especially between countries. This is mainly due to differences in applied analytical methods. The most widely used analytical method only aims at detecting *E. coli* O157, and not all MSs use methodologies aiming at detecting other VTEC serotypes.

Figure VT1 illustrates the geographical distribution of the reported notification rates in the EU. In several MSs, infection with VTEC is not notifiable (see Appendix, Table VT2). The different sensitivities of the reporting systems in MSs may also influence the reported data. Consequently, comparison between countries should be done with caution. Comparison between years within a country is, in general, more valid.

Figure VT1. VTEC notification rates in humans in the European Community, 2008 (per population of 100,000)

3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

Table VT2. Reported VTEC cases in humans, 2004-2008 and notification rates for confirmed cases, 2008[1]

Country	2008				2007	2006	2005	2004
	Report Type[2]	Cases	Confirmed Cases	Cases/ 100,000	Confirmed Cases			Cases
Austria	C	69	69	0.8	82	41	53	45
Belgium	C	103	103	1.0	47	46	47	45
Bulgaria[3]	U	0	0	0	0			
Cyprus	C	2	2	0.3	–			
Czech Republic	-	-	-	-	–	–		–
Denmark	C	161	161	2.9	156	146	154	163
Estonia	C	3	3	0.2	3	8	19	0
Finland	C	8	8	0.2	12	14	21	10
France	C	85	85	0.1	57	67		
Germany	C	876	876	1.1	870	1,183	1,162	903
Greece	U	0	0	0	1	1		
Hungary	U	0	0	0	1	3	5	12
Ireland	C	225	213	4.8	115	153	125	61
Italy	C	36	24	0.0	27	*17*		3
Latvia	U	0	0	0	0	0	0	0
Lithuania	A	0	0	0	0	0		
Luxembourg	C	4	4	0.8	1	2	8	
Malta	C	8	8	1.9	4	21	23	
Netherlands	C	92	92	0.6	88	41	64	30
Poland	C	5	3	<0.1	2	4	4	3
Portugal[4]	–	-	-	-	–			
Romania[3]	C	4	4	<0.1	–			
Slovakia	C	8	8	0.1	6	8	61	4
Slovenia	C	7	7	0.3	4	30		2
Spain	C	21	21	<0.1	18	13	16	
Sweden	C	304	304	3.3	262	265	336	149
United Kingdom	C	1,164	1,164	1.9	1,149	1,294	1,171	926
EU Total		**3,185**	**3,159**	**0.7**	**2,905**	**3,357**	**3,269**	**2,356**
Iceland	C	4	4	1.3	13	1		
Liechtenstein	U	0	0	0	–			
Norway	C	22	22	0.5	26	50	18	12
Switzerland	C	84	67	0.9	53	48	52	45

1. Number of confirmed cases for 2005-2008 and number of total cases for 2004.
2. A: aggregated data report; C: case-based report; –-: no report; U: unspecified.
3. EU membership began in 2007.
4. No surveillance system exists.

More than half (53.0%) of reported confirmed human VTEC infections in 2008 were associated with the O157 serogroup (Table VT3). The majority of O157 cases (68.7%) were reported from the United Kingdom (Table VT4).

3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

Table VT3. Reported confirmed VTEC cases in humans by serogroup (top 10), 2007-2008 (TESSy)

2008				2007			
Serogroup	**No of cases**	**% Total**	**% Known**	**Serogroup**	**No of cases**	**% Total**	**% Known**
O157	1,673	53.0	53.0	O157	1,571	54.1	54.1
NT[1]	819	25.9	25.9	NT[1]	842	29.0	29.0
O26	166	5.3	5.3	O26	136	4.7	4.7
O103	88	2.8	2.8	O103	77	2.7	2.7
O145	49	1.6	1.6	O91	43	1.5	1.5
O91	50	1.6	1.6	O145	31	1.1	1.1
O111	43	1.4	1.4	O111	23	0.8	0.8
O128	28	0.9	0.9	O128	21	0.7	0.7
O146	25	0.8	0.8	O113	16	0.6	0.6
O117	20	0.6	0.6	O146	14	0.5	0.5
Other	198	6.3	6.3	Other	130	4.5	4.5
Total	**3,159**			**Total**	**2,904**		

Source: Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, Germany, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

1. NT = untyped/untypeable.

Table VT4. VTEC serogroups by country, 2008 (TESSy data)

Country	**Serogroup**										
	O157	**NT**	**O26**	**O103**	**O145**	**O91**	**O111**	**O128**	**O146**	**O117**	**Other**
Austria	22	37	3	0	1	0	1	0	1	0	4
Belgium[1]	55	3	7	1	0	1	8	2	1	2	23
Cyprus	0	2	0	0	0	0	0	0	0	0	0
Denmark	15	7	6	19	11	11	9	8	12	8	55
Estonia	3	0	0	0	0	0	0	0	0	0	0
Finland	2	6	0	0	0	0	0	0	0	0	0
France	42	28	12	0	0	0	1	2	0	0	0
Germany	59	576	64	45	22	30	11	11	9	1	48
Ireland	161	7	36	2	0	0	0	0	0	0	7
Italy	7	2	7	2	0	0	4	1	0	0	1
Luxembourg	1	0	0	0	0	0	2	0	0	0	1
Malta	8	0	0	0	0	0	0	0	0	0	0
Netherlands[2]	46	5	5	2	2	1	0	2	0	4	25
Poland	3	0	0	0	0	0	0	0	0	0	0
Romania	3	0	0	0	0	0	0	0	0	0	1
Slovakia	0	8	0	0	0	0	0	0	0	0	0
Slovenia	1	1	1	3	0	0	1	0	0	0	0
Spain	21	0	0	0	0	0	0	0	0	0	0
Sweden	75	134	24	13	10	7	6	2	2	5	26
United Kingdom	1,149	3	1	1	3	0	0	0	0	0	7
EU Total	**1,673**	**819**	**166**	**88**	**49**	**50**	**43**	**28**	**25**	**20**	**198**
Iceland	4	0	0	0	0	0	0	0	0	0	0
Norway	8	4	1	2	1	0	0	0	1	2	3

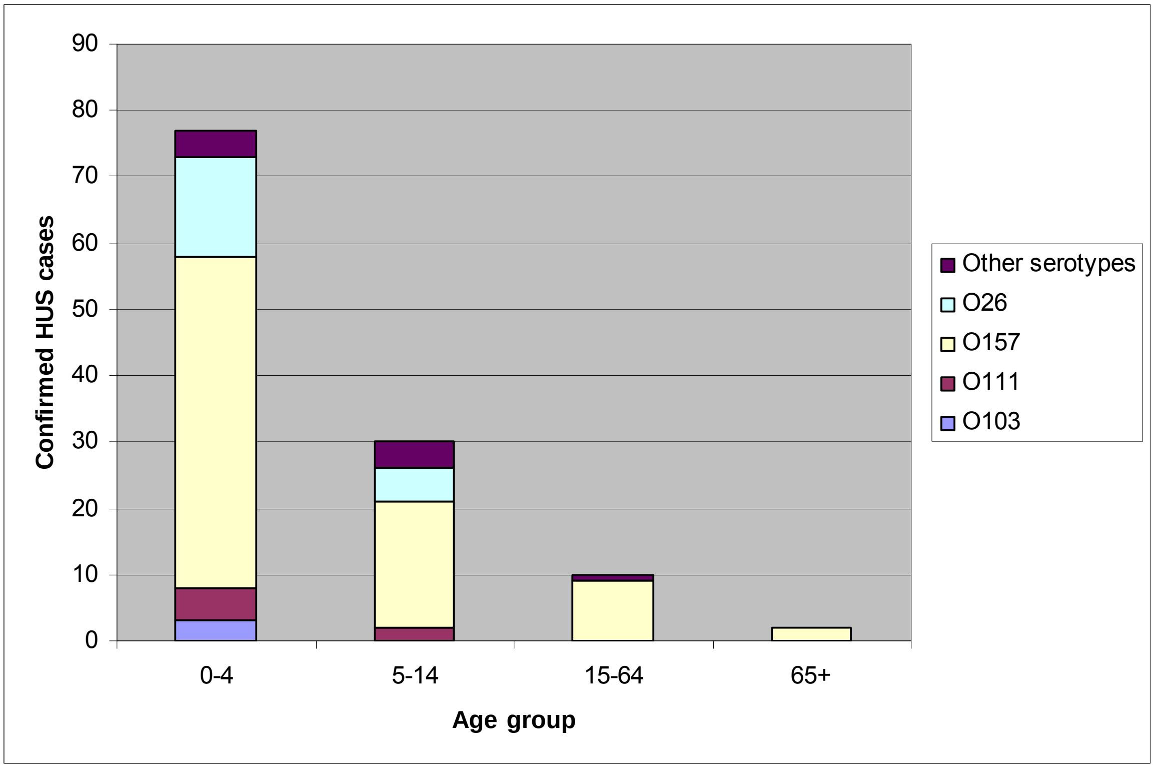
Note: In Belgium, laboratory data.

1. Cases of VTEC non-O157 cover only a part of the Netherlands (+/- 25%), as not all laboratories use methods aiming at detecting VTEC serotypes other than O157.

The largest proportion (37.3%) of reported VTEC infections occurred in the age group 0 to 4 years.

A total of 146 haemolytic uremic syndrome (HUS) cases associated with VTEC infections were reported in MSs in 2008 (Figure VT2). The majority of HUS cases were reported by France (43), Germany (41), Italy (23) and the United Kingdom (23). Most of the reported HUS cases were associated with the VTEC O157 infection (56%), with the highest numbers of cases among the youngest age categories.

Figure VT2. Haemolytic Uremic Syndrome (HUS) by age and serogroup in reporting MSs[1], 2008

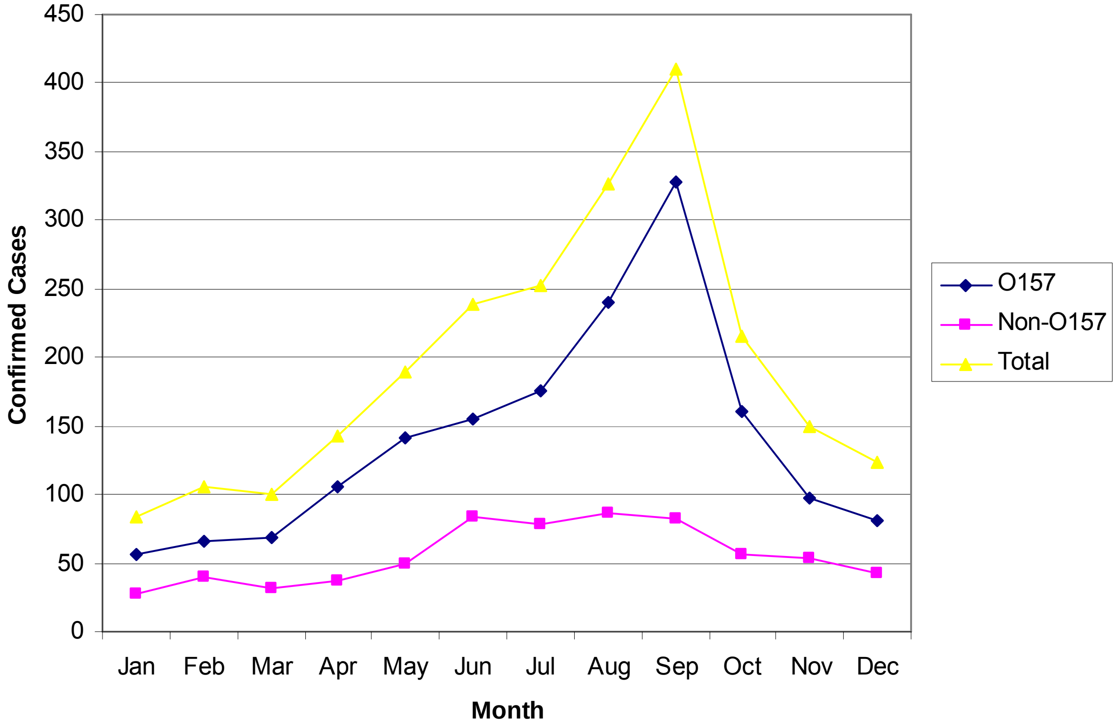


Source: Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Poland, Spain and United Kingdom (N=144).

As in previous years, the distribution of VTEC infections in 2008 followed a seasonal pattern, with a rise in the number of cases over the summer and autumn months, peaking in September (Figure VT3). This seasonal pattern was largely influenced by the increases in VTEC O157 infections during these months. The non-O157 cases were less seasonally variable, although these cases also showed a slight increase during the summer months (June-September).

3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

Figure VT3. Number of reported confirmed cases of VTEC infection in humans by month, TESSy data for reporting MSs, 2008



3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

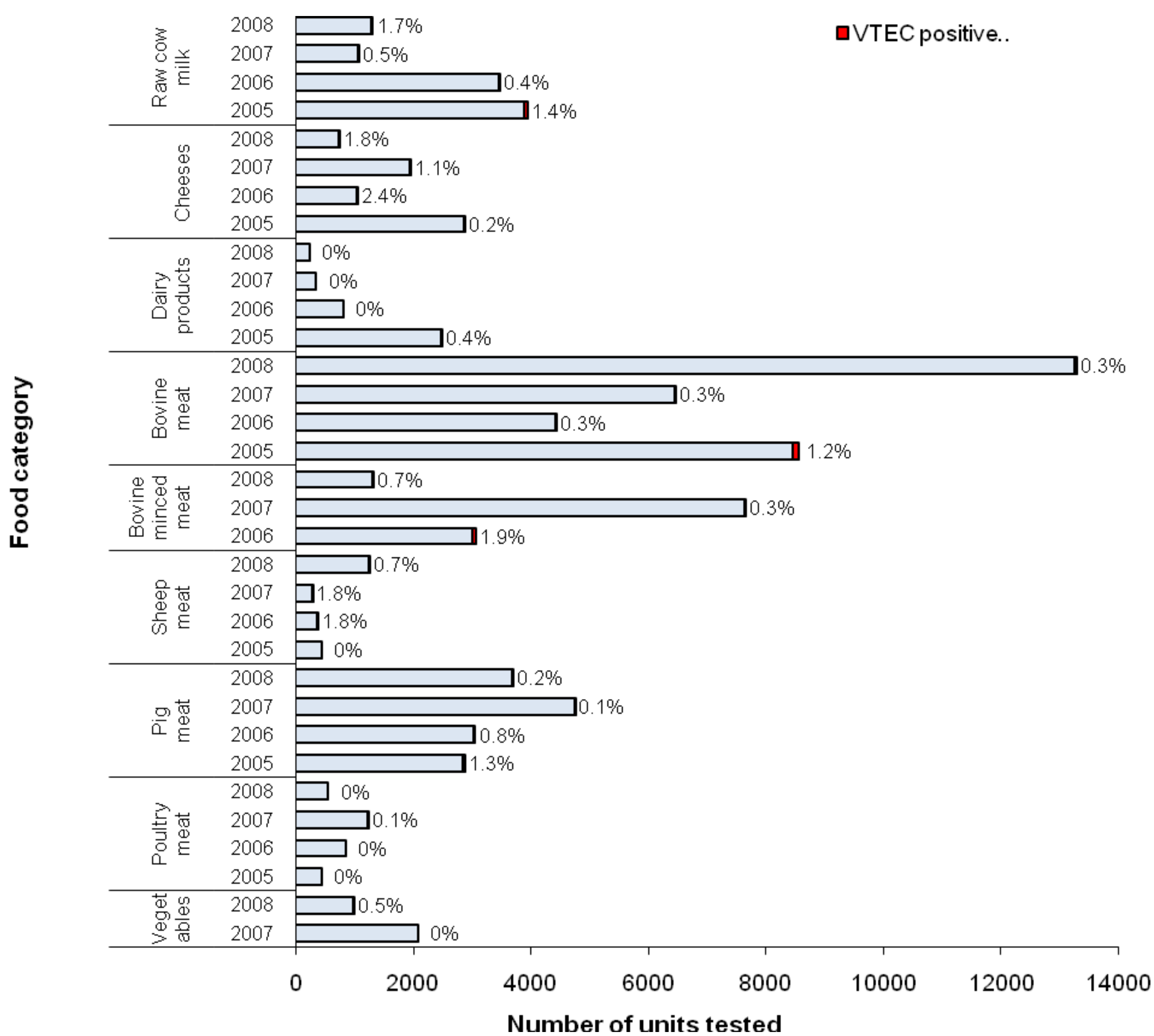
3.7.2. VTEC in food and animals

Eighteen MSs and one non-MS reported data on VTEC in food and 14 MSs and one non-MSs reported data on VTEC in animals for the year 2008. An overview of the food categories investigated, the number of samples tested and the number of VTEC positive samples for the years 2005 to 2008 are presented in Figure VT4. Table VT5 presents the findings in fresh bovine meat, and data from bovine animals is presented in Table VT6.

When interpreting VTEC data from food and animals it is important to note that data from different investigations are not directly comparable, especially between countries. This is mainly due to differences in sampling strategies and applied analytical methods. The most widely used analytical method only aims at detecting *E. coli* O157, and only a few investigations have been conducted with analytical methods aiming at detecting other serotypes of VTEC.

In 2008, the levels of VTEC contamination in different food categories were low, which is similar to findings in previous years (Figure VT4), except for raw milk from cows, where a three-fold increase in the proportion of positive samples was observed in 2008 compared to 2007.

Figure VT4. Numbers of food samples tested for VTEC by food category and number of VTEC positive units, 2005-2008



Note: Data are only presented for sample size ≥25. Percentage on top of columns indicate proportion of positive samples.

3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

Bovine meat is believed to be a major source of food-borne VTEC infections for humans. Overall 14,598 bovine meat samples were investigated of which 0.3% was VTEC positive and 0.1% VTEC O157 positive (Table VT5). The proportion of VTEC and VTEC O157 positive samples ranged between reporting MSs from 0% to 5.8% and from 0% to 1.2%, respectively.

The United Kingdom reported results from a national VTEC O157 survey of sheep meat at retail; VTEC O157 was not detected in the 1,056 samples taken. Austria and Germany also reported investigations of fresh sheep meat from retail level and found a VTEC prevalence of 6.8% (N= 59) and 8.2% (N= 61) respectively. The following serotypes were identified in the two studies: O6:H-, O75:H-, O128:H-, O166:H28, ONT:H2, ONT:H14, O146 and unspecified. However, according to the opinion from the Biological Hazard panel of EFSA on the monitoring of VTEC (2007), these reported serotypes are only rarely identified as the source of human disease. According to the opinion, the serogroups that currently should be considered as human pathogenic are: O26, O91, O103, O111, O157 and O145.

VTEC was also found in meat from other animal species than bovine and sheep, but generally the data reported showed that the VTEC prevalence in most other meat types is low, and VTEC O157 is only rarely reported from pig meat (0.2%, N=3,784) and game meat and not reported in poultry meat.

Switzerland reported a VTEC survey in cheeses made from raw or low heat-treated cow's and goat's milk. VTEC was isolated from 2.7% out of 404 samples of cheese made from cow's milk samples (serotypes O2:H27, O15:H16, O9:H21, O22:H16, O86:H21, O91:H10, O148:H8, and O174:H21) and VTEC was isolated from 3.4% out of 58 samples of cheese made from goat's milk samples (serotypes O8:H20 and O116:H28). The Swiss findings show that VTEC can be frequently isolated from cheeses made from unpasteurised milk.

In recent years, a number of international VTEC O157 outbreaks has been attributed to vegetables. In 2008, most data on vegetables was provided by the Netherlands. In three studies of lettuce, VTEC O157 was detected in two of the studies (1.3% out of 298 samples and 0.6% out of 172 samples). The findings indicate that vegetables might be a significant source of human VTEC O157 infections.

VTEC 0157 was also occasionally reported from cow's milk in 2008.

The majority of VTEC data from cattle was obtained by analysing faecal samples from single animals. The average proportion of VTEC positive samples, based on the investigation of 5,368 animals, was 2.2%, ranging from 0% to 30.0%, and the average proportion of VTEC O157 positive samples was 0.5%, ranging from 0% to 7.2% (Table VT6). The reported mean proportion of VTEC and VTEC O157 positive herds/holdings in the two reporting MSs ranged from 4.5% to 22.2%.

Several MSs reported data in animals other than cattle. Sweden reported two national sheep surveys conducted at slaughterhouse and found 1.8% of 492 sheep faeces samples and 1.9% of 105 sheep ear samples positive for VTEC O157. In a small survey in sheep, Austria reported 26.3% positive animals out of 38 animals tested with the following VTEC serotypes: O5:H8, O5:H-, O8:H21, O55:H2, O78:H1, O125:H51, O146:H28, ONT:H16. However, according to the opinion from the BIOHAZ panel EFSA, the reported serotypes are only rarely identified as the source of human disease. Germany reported a non-O157 VTEC prevalence of 23.6% in sheep (N=55). Germany also provided data on the occurrence of VTEC in dogs and cats; VTEC was not detected in dogs whereas 0.3% of the investigated cats was VTEC positive (N=631). VTEC O157 is sporadically detected in other animals and in 2008 VTEC findings were reported in dogs, pigs, poultry, and water buffalo.

Norway conducted during 2006 and 2007 a national survey in sheep including 585 herds. VTEC O103:H2 and VTEC O157:H7 (stx1 and eae positive) were detected in 0.7% and 0.9% of the herds, respectively. Only the 2007 samples (491 herds) were analysed for *E. coli* O26, and VTEC O26 were detected in 0.8% of these.

3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

Table VT5. VTEC in fresh bovine meat, 2008

Country	Description	Sample weight	N	VTEC % pos	VTEC O157 % pos	Additional information/ serotype (no. of isolates)
At slaughter, cutting/processing plant						
Belgium	Fresh	Swab (1,600 cm^2)	1,353	0.9	0.9	Carcass swab sample
	Fresh	25g	766	0	0	
Czech Republic	Fresh	Swab (100 cm^2)	516	0	0	
France	Fresh	300g	3,992	0.3	<0.1	Serotype not specified for non-O157
Germany	Fresh	25g	57	3.5	0	Serotype not specified for non-O157
	Minced meat	25g	41	0	0	Intended to be eaten raw
Hungary	Fresh	25g	219	0.5	0.5	
Poland	Fresh	Swab	93	0	0	Carcass swab sample
	Fresh	25g	12	0	0	
Romania	Fresh	25g	1,554	0	0	
	Minced meat	25g	73	0	0	
Slovenia	Fresh	25g	265	0.4	0.4	
Spain	Fresh	25g	97	1.0	0	Serotype not specified
At retail						
Belgium	Minced meat	25g	138	0	0	Intended to be eaten raw
Bulgaria	Fresh		82	1.2	1.2	
	Minced meat		193	0	0	Intended to be eaten raw
Germany	Fresh	25g	163	1.8	0	O22 (1); not specified (2)
	Minced meat	25g	317	2.5	0	O91 (1); not specified (7). Intended to be eaten raw
Hungary	Minced meat	25g	81	0	0	
Italy	Fresh	25g	45	0	0	
Latvia	Fresh	1g	95	0	0	
	Minced meat	1g	36	0	0	
Netherlands	Fresh	25g	343	0	0	
	Minced meat	25g	441	0.2	0.2	
Romania	Fresh	25g	239	0	0	
Spain	Fresh	25g	138	5.8	0	Serotype not specified
United Kingdom	Fresh	Swab	3,249	<0.1	<0.1	
Level of sampling not specified						
Italy	Fresh	25g	212	0.5	0	
Total (14 MSs)			**14,598**	**0.3**	**0.1**	

Note: Data are only presented for sample size ≥25.

3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

Table VT6. VTEC in cattle, 2008

Country	Sample unit	N	VTEC	VTEC O157	Additional information/ serotype (no. of isolates)
			% pos	% pos	
Calves					
Austria[1]	Animal[2], faeces	96	9.4	0	O5:H8, O8:H2, O84:H2, O116:H12, O119:H1, O119:H- (2), O119:HNT, O128abc, O145:H- (3), O174:H2, O177:H-, ONT:H8, ONT:H- (2), NT (6)
	Animal[3], swab mucosa	70	30.0	0	
Germany	Single	229	0	0	
Netherlands	Holding	171	22.2	22.2	
Dairy cows					
Estonia	Animal	209	0.5	0.5	
Germany	Single	617	0	0	
Latvia	Animal	71	11.3	0	O26 (4), O103 (3) O145 (1)
Netherlands	Holding	157	4.5	4.5	
Poland	Single	229	0.9	0	
Meat production animals					
Spain	Slaughter batch	167	17.4	17.4	
Not specified					
Denmark	Animal	222	7.2	7.2	
Finland	Animal	1,497	0.2	0.2	
Germany	Single	1,482	2.8	0	
Italy	Herd	139	5.8	0	
	Animal	226	4.0	0	
Portugal	Animal	35	2.9	0	O138:K81
Slovenia	Animal	385	1.8	1.8	
Total (12 MSs)	**Animal/single**	**5,368**	**2.2**	**0.5**	
	Herd/holding	**467**	**11.3**	**9.6**	
	Slaughter batch	**167**	**17.4**	**17.4**	

NT: Not typeable.

Note: Data are only presented for sample size ≥25.

1. In most cases, it is the same animals that have both faeces and mucosa samples analysed.

2. Include 46 animals older than one year (3 positive).

3. Include 34 animals older than one year (10 positive).

For additional information on food and animal data, please see level 3 tables.

3.7 VEROTOXIGENIC *ESCHERICHIA COLI*

3.7.3 Discussion

As in previous years, confirmed cases of VTEC in humans reported at EU level are dominated by *E. coli* O157, mainly occurring in 0-4 year old children. Although in the EU there was an apparent increase of 8.7% in the number of VTEC cases in 2008 compared with 2007, this could be due to a lack of harmonised data since testing and reporting practices for VTEC vary between countries, consequently, this increase should be interpreted with caution. In 2008, 25.9% of VTEC isolates reported at EU level were not typed at serogroup level. This lack of information regarding VTEC typing and further characterisation, limits the understanding of VTEC distribution in terms of serotypes and possible case clustering.

Most data received on VTEC in food and animals are also concentrated on the VTEC O157 serogroup. For the other VTEC serogroups, the data provided by reporting countries is in most cases sparse. Therefore, it is difficult to assess the potential human health risk of the presence of VTEC in animals and food, since the pathogenicity to humans are linked to certain VTEC serogroups only. According to the opinion from EFSA's Biological Hazards panel on the monitoring of VTEC[2], the serogroups that are currently to be considered as the most important regarding pathogenicity to humans are: O26, O91, O103, O111, O157 and O145.

Most of the MS findings of VTEC, and in particular of VTEC O157, in foodstuffs are from bovine meat and meat from other ruminants. This is in line with the information reported on food-borne outbreaks in 2008 where half of the VTEC outbreaks where information on the food vehicle was available, were linked to bovine meat and products thereof.

In order to improve the quality of the data from VTEC monitoring in the EU, EFSA's Task Force on Zoonoses Data Collection has developed guidelines and technical specifications for the monitoring and reporting of VTEC in animals and food[3]. These guidelines will facilitate the generation of data that can enable a more thorough analysis of VTEC in food and animals in the future.

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[2] Scientific Opinion of the Panel on Biological Hazards on a request from EFSA on monitoring of verotoxigenic Escherichia coli (VTEC) and identification of human pathogenic VTEC types. The EFSA Journal (2007) 579, 1-61.

[3] European Food Safety Authority; Technical specifications for the monitoring and reporting of verotoxigenic *Escherichia coli* (VTEC) on animals and food (VTEC surveys on animals and food) on request of EFSA. EFSA Journal 2009; 7(11):1366. [43 pp.]. doi:10.2903/j.efsa.2009.1366. Available online: www.efsa.europa.eu.

3.8 *YERSINIA*

The bacterial genus *Yersinia* comprises three main species that are known to cause human infections: *Yersinia enterocolitica*, *Y. pseudotuberculosis* and *Y. pestis* (plague). The last major human outbreak of *Y. pestis* in Europe was in 1720, and today it is believed to no longer exist in Europe. *Y. pseudotuberculosis* and specific types of *Y. enterocolitica* cause food-borne enteric infections in humans. This chapter deals only with *Y. enterocolitica* and *Y. pseudotuberculosis* infections.

Yersiniosis caused by *Y. enterocolitica* most often causes diarrhoea, at times bloody, and occurs mostly in young children. Symptoms typically develop four to seven days after exposure and may last for one to three weeks (or longer). In older children and adults, right-sided abdominal pain and fever may be the predominant symptoms and is therefore often confused with appendicitis. Complications such as a rash, joint pain and/or bacteraemia can occur. Infection is most often acquired by eating contaminated food, particularly raw or undercooked pig meat. The ability of the organism to grow at +4°C makes refrigerated food with a relatively long shelf life a probable source of infection. Drinking contaminated unpasteurised milk or untreated water can also transmit the organism. On rare occasions, transmission may occur by direct contact with infected animals or humans.

Yersiniosis caused by *Y. pseudotuberculosis* shows many similarities with the disease pattern of *Y. enterocolitica*. Infections are caused by the ingestion of the bacteria from raw vegetables, fruit or other foodstuffs via water or direct contact with infected animals.

Pigs have been considered to be the primary reservoir for the human pathogenic types of *Y. enterocolitica*. However other animal species, e.g. cattle, sheep, deer, small rodents, cats and dogs may also carry pathogenic biotypes. Clinical disease in animals is uncommon.

Y. enterocolitica is closely related to a large array of *Yersinia* spp. without any reported public health significance. Within *Y. enterocolitica*, the majority of isolates from food and environmental sources are non-pathogenic types. It is, therefore, crucial that investigations discriminate between which strains are pathogenic for humans. Biotyping of the isolates is essential to determine whether or not isolates are pathogenic to humans, and this method is ideally complimented by serotyping. Pathogenicity can also be determined by PCR methods. In Europe, the majority of human pathogenic *Y. enterocolitica* belong to biotype 4 (serotype O:3) or less commonly biotype 2 (serotype O:9).

In 2008, an overview of reported data is given in tables and figures. Additional information on the data provided by MSs on *Yersinia* in 2008 is presented in Level 3 tables.

Table YE1 presents the countries reporting *Yersinia* data for 2008.

Table YE1. Overview of countries reporting data on **Yersinia** ***spp., 2008***

Data	Total number of MSs reporting	Countries
Human	22	**All MSs** except FR, GR, IT, NL, and PT
		Non-MSs: LI, NO
Food	9	**MSs:** AT, BE, DE, ES, IT, PT, RO, SK, UK
Animal	12	**MSs:** EE, ES, DE, NL, HU, IE, IT, LV, PL, PT, SI, UK
		Non-MSs: CH-NO

Note: In the following chapter, only countries reporting 25 samples or more have been included for analyses.

3.8 *YERSINIA*

3.8.1 Yersiniosis in humans

A total of 8,346 confirmed cases of yersiniosis was reported in the EU in 2008. The number of reported yersiniosis cases in humans has been decreasing since 2004. The notification rate was also lower in 2008 (1.8 per 100,000 population) than in 2007 (2.8 per 100,000 population).

Yersinia enterocolitica was the most common species reported in human cases by MSs and was isolated from 91.9% of all confirmed cases. *Y. pseudotuberculosis* only represented 1.8% of all isolates, while no information about the species of Yersinia was provided about the remaining 6.3%.

Table YE2. Reported cases of yersiniosis in humans in 2004-2008[1], and notification rates in 2008

Country	2008				2007	2006	2005	2004
	Report Type[2]	Cases	Confirmed Cases	Confirmed cases/ 100,000	Confirmed cases			Cases
Austria	C	93	93	1.1	142	158	143	110
Belgium	C	273	273	2.6	248	264	303	326
Bulgaria[3]	A	10	10	0.1	8	5		
Cyprus	U	0	0	0	0			
Czech Republic	C	557	557	5.4	576	534	498	498
Denmark	C	331	331	6.0	274	215	241	227
Estonia	C	42	42	3.1	76	42	31	15
Finland	C	608	608	11.5	480	795	638	686
France	C	213	213	0.3	195	158	171	249
Germany	C	4,352	4,352	5.3	4,987	5,161	5,624	6,182
Greece	-	-	-	-	-		0	39
Hungary	C	40	40	0.4	55	38	41	68
Ireland	C	3	3	0.1	6	1	3	6
Italy	-[4]	-	-		-	0		0
Latvia	C	56	50	2.2	41	92	51	25
Lithuania	A	536	536	15.9	569	411	501	470
Luxembourg	C	17	17	3.5	11	5	1	-
Malta	U	0	0	0	0		0	
Netherlands	-	-	-	-	-			
Poland	C	204	204	0.5	182	110	132	84
Portugal	-[4]	-	-	-	-			3
Romania[3]	C	9	9	<0.1	-			
Slovakia	C	70	68	1.3	71	82	63	78
Slovenia	C	31	31	1.5	32	80	0	38
Spain	C	315	315	0.7	381	375	318	231
Sweden	C	546	546	5.9	567	558	684	804
United Kingdom	C	48	48	0.1	86	58	65	74
EU Totals	**-**	**8,354**	**8,346**	**1.8**	**8,988**	**9,142**	**9,508**	**10,213**
Iceland	-[4]	-	-	-	-			
Liechtenstein	U	0	0	0	-			
Norway	C	50	50	1.1	71	86	125	

1. Number of confirmed cases for 2005-2008 and number of total cases for 2004.
2. A: aggregated data report; C: case-based report; –-: no report; U: unspecified.
3. EU membership began in 2007.
4. No surveillance system exists.

3.8.2 *Yersinia* in food and animals

The results from the most important food and animal sources for *Yersinia* infection in humans are presented in Tables YE3 and YE4. These are assumed to be pigs, pig meat and products thereof. Together 16 MSs reported data on *Y. enterocolitica* in pigs and pig meat. As in previous years, *Y. enterocolitica* was detected both from pig meat and pigs by some MSs. Overall 2.5% and 1.8% of pig meat samples tested were positive for *Yersinia* spp. and *Y. enterocolitica*, respectively. A total of 1.8% of tested pigs was found positive both for *Yersinia* spp. and *Y. enterocolitica*. A few MSs reported isolation of *Y. enterocolitica* serotypes and biotypes recognised as pathogenic for humans. According to the opinion from the Biological Hazard Panel in 2007, the majority of human pathogenic *Y. enterocolitica* strains in Europe belong to biotype 4 (serotype O:3), followed by biotype 2 (serotype O:9) . Also the biotypes 1B, 3 and 5 are human pathogenic, while the biotype 1A is not.

For additional information refer to Level 3 tables.

Table YE3.* Yersinia *spp. in pig meat and products thereof, 2008

Country	Description	Sample weight	N	*Yersinia* spp.	*Y. enterocolitica*	*Y. enterocolitica* serotypes/ biotypes (no of isolates)
				% pos	% pos	
At slaughter						
Romania	Fresh	10 g	3,093	0	0	
At retail						
Austria	Meat products	25 g	62	1.6	1.6	Biotype 1A (1)
Portugal	Minced meat	25 g	75	2.7	2.7	O:9 (2)
Romania	Minced meat	10 g	28	0	0	
United Kingdom[1]	Fresh	swab	654	11.5	9.2	Biotype 1A (58); biotype 3 (2); O:5 (6); O:5,27 (2); O:9 (1)
Sampling level not stated						
Gemany	Fresh	25 g	160	3.1	3.1	
	Meat products	25 g	205	2.0	2.0	O:3 (2); O:9 (2)
	Minced meat	25 g	58	1.7	1.7	
	Fresh, monitoring	25 g	134	0.7	0.7	
Italy	Fresh	25 g	115	5.2	3.5	
	Meat preparation	25 g	94	12.8	5.3	
	Meat products	25 g	45	17.8	6.7	
Spain	Fresh	25 g	91	4.4	2.2	
Total (7 MSs)			**4,814**	**2.5**	**1.8**	

Note: Data are only presented for sample size ≥25 .

1. In the United Kingdom, samples may be positive for more than one serotype .

3.8 *YERSINIA*

Table YE4.* Yersinia *spp. in pigs, animal based data, 2008

Country	N	*Yersinia* spp.	*Y. enterocolitica* (all serotypes)	*Y. enterocolitica* serotypes/ biotypes (no of isolates)
		% pos	% pos	
Germany	5,450	1.0	1.0	O:3 (7); O:9 (32)
Ireland	480	0	0	
Italy	98	12.2	10.2	O:3 (1)
Netherlands	3,721	0.4	0.4	
Slovenia	384	19.3	19.3	
Spain	145	20.0	20.0	Biotype 4 (29)
Total (6 MSs)	**10,278**	**1.8**	**1.8**	

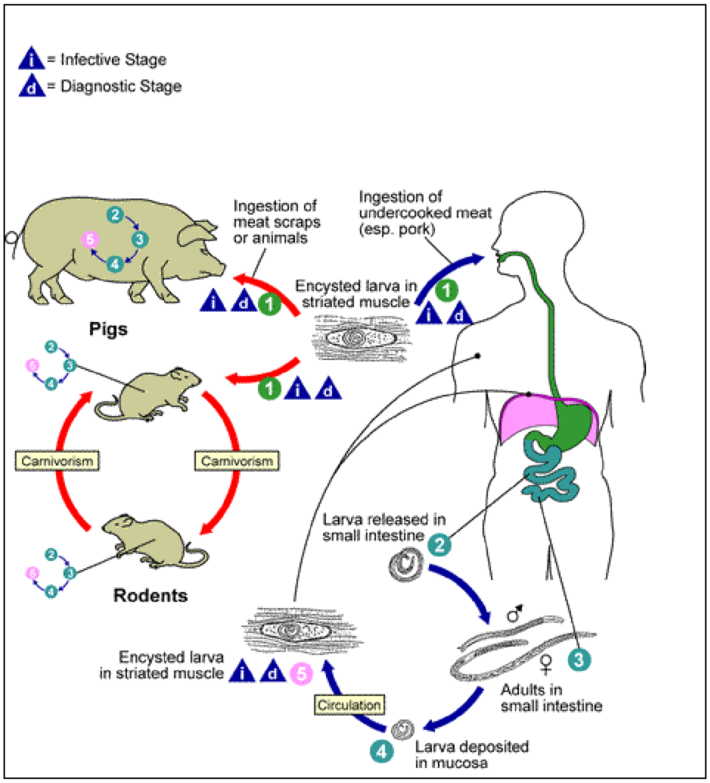
Note: Data are only presented for sample size ≥25, clinical investigations not included.

3.9 *TRICHINELLA*

3.9. *TRICHINELLA*

Trichinellosis is a zoonotic disease caused by parasitic nematodes of the genus *Trichinella*. The parasite has a wide range of host species, mostly mammals. *Trichinella* spp. undergoes all stages of the life cycle, from larva to adult, in the body of a single host (Figure TR1).

***Figure TR1. Life cycle of* Trichinella**



Source: http://www.dpd.cdc.gov/dpdx.

In Europe, trichinellosis has been described as an emerging and/or re-emerging disease during the past decades. Worldwide, eight species and three genotypes have been described: *T. spiralis, T. nativa, T. britovi, T. murelli, T. nelsoni, T. pseudospiralis, T. papuae and T. zimbabwensis, Trichinella* T6, *Trichinella* T8 and *Trichinella* T9. The majority of human infections in Europe are caused by *T. spiralis, T. britovi* and *T. nativa*, while a few cases caused by *T. pseudospiralis* and *T. murelli* have been described as well.

Humans typically acquire the infection by eating raw or inadequately cooked meat contaminated with infectious larvae. The most common sources of human infection are pig meat, wild boar meat and other game meat. Horse, dog and many other animal meats have also transmitted the infection. Horse meat was identified as the source of infection in a number of human outbreaks recorded in the EU from the mid-1970s until 2005, including some of the largest outbreaks recorded in decades. Freezing of the meat minimises the infectivity of the parasite, even though some *Trichinella* species/genotypes (*T. nativa, T. britovi* and *Trichinella* genotype T6) have demonstrated resistance to freezing in game meats.

The clinical signs of acute trichinellosis in humans are characterised by two phases. The first phase of trichinellosis symptoms may include nausea, diarrhoea, vomiting, fatigue, fever and abdominal discomfort. However, this phase is often asymptomatic. Thereafter, a second phase of symptoms including muscle pains, headache, fever, eye swelling, aching joints, chills, cough, itchy skin, diarrhoea or constipation may follow. In more severe cases, difficulties with coordinating movements as well as heart and breathing problems may occur. A small proportion of cases die from trichinellosis infection.

3.9 *TRICHINELLA*

An overview of the data reported in 2008 is presented in the following tables and figures. In-depth analyses will be presented in the report every two to three years depending on relevance and available data. Additional data provided on *Trichinella* is presented in Level 3 tables.

Table TR1. Overview of countries reporting data on* Trichinella *spp., 2008

Data	Total number of MSs reporting	Countries
Human	26	**All MSs** except DK **Non-MS**: NO
Animal	25	**All MSs** except CY and MT **Non-MSs**: CH, NO

3.9 *TRICHINELLA*

3.9.1 Trichinellosis in humans

The number of reported trichinellosis cases in humans is presented in Table TR2. In 2008, 670 confirmed cases of trichinellosis were reported by MSs. The highest number of cases was recorded in Romania, followed by Bulgaria and Lithuania. The large number of cases in Romania and Lithuania can partly be explained by the reported food-borne outbreaks in Romania (31 outbreaks with a total of 391 cases), and Lithuania (4 outbreaks with a total of 19 cases).

In 2008, *Trichinella spiralis* was the most common species reported, detected in 4.1% of confirmed cases. The *Trichinella* species was unknown in 88.9% of confirmed human cases, while in 6.3% of cases, the species was not reported, and in 0.7% of cases, species other than *T. spiralis* were detected. In 2008, no cases due to *T. nativa* or *T. pseudospiralis* were reported (N = 567).

Table TR2. Reported cases of trichinellosis in humans 2004-2008[1], and notification rate for confirmed cases, 2008

Country	2008					2007		2006		2005		2004	
	Report Type[2]	Cases	Confirmed cases (Imported)		Confirmed cases per 100,000	Confirmed cases (Imported)						Cases (Imported)	
Austria	U	0	0		0	0		0		0		0	
Belgium	A	5	5		<0.1	3		-		0		0	
Bulgaria[3]	A	67	67		0.9	62		180		-		-	
Cyprus	U	0	0		0	0				0		0	
Czech Republic	U	0	0		0	0		-		0		0	
Denmark	–[4]	-	-		-	–		-		-		9	(9)
Estonia	U	0	0		0	0				1		0	
Finland	U	0	0		0	0		-		0		0	
France	C	3	3		<0.1	1	(1)	10		20	(20)	3	(3)
Germany	C	1	1	(1)	<0.1	10	(7)	22	(1)	0		5	(4)
Greece	U	0	0		0	0		-		-		0	
Hungary	C	5	5	(3)	<0.1	2	(2)	-		0		0	
Ireland	C	0	0		0	2	(2)	0		0		0	
Italy	U	0	0		0	1		-		-		0	
Latvia	C	4	4		0.2	4		11		62		24	
Lithuania	A	41	31		0.9	8		20		13		22	
Luxembourg	U	0	0		0	–		-		0		-	
Malta	U	0	0		0	0		-		0		-	
Netherlands	C	1	1	(1)	<0.1	0		-		0		0	
Poland	C	4	4		<0.1	217		89		70		163	
Portugal	U	0	0		0	0		-		0		-	
Romania[3]	C	503	503		2.3	432		350		-		-	
Slovakia	C	18	18		0.3	8		5		0		1	
Slovenia	C	1	1	(1)	<0.1	0		1		0		0	
Spain	C	27	27		0.1	29		18		9	(3)	33	(1)
Sweden	U	0	0		0	1		-		0		1	(1)
United Kingdom	U	0	0		0	0		0		0		0	
EU Total		**680**	**670**	**(6)**	**0.1**	**780**	**(12)**	**706**	**(1)**	**175**	**(23)**	**261**	**(18)**
Iceland	–[4]	-	-		-	-		-		0		-	
Liechtenstein	–[4]	-	-		-	-		-		-		-	
Norway	U	0	0		0	0		-		0		0	

Note: in Switzerland no surveillance system exists for humans.

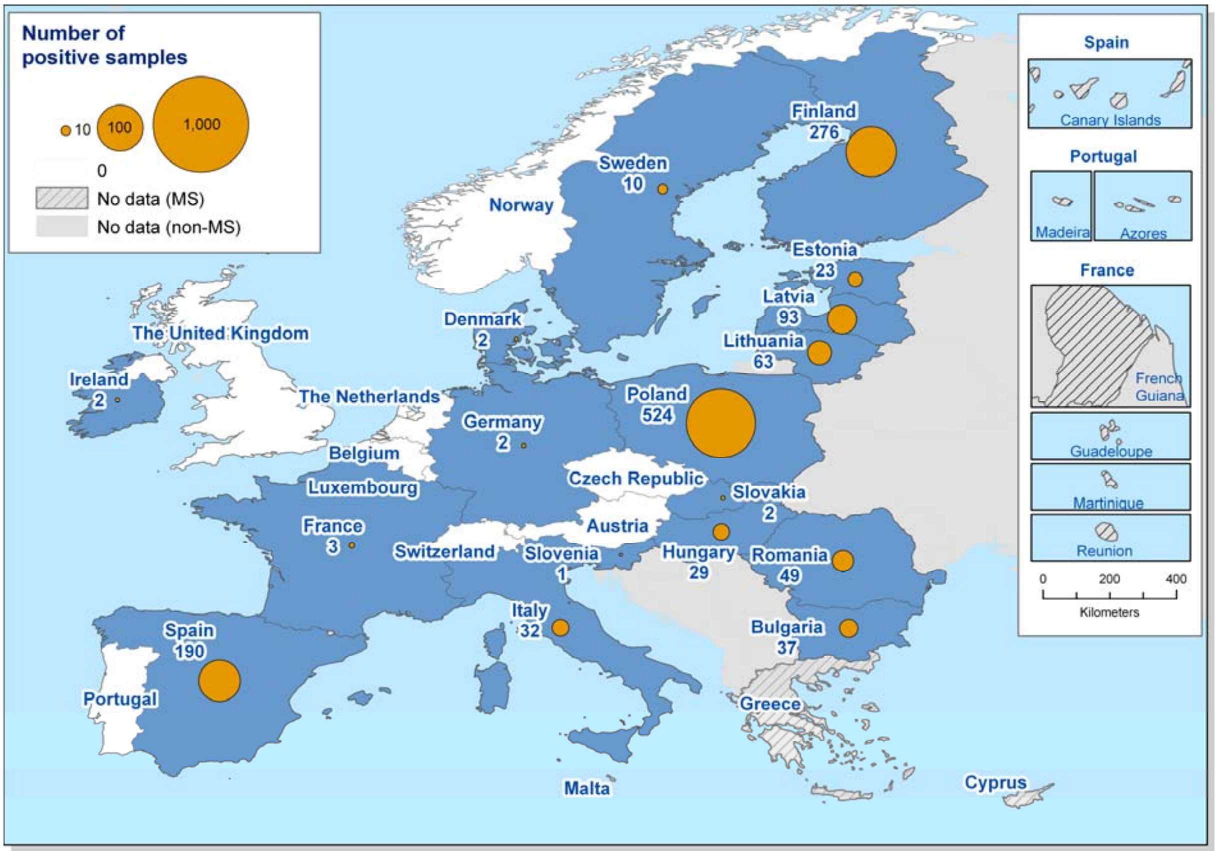
1. Number of confirmed cases for 2005-2008 and number of total cases for 2004.
2. A: aggregated data report; C: case based report; —: No report; U: Unspecified.
3. EU membership began in 2007.
4. No surveillance system exists.

3.9 *TRICHINELLA*

3.9.2 *Trichinella* in animals

Findings of *Trichinella* in animals are presented in Figure TR2 and Table TR3. The results are given for the most important animal species that serve as sources or reservoirs of human trichinellosis cases in MSs. In most MSs, slaughter pigs, horses, wild boars and other wildlife intended for human consumption, are tested for *Trichinella* at meat inspection. As in 2007, the highest number of *Trichinella*-positive slaughter pigs was reported by Romania, followed by Spain and Poland, although still at very low prevalence (≤0.03). *Trichinella* was detected more often in non-farmed wild boar than in slaughter pigs and farmed wild boar. For the first time in many years, *Trichinella* in horses was reported by one MS; Italy reported one positive horse imported from Poland. Most MSs provided also information on *Trichinella* in wildlife.

Figure TR2. Findings of* Trichinella *in wildlife, 2008



3.9 *TRICHINELLA*

Table TR3. Number of* Trichinella *positive animal samples, 2008

Country	Pigs		Wild boar farmed		Wild boar non-farmed		Foxes		Bears		Raccoon dogs		Other wildlife[1]	
	N	Pos	N	Pos	N	Pos	N	Pos	N	Pos	N	Pos	N	Pos
Austria	5,491,872	0	546	0	11,555	0	-	-	-	-	-	-	-	-
Belgium	11,547,720	0	-	-	15,177	0	61	0	-	-	-	-	-	-
Bulgaria	342,942	12	22,884	1	4,307	34	94	3	-	-	-	-	-	-
Czech Republic	3,401,215	0	-	-	78,911	0	-	-	-	-	-	-	-	-
Denmark	18,935,880	0	1,946	0	-	-	122	0	-	-	-	-	193	2
Estonia	474,859	0	-	-	4,255	12	-	-	50	5	-	-	-	-
Finland	4,872,522	0	118	0	-	-	445	100	45	4	280	92	186	77
France	16,548,576	2	1,083	0	44,708	0	40	3	-	-	-	-	-	-
Germany	9,358,968	3	-	-	-	-	4,221	2	-	-	-	-	-	-
Greece	848,620	0	790	0	-	-	-	-	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	1,046	25	-	-	-	-	-	-
Ireland	2,561,293	0	-	-	-	-	452	2	-	-	-	-	445	0
Italy	9,786,611	0	2,813	0	7,978	29	551	2	-	-	-	-	934	0
Latvia	405,460	0	-	-	2,040	17	45	35	-	-	56	40	-	-
Lithuania	688,603	9	-	-	18,150	62	-	-	-	-	-	-	-	-
Luxembourg	2,305	0	-	-	877	0	-	-	-	-	-	-	-	-
Netherlands[2]	13,999,301	0	27	0	3,585	0	-	-	-	-	-	-	338	7
Poland	20,027,092	69	-	-	103,612	524	-	-	-	-	-	-	-	-
Portugal	78,369	0	-	-	2,152	0	-	-	-	-	-	-	-	-
Romania	3,030,926	1,005	-	-	7,313	27	-	-	164	22	-	-	-	-
Slovakia	1,124,256	2	-	-	12,960	2	-	-	-	-	-	-	-	-
Slovenia	385,195	0	-	-	1,496	1	-	-	49	0	-	-	-	-
Spain	38,897,604	77	-	-	81,248	182	-	-	-	-	-	-	121,655	8
Sweden[3]	3,015,835	0	-	-	27,131	1	348	1	167	0	-	-	149	7
United Kingdom	1,673,775	0	1,567	0	31	0	600	0	-	-	-	-	44	0
EU Total	**167,499,799**	**1,179**	**31,774**	**1**	**427,486**	**891**	**8,025**	**173**	**475**	**31**	**336**	**132**	**123,944**	**101**
Norway	1,497,200	0	-	-	-	-	-	-	-	-	-	-	-	-
Switzerland[2]	2,360,000	0	-	-	1,458	3	-	-	-	-	-	-	-	-

Note: Data are only presented for sample size ≥25.

1. Other wildlife include lynxes, wolves, martens, wild birds, badgers, wild minks, otters, wild polecats, deer, stray dogs, squirrels, beavers, hedgehogs, rodents.
2. In the Netherlands and Switzerland, samples from other wildlife and wild boar (non-farmed) are based on serological tests, respectively.
3. The number on wild boars sampled includes both farmed and non-farmed. Data only covers the samples tested at the National Veterinary Institute (SVA).

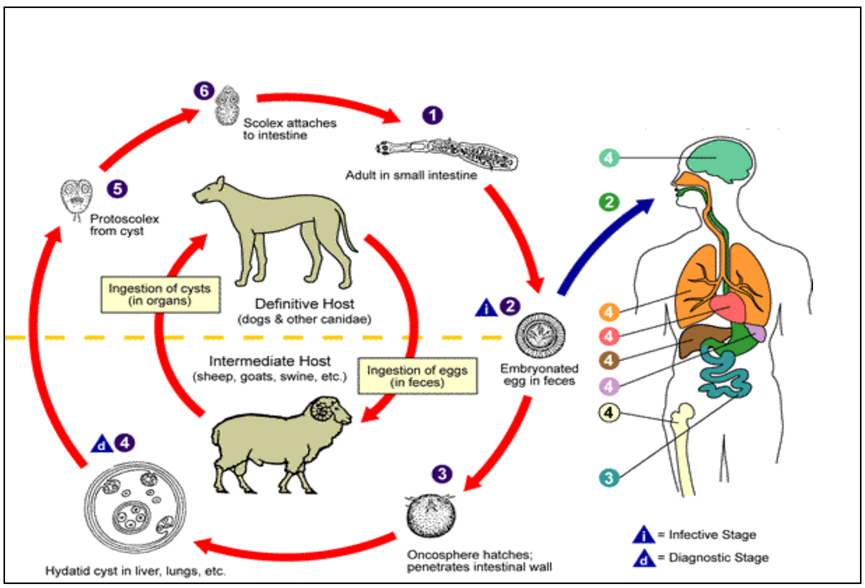
3.10 *ECHINOCOCCUS*

Human echinococcosis (also known as hydatid disease) is caused by the larval stages of the small tapeworms of the genus *Echinococcus*. In Europe, this disease is caused by two of the six recognised species, namely *E. granulosus* and *E. multilocularis*. The disease caused by the two species is also known as ‘cystic hydatid disease’ and ‘alveolar hydatid disease’, respectively.

The adult stage of the tapeworm *E. granulosus* lives in the small intestines of dogs and, rarely, of other canids e.g. wolves and jackals, which are the definitive hosts. The adult parasite releases eggs that are passed in the faeces. Sheep, goats, cattle and reindeer are the intermediate hosts in which ingested eggs hatch and release the larval stage (oncosphere) of the parasite. The larvae may enter the bloodstream and migrate into various organs, especially the liver and lungs, where they develop into hydatid cysts. The definitive hosts become infected by ingestion of the cyst-containing organs of the infected intermediate hosts.

Humans are a dead-end host and may become infected through accidental ingestion of the eggs, shed in the faeces of infected dogs or other canids. In humans, the eggs also hatch in the digestive tract releasing oncospheres which may enter the bloodstream and migrate to the liver, lungs and other tissues to develop into hydatid cysts. These cysts may develop unnoticed over many years, and may ultimately rupture (Figure EH1). Clinical symptoms and signs of the disease (cystic echinococcosis) depend on the location of the cysts and are often similar to those induced by slow growing tumours.

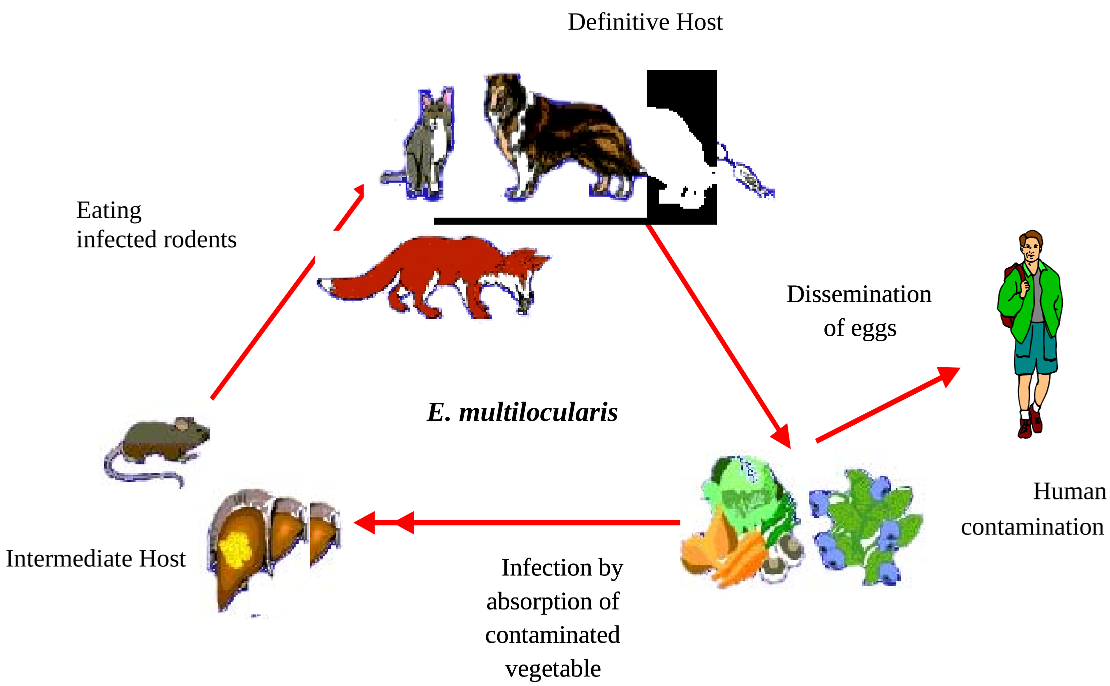
***Figure EH1. Lifecycle of* E. granulosus**



Source: http://www.dpd.cdc.gov/dpdx.

3.10 *ECHINOCOCCUS*

***Figure EH2. Lifecycle of* E. multilocularis**



Source: http://www.efsa.europa.eu/en/scdocs/scdoc/036e.htm?WT.mc_id=EFSAHL01&emt=1.

E. multilocularis has a similar life cycle to *E. granulosus* (Figure EH2). The definitive hosts are foxes, raccoon dogs and to a lesser extent dogs, cats, coyotes and wolves. Small rodents and voles are the intermediate hosts. The larvae form of the parasite remains indefinitely in the proliferative stage in the liver, thus invading the surrounding tissues. In accidental cases, humans may also acquire *E. multilocularis* infection by ingesting eggs shed by the definitive host via e.g. contaminated vegetables, berries or when touching animals with infective eggs in the fur. *E. multilocularis* is the causative agent of the highly pathogenic alveolar echinococcosis in man. Although a rare human disease, alveolar echinococcosis is a chronic disease with infiltrative growth of considerable public health importance since it is fatal in up to 100% of untreated patients.

An overview of the data reported in 2008 is presented in the following tables and figures. In-depth analyses will be presented in the report every two to three years depending on relevance and available data. Additional information on data provided by MSs on *Echinococcus* spp. in 2008 is presented in Level 3 tables.

3.10 *ECHINOCOCCUS*

Table EH1. Overview of countries reporting data on* Echinococcus *spp., 2008

Data	Total no. of MSs reporting	Countries
Human	25	**All MSs** except DK and IT
		Non-MSs: LI, NO
Animal	24	**All MSs** except CY, IE, MT
		Non-MS: CH, NO

3.10 *ECHINOCOCCUS*

3.10.1 Echinococcosis in humans

The number of reported human cases of echinococcosis (including both cystic and alveolar echinococcosis), are presented in Table EH2a. In 2008, a total of 891 confirmed cases of echinococcosis were reported in the EU. The highest notification rate was reported by Bulgaria, followed by Lithuania and Latvia *E. granulosus* was the most common species reported by MSs, and was detected from 71.7% of confirmed cases, while *E. multilocularis* only represented 5.6% of all cases. Species was not specified in 22.7% of the cases (Table EH2b). The geographical origin of cases, as determined by the reporting country, is presented in Table EH3.

Table EH2a. Reported cases of echinococcosis in humans, 2004-2008[1], and notification rates in 2008

Country	2008				2007	2006	2005	2004
	Report Type[2]	Cases	Confirmed Cases	Confirmed cases/ 100,000	Confirmed Cases			Cases
Austria	A	6	6	0.1	17	26	9	25
Belgium	U	0	0	0	1	1	0	1
Bulgaria[3]	A	386	386	5.1	461	543		
Cyprus	C	1	1	0.1	4	6	1	0
Czech Republic	C	2	2	0	-	2	2	-
Denmark	–[4]	-	-	-	-		-	9
Estonia	C	1	1	0.1	2	0	0	0
Finland	C	1	1	0	1	0	-	4
France	C	7	7	0	-	15	17	17
Germany	C	102	102	0.1	89	124	109	97
Greece	C	31	28	0.3	10	5	10	25
Hungary	C	7	7	0.1	8	6	5	11
Ireland	C	2	2	0	0	0	0	0
Italy	–[4]	-	-	-	-	0	-	-
Latvia	C	21	21	0.9	12	22	5	2
Lithuania	A	32	32	1.0	12	15	15	15
Luxembourg	U	0	0	0	-		0	-
Malta	U	0	0	0	0	0	0	-
Netherlands	A	12	12	0.1	6	31	-	34
Poland	C	28	28	0.1	40	65	34	21
Portugal	C	4	4	<0.1	10	9	9	57
Romania[3]	A	119	119	0.6	-			
Slovakia	C	5	5	0.1	4	6	2	0
Slovenia	C	7	7	0.3	1	3	0	1
Spain	C	98	98	0.2	125	98	78	6
Sweden	C	13	13	0.1	24	7	4	9
United Kingdom	C	9	9	<0.1	7	13	14	8
EU Totals		**894**	**891**	**0.2**	**834**	**997**	**314**	**342**
Iceland	–[4]	-	-	-	-			
Liechtenstein	U	0	0	0	0			
Norway	C	2	2	<0.1	0	0	1	0

Note: in Switzerland no surveillance system exists for humans.

1. Number of confirmed cases for 2005-2008 and number of total cases for 2004.
2. A: aggregated data report; C: case-based report; –: no report; U: unspecified.
3. EU membership began in 2007.
4. No surveillance system exists.

3.10 *ECHINOCOCCUS*

Table EH2b. Species distribution of reported confirmed echinococcosis cases in humans, 2008

Country	*E. granulosus*	*E. multilocularis*	*E.* spp	Unknown	Total
Austria	0	0	6	0	6
Bulgaria	386	0	0	0	386
Cyprus	0	0	0	1	1
Czech Republic	0	0	0	2	2
Estonia	1	0	0	0	1
Finland	1	0	0	0	1
France	0	5	2	0	7
Germany	67	26	9	0	102
Greece	0	0	0	28	28
Hungary	4	1	2	0	7
Ireland	1	0	1	0	2
Latvia	12	0	9	0	21
Lithuania	21	11	0	0	32
Netherlands	11	1	0	0	12
Poland	10	5	13	0	28
Portugal	3	0	1	0	4
Romania	0	0	119	0	119
Slovakia	3	0	2	0	5
Slovenia	4	1	2	0	7
Spain	98	0	0	0	98
Sweden	8	0	5	0	13
United Kingdom	9	0	0	0	9
EU Total	**639**	**50**	**171**	**31**	**891**
Norway	0	0	2	0	2

3.10 *ECHINOCOCCUS*

Table EH3. Distribution of confirmed echinococcosis cases in humans by reporting MS and by geographical origin of cases (domestic/imported), 2008

Country	Domestic (%)	Imported (%)	Unknown (%)	Total (N)
Austria	0	0	100	6
Bulgaria	0	0	100	386
Cyprus	100	0	0	1
Czech Republic	100	0	0	2
Estonia	100	0	0	1
Finland	0	100	0	1
France	100	0	0	7
Germany	33.3	38.2	28.4	102
Greece	0	0	100	28
Hungary	100	0	0	7
Ireland	0	0	100	2
Latvia	100	0	0	21
Lithuania	100	0	0	32
Netherlands	0	0	100	12
Poland	0	3.6	96.4	28
Portugal	0	0	100	4
Romania	0	0	100	119
Slovakia	100	0	0	5
Slovenia	28.6	14.3	57.1	7
Spain	100	0	0	98
Sweden	0	100	0	13
United Kingdom	0	0	100	9
EU Total	**23.6**	**6.2**	**70.3**	**891**

3.10.2 *Echinococcus* in animals

In 2008, 17 MSs reported data from meat inspection at the slaughterhouse in farm animals (Table EH4 and Figure EH2). Out of these only Bulgaria, Germany, Italy, the Netherlands and Slovenia provided information on the *Echinococcus* species detected. In case of *E. granulosus,* Bulgaria reported the highest proportions of samples positive: 16.0%, 1.3% and 4.3% for cattle, pigs and sheep, respectively. For *Echinococcus* spp., the most frequent findings came from Romania and Italy. Romania reported 23.9% of inspected cattle positive and Italy reported 11.3% of inspected sheep positive.

In total, six MSs and two non-MSs reported data on *Echinococcus* spp. in foxes in 2008, while in 2007 seven MSs provided data. The data from Belgium, the Czech Republic and Finland derive from surveillance and monitoring of hunted foxes, and France and Germany indicated that their data is from surveillance. The Czech Republic reported 32.0% of samples from foxes positive with *Echinococcus* spp., and Germany and France reported 18.5% and 19.2% of samples from foxes positive with *E. multilocularis* (Table EH5 and Figure EH3). Additionally, France, and Germany reported positive findings of *E. multilocularis* from the surveillance of dogs: 1 out of 797 and 195 samples, respectively. Also Switzerland reported positive findings from clinical investigations of dogs. However, foxes are considered the most important reservoir for *E. multilocularis* in MSs.

For additional information on *Echinococcus* in animals, please see Level 3 tables.

Table EH4. Proportion of inspected farm animals positive with* Echinococcus *spp., 2008

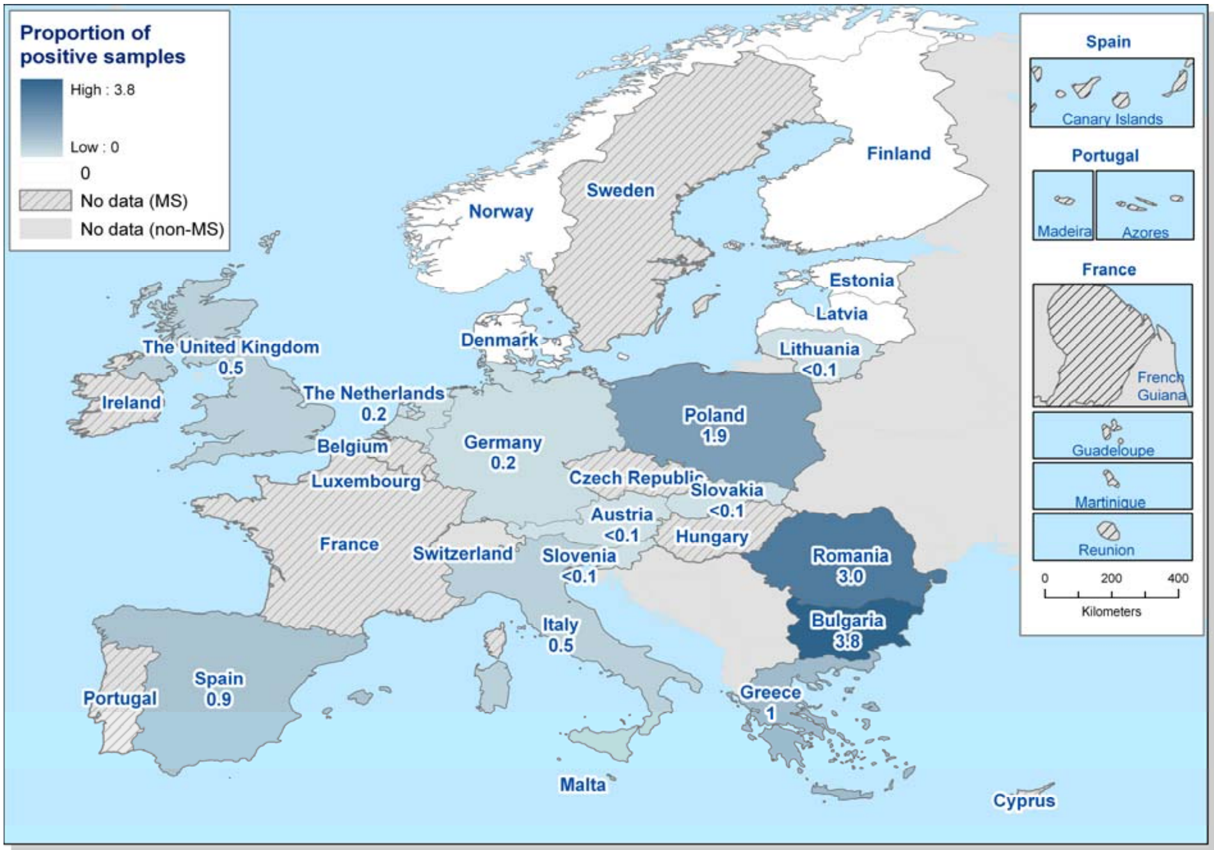
Country	Cattle		Goats		Pigs		Sheep		Solipeds	
	N	% pos	N	% pos	N	%pos	N	% pos	N	% pos
E. granulosus										
Bulgaria	23,110	16.0	-	-	258,315	1.3	637,493	4.3	-	-
Germany	489	0.2	-	-	320	0	247	0.4	-	-
Slovenia	131,395	<0.1	422	0	385,195	<0.1	10,878	0	-	-
Total (3 MSs)	**154,994**	**2.4**	**422**	**0**	**643,830**	**0.5**	**648,618**	**4.2**	**-**	**-**
***Echinococcus* spp.**										
Austria	610,304	<0.1	3,527	0	5,491,872	<0.1	116,753	0.2	-	-
Denmark	511,300	0	-	-	18,582,288	0	-	-	-	-
Estonia	48,075	0	58	0	474,859	0	5,750	0	-	-
Finland	265,664	0	-	-	2,436,379	0	23,808	0	1,150	0
Greece	160,585	1.1	694,204	0.5	675,984	<0.1	2,034,355	1.5	-	-
Italy[1]	1,822,679	0.5	58,026	1.2	9,220,665	<0.1	358,602	11.3	36,557	<0.1
Latvia[4]	114,440	0	9,338	0	405,460	0	-	-	430	0
Lithuania	212,217	<0.1	-	-	694,827	0.1	184	0	-	-
Netherlands[2]	3,469	0.2	-	-	-	-	-	-	-	-
Poland	1,523,115	<0.1	235	0	20,027,092	2.0	21,304	6.7	-	-
Romania	211,480	23.9	1,498	13.5	2,605,595	1.1	277,885	5.0	22,337	0
Slovakia[3]	72,829	<0.1	-	-	913,655	<0.1	9,129	<0.1	-	-
Spain[4]	2,071,978	0.5	12,217,824	3.7	38,897,604	<0.1	-	-	25,820	0
United Kingdom	2,262,297	0.1	-	-	-	-	16,043,345	0.5	-	-
Total (14 MSs)	**9,890,432**	**0.8**	**12,984,710**	**3.5**	**100,426,280**	**0.4**	**18,891,115**	**0.9**	**86,294**	**<0.1**

Note: Data are only presented for sample size ≥25

1. Initially, 3,467 positive samples from cattle were reported as *E. granulosus*, 75 positive samples from pigs were reported as *E. granulosus*, one positive sample from goats was reported as *E. granulosus* and 628 positive samples from sheep were reported as *E. granulosus.* Of an additional 9,947 animals reported as "sheep and goats", 268 were *Echinococcus* spp. positive.
2. In the Netherlands, an additional 27 cattle imported from Romania were tested and three were positive with *E. granulosus.*
3. In Slovakia, one positive sample from sheep was reported as *E. multilocularis.*
4. In Latvia and Spain, samples from sheep and goats were reported together.

3.10 *ECHINOCOCCUS*

Figure EH3. Findings of* Echinococcus *spp. in farm animals, 2008



Note: Data from cattle, goats, pigs, sheep and solipeds are included. Data include clinical investigations and monitoring at the slaughterhouse.

Table EH5.* Echinococcus multilocularis *in foxes, 2006-2008

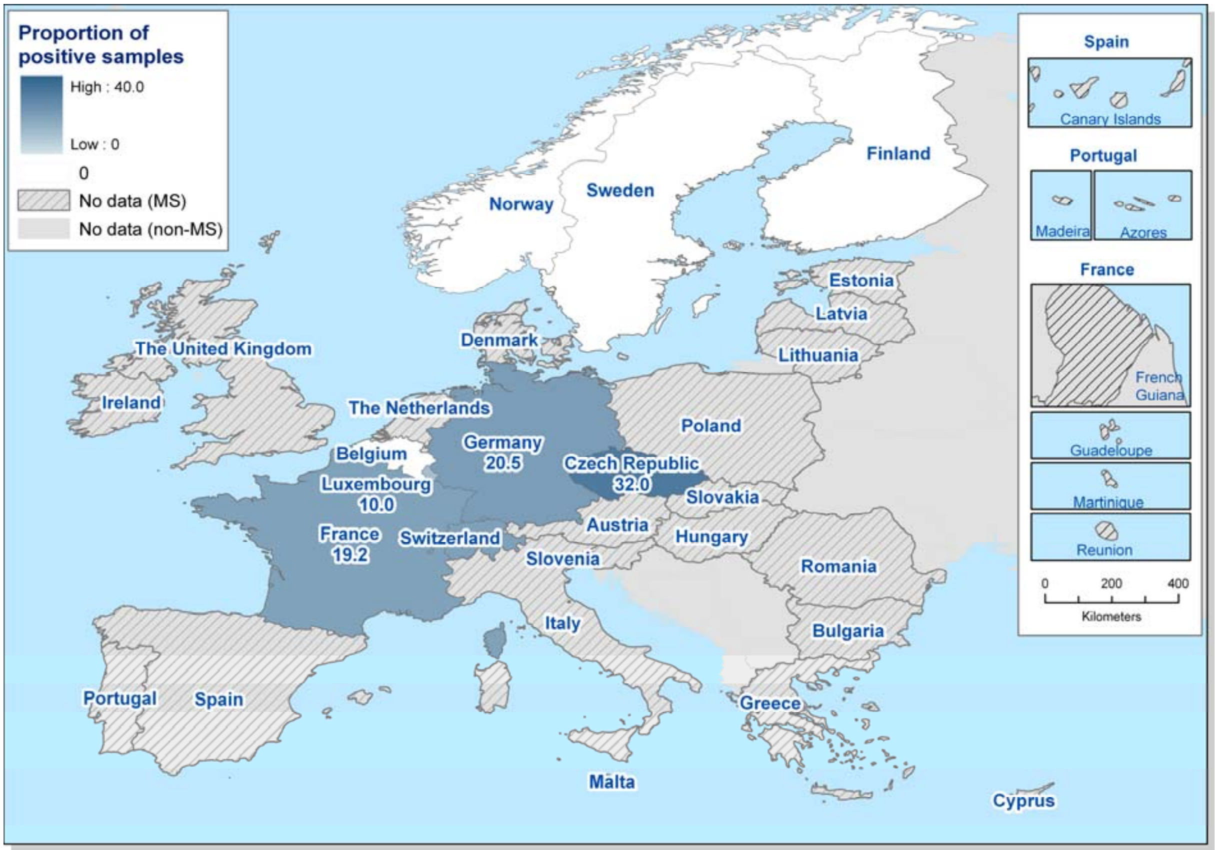
Country	2008		2007		2006	
	N	Pos	N	Pos	N	Pos
Belgium	117	0	-	-	-	-
Czech Republic[1]	1,333	426	1,250	255	958	107
Finland	411	0	264	0	209	0
France	1,344	258	941	148	131	31
Germany[2]	5,927	1,217	4,385	510	3,605	906
Netherlands	-	-	116	11	49	3
Slovakia	-	-	570	103	-	-
Sweden[3]	244	0	245	0	300	0
Total (6 MSs in 2008)	**9,396**	**1,903**	**7,794**	**1,030**	**5,275**	**1,054**
Norway[3]	427	0	483	0	-	-
Switzerland[4]	1,044	202	1,376	361	14	2

Note: Data are only presented for samples size ≥25.

1. In Czech Republic in 2008, all 426 positive samples were reported as *Echinococcus* spp.
2. In Germany in 2006, 37 of the 906 positive samples were reported as *Echinococcus* spp.; in 2008, 122 of the 1,217 positive samples were reported as *Echinococcus* spp.; the rest were *E. multilocularis.*
3. In Sweden and Norway, a targeted sampling programme in foxes is running continuously.
4. In Switzerland in 2006, the positive samples were reported as *Echinococcus* spp.

3.10 *ECHINOCOCCUS*

Figure EH4. Findings of* Echinococcus multilocularis *in foxes, 2008



3.11. Q FEVER

Q fever, or Query fever, is a zoonotic disease caused by the bacterium *Coxiella burnetii.* Cattle, sheep and goats are the primary domestic animal reservoirs, and the bacteria are excreted in milk, urine, faeces and in high numbers in the amniotic fluids and the placenta at birth. Clinical disease in these animals is rare, although abortion in goats and sheep as well as metritis and infertility in cattle have been associated with *C. burnetii* infections.

The bacteria can survive for long periods in the environment. Humans are most often infected when inhaling airborne dust contaminated by dried placental material, birth fluids or faeces. Only a few organisms may suffice to cause infection. Infection by ingestion of contaminated milk has been reported as well, but is less common.

Only 50% of people infected with *C. burnetii* show clinical signs. Clinical signs and symptoms of acute Q fever may include fever, severe headache, muscle pain, discomfort, sore throat, chills, sweats, non-productive cough, nausea, vomiting, diarrhoea, abdominal pain and chest pain. The fever usually lasts for one to two weeks and may result in a life-long immunisation. Acute Q fever is fatal in approximately 2% of cases. Chronic Q fever is uncommon, but may develop in persons with a previous history of acute Q fever. A serious complication of chronic Q fever is inflammation of the heart valves, which may be fatal in up to 65% of cases.

Table QF1. Overview of countries reporting data on Q fever, 2007-2008

Year	Data	Total no. of MSs reporting	Countries
2007	Human	20	**All MSs except:** AT, CZ, DK, FR, IT, LU, MT
			Non-MSs: IS, LI, NO
2008	Human	21	**All MSs except:** AT, CZ, DK, FR, IT, LU
			Non-MSs: IS, LI, NO
2008	Animal	17	**MSs:** AT, BE, BG, DE, DK, ES, FI, GR, HU, IT, NL, PL, PT, SE, SI, SK, UK
			Non-MSs: CH, NO
2007	Animal	18	**MSs:** AT, BE, BG, DE, DK, ES, FI, FR, GR, HU, IT, NL, PL, PT, SE, SI, SK, UK

3.11.1 Q fever in humans

Of the 21 MSs reporting data on Q fever in humans, 10 MSs (47.6%) reported no cases. A total of 1,594 confirmed cases of Q fever in humans were reported in 2008 in the EU, which is a 172.5% increase from 2007 (Table QF2). Combined, cases in the Netherlands and in Germany increased by 542.3% compared to 2007, accounting for the majority of the overall increase in cases in 2008 in the EU.

Table QF2. Reported confirmed Q fever cases in humans, 2007-2008 (TESSy) and notification rates in 2008

Country	2008				2007
	Report Type[1]	Cases	Confirmed Cases	Cases/ 100,000	Confirmed Cases
Austria	–[2]	–	–	–	–
Belgium	A	0	0	0	0
Bulgaria	A	17	17	0.2	33
Cyprus	C	0	0	0	8
Czech Republic	–	–	–	–	–
Denmark	–[2]	–	–	–	–
Estonia	C	0	0	0	0
Finland	C	2	2	<0.1	2
France	–	–	–	–	–
Germany	C	370	370	0.5	83
Greece	C	3	3	<0.1	0
Hungary	C	0	0	0	0
Ireland	C	13	10	0.2	4
Italy	–	–	–	–	–
Latvia	C	0	0	0	0
Lithuania	A	0	0	0	0
Luxembourg	–[2]	–	–	–	–
Malta	C	0	0	–	0
Netherlands	C	1,013	1,011	6.2	132
Poland	C	0	0	0	0
Portugal	C	12	12	0.1	8
Romania	A	3	3	<0.1	0
Slovakia	C	0	0	0	1
Slovenia	C	0	0	0	93
Spain	C	119	119	0.3	159
Sweden	C	7	7	0.1	0
United Kingdom	A	40	40	<0.1	62
EU Total		**1,599**	**1,594**	**0.5**	**585**
Iceland	C	0	0	0	0
Liechtenstein	C	0	0	0	0
Norway	C	0	0	0	0

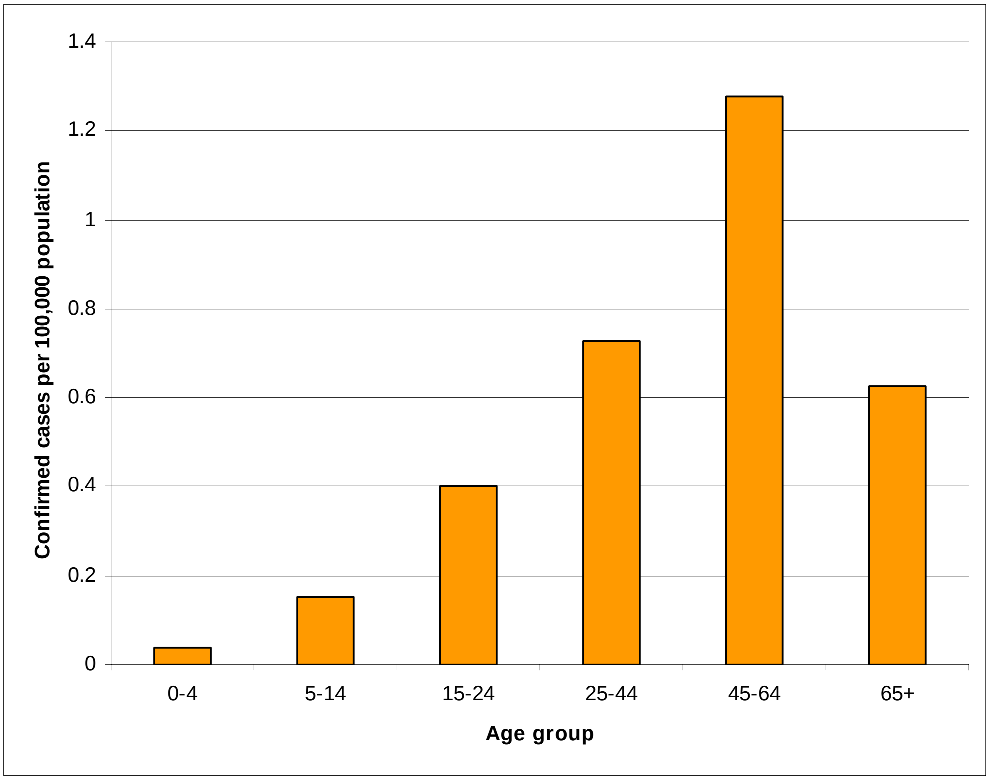
Note: in Switzerland no surveillance system exists for humans.

1. A: aggregated data report; C: case-based report; –-: no report.

2. No surveillance system exists.

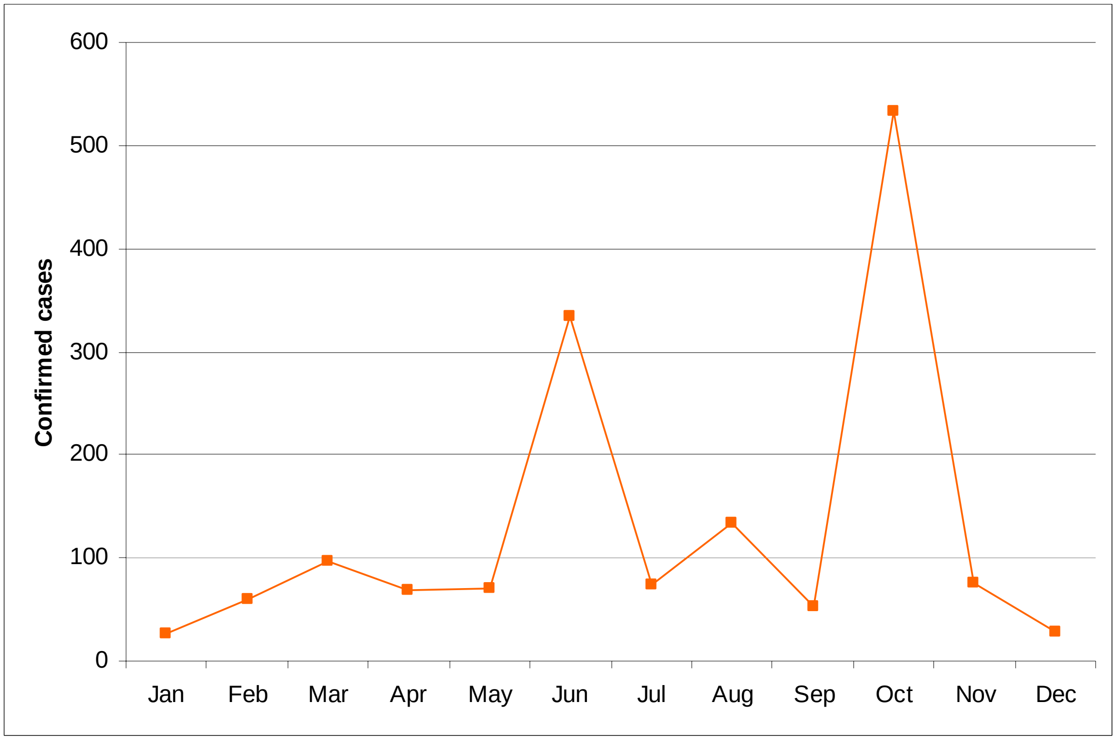
The highest notification rate of human Q fever was in the 45 to 64 year old age group, followed by 25 to 44 year olds, and 65 year olds and older. These three groups accounted for 91.0% of the Q fever cases in 2008 (Figure QF1). No seasonal pattern was observed for Q fever, however there was a large peak in cases in both June and October of 2008 which were both due to the large number of cases reported from the Netherlands in these two months.

Figure QF1. Age-specific notification rate of reported confirmed human cases of Q fever, TESSy data for reporting MSs, 2008



Source: Bulgaria, Finland, Germany, Greece, Ireland, Netherlands, Portugal, Romania, Spain, Sweden (N=1,542).

Figure QF2. Seasonal distribution of reported confirmed human cases of Q Fever in reporting MSs, 2008



Source: Bulgaria, Finland, Germany, Greece, Ireland, Netherlands, Portugal, Romania, Spain, Sweden (N=1,554).

Q fever in the Netherlands

In 2008 the Netherlands reported a marked increase in Q fever with 1,000 human cases registered. Of the cases for whom clinical details were available, 545 presented pneumonia, 33 hepatitis and 115 other febrile illness. The epidemic was widespread in the province of Noord-Brabant, area known for its high density of large dairy goat farms, and has expanded to the adjacent region Nijmegen in Gelderland province. Most of cases reside in one municipal health service region where several distinct clusters of Q fever have been observed in rural municipalities. However the larger geographic area in which cases occur in 2008, compared to 2007, points at multiple sources. During the years 2005-2008 together, 22 dairy goat farms reported an unusually high incidence of abortions. These farms were mainly located in the same area where the human cases occurred. Since June 2008 notification of Q fever in dairy goats and sheep is mandatory in the Netherlands. This veterinary notification can potentially facilitate the detection of related human cases or clusters. In autumn 2008, a voluntary vaccination campaign of small ruminants with a Phase I vaccine, was implemented in the province of Noord-Brabant.

3.11.2 *Coxiella burnetii* in animals

In 2007, 18 MSs and in 2008, 17 MSs and two non-MSs provided information about *C. burnetii* in animals (Table QF1). The majority of samples were make due to clinical suspicion or after abortion and was examined using serological tests; most of the samples originated from cattle (Table QF3).

The proportion of positive cattle samples was 7.4% in 2007 and 10.0% in 2008. Poland reported the highest increase in positive cases from 2.2% in 2007 to 40.1% in 2008, whereas Belgium reported a large decrease from 33.2% to 8.0% in 2008. However, the results do not necessarily reflect the situation in MSs, since most data originate from sampling based on suspicion. In goats, the proportion of positive samples increased from 9.7% in 2007 to 15.7% in 2008. All MSs providing data from both years reported more positive samples in 2008 compared to 2007 in goats; and the Netherlands reported a three-fold increase in 2008. Furthermore, the Netherlands also reported an increase of positive samples from 0% to 10.1% in sheep.

Denmark was the only MS to provide information at herd level for both years with prevalence around 50%, which is by far the highest level in the EU. During the last couple of years Denmark has focused especially on the sampling of animals suspected of being infected with *C. burnetii.* This fact may, in part, explain the high number of positive findings.

Additionally, in 2008, Germany, Italy, Slovakia and Switzerland analysed samples from buffalo, dogs, solipeds, water buffalo; one German sample from a soliped was positive.

For additional information on data, please refer to Level 3 tables.

Table QF3. **Coxiella burnetii** ***(Q fever) in farm animals, 2007-08***

Animal based data[1]	Cattle				Goats				Sheep			
	2008		2007		2008		2007		2008		2007	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Austria	1,147	1.1	1,070	1.5	109	10.1	-	-	27	0	-	-
Belgium	314	8.0	220	33.2	-	-	-	-	-	-	-	-
Bulgaria	249	10.8	3,366	10.9	25	12.0	-	-	820	5.0	3,410	11.2
France	-	-	-	-	-	-	110	30.0	-	-	330	40.3
Germany	11,866	10.7	6,936	10.7	499	15.6	190	10.5	1,880	10.3	527	5.9
Greece	-	-	-	-	-	-	114	14.9	30	26.7	202	20.3
Hungary	-	-	536	7.5	-	-	76	0	-	-	27	7.4
Italy	1,743	18.4	464	24.6	-	-	141	9.2	25	16.0	903	16.6
Netherlands	1,201	0.4	1,062	<0.1	160	31.9	74	9.5	129	10.1	144	0
Poland	1,130	40.1	91	2.2	-	-	-	-	-	-	-	-
Portugal	-	-	147	4.1	-	-	-	-	727	8.8	75	0
Slovakia	5,786	4.9	7,587	3.0	130	1.5	227	0	1,476	0	3,758	<0.1
Slovenia	1,400	6.8	-	-	-	-	-	-	-	-	-	-
Total (13 MSs)	**24,836**	**10.0**	**21,479**	**7.4**	**923**	**15.7**	**932**	**9.7**	**5,114**	**6.3**	**9,376**	**7.9**
Switzerland	2,660	2.4	-	-	139	6.5	-	-	141	1.4	-	-
Herd based data[2]												
Denmark	836	46.4	812	54.7	-	-	-	-	-	-	-	-
Italy	34	8.8	-	-	-	-	101	10.9	-	-	-	-
Sweden	1,000	8.5	-	-	-	-	-	-	-	-	-	-
Total (3 MSs)	**1,870**	**25.5**	**812**	**54.7**	**-**	**-**	**101**	**10.9**	**-**	**-**	**-**	**-**
Norway	525	0	-	-	-	-	-	-	-	-	-	-

Note: Data are only presented for sample size ≥25.

1. For animal based data in 2007, sampling stage was not indicated; in 2008, samples from Austria, Belgium, Greece, Italy, the Netherlands and Slovenia were collected at farm.
2. For herd based data in 2007, Denmark was the only country to report sampling stage (at farm); in 2008, samples from Denmark, Norway and Sweden were collected at farm.

3.12. OTHER ZOONOSES

Table OZ1 presents countries reporting data on the other zoonoses not covered by the specific chapters of this report in 2008.

Table OZ1. Overview of countries reporting data on other zoonoses, 2008

Pathogen	Total no MSs reporting	Countries
Toxoplasma	17	**MSs:** AT, EE, ES, FI, FR, DE, GR, HU, IE, IT, LV, LT, NL, PL, PT, SI, UK
		Non-MSs: CH, NO
Cysticerci	2	**MSs:** BE, EE
Francisella	1	**MS:** FR
Lepstospira	1	**MS:** PT

Note: In the following chapter, only countries reporting ≥ 25 samples have been included for analysis.

3.12.1 *Toxoplasma*

Toxoplasmosis is a common infection in animals and humans. It is caused by an obligate intracellular protozoan parasite, *Toxoplasma gondii*. Many species of warm-blooded animals can act as intermediate hosts, and seemingly most animal species may be carriers of tissue cysts of this parasite. The parasite, however, only matures in cats and felids which are the definitive hosts. The infection may be acquired by humans through the consumption of undercooked meat contaminated with parasite cysts, or food and water contaminated with cat faeces or from handling contaminated soil or cat litter trays. Assisting sheep during lambing is also a known risk factor.

In humans, the majority of infections is asymptomatic or cause mild flu-like symptoms. However, toxoplasmosis can be life threatening especially for immunocompromised individuals. If acquired during pregnancy, toxoplasmosis can cause abortion or congenital malformation affecting the brain, eyes or other organs of the foetus.

In animals, *T. gondii* is an important cause of abortion in sheep and goats, yet it may be controlled by proper management practices and vaccination. The parasite is most frequently reported in cats, dogs, sheep, goats and pigs.

Animals

In total, 17 MSs and two non-MSs reported information on the occurrence of *Toxoplasma* in animals. The highest proportion of *Toxoplasma* spp. positive samples was reported from sheep and goats, and wild boar (Table OZ2). Most of the data on wild boar was reported from France. In a Norwegian survey, 18.5% of goats were positive (N =2,248).

3.12 OTHER ZOONOSES

Table OZ2. Proportion of* Toxoplasma *positive animal samples, 2008

Animal species	N	% pos
MSs		
Cattle	4,239	1.3
Goats	487	10.3
Sheep	2,974	20.1
Sheep and goats	571	54.5
Pigs	1,245	4.9
Solipeds	99	1.0
Dogs	1,141	12.2
Cats	1,407	9.2
Hares	186	3.8
Wild boars	1,034	29.8
Non-MSs		
Goats	2,252	18.5
Sheep	73	35.6
Cats	427	0.7

Note: Data are only presented for samples size ≥25.

For additional information on *Toxoplasma* in animals, please see Level 3 tables.

3.12 OTHER ZOONOSES

3.12.2 *Cysticerci*

Cysticercus infections in animals are caused by the larval forms of the tapeworms *Taenia saginata* and *T. solium*. *T. saginata* is most commonly seen in cattle and *T. solium* is most commonly seen in pigs. The related diseases in humans are taeniosis, caused by the adult form of *T. saginata* or *T. solium*, and cysticercosis, caused by the larval form of *T. solium* only. Cattle and pigs become infected mostly through the ingestion of vegetation contaminated with the *T. saginata* and *T. solium* eggs shed in human faeces. Infection is established in the animal by the hatching of eggs in the stomach releasing oncospheres, which penetrate the intestinal wall and develop into *cysticerci* in the muscles of the animal. Humans may become infected through the consumption of raw or undercooked contaminated meat, and the taeniae develop in the intestine.

In humans, symptoms are usually mild abdominal discomfort to which effective drug treatments exist. In the case of human cysticercosis, *cysticerci* of *T. solium* can establish in muscles, subcutaneous tissue, the central nervous system (neurocysticercosis, NCC) and the eyes. NCC can be subclinical but is often accompanied by mild to very severe neurological symptoms of which epilepsy is the most common. Treatment of cysticercosis is cumbersome and needs hospitalisation of patients.

Animals

In 2008, Belgium and Estonia provided information on *cysticerci* in bovine animals at the slaughterhouse. Belgium reported 0.3% of 823,659 bovine animals positive. Estonia reported 0.2% of 5,750 sheep positive to *Cysticercus tenuicollis* and one positive sample from 2,190 wild boar. Estonia reported no findings in 48,075 bovine animals and 474,859 pigs.

3.12 OTHER ZOONOSES

3.12.3 *Francisella*

Tularemia (rabbit fever) is a zoonotic disease caused by *Francisella tularensis*, a gram negative coccobacillus geographically widely distributed. *F. tularensis* has been isolated from more than 200 animal species including vertebrates and invertebrates. The bacterium is able to survive for long periods of time in diverse environments such as water, mud and decomposing carcasses.

The main transmission route for humans is tick bites. Therefore, tularemia is a disease associated primarily with rural environments where people may be in contact with infected ticks. In addition, transmission may also occur through the skin after direct contact with infected animals, by ingestion of contaminated food or water and inhalation of aerosolised soil dust containing bacteria.

Tularemia in humans has an incubation period that varies between three to five days. Although there are six different types of tularemia highly associated with the course of infection (ulceroglandular, septicemic, glandular, oculoglandular, oropharyngeal and pneumonic), only two of these types, the ulceroglandular and septicemic infection account for almost 100% of human cases.

Typical clinical signs of this type include painful and swollen lymph nodes, fever and chills. Clinical symptoms of septicemic tularemia include pneumonia, myalgia and high fever. Severe cases of tularaemia may develop complications such as meningitis, pericarditis and osteomyelitis. Long term immunity is developed after recovery and re-infection is extremely rare. Ulceroglandular tularemia begins when an ulcer appears at the bite site.

Wild animals such as rabbits, voles, muskrats and ticks are considered the main reservoir for *F. tularensis*. Wildlife and domestic animals may develop clinical infections that include a wide range of symptoms such as fever, abortions and jaundice. Tularemia in wild rabbits, rodents and domestic sheep is often fatal.

Humans

Human cases with *Francisella* are rarely reported, however in 2008, Norway reported one waterborne outbreak involving 15 cases where the water was contaminated with dead infected rodents or infected rodent faeces.

Animals

France reported data on *F. tularensis* (rabbit fever). In a survey, 59.4% of 106 wild hares were positive, and three out of six clinical samples from monkeys at the zoo were positive.

3.12 OTHER ZOONOSES

3.12.4 *Leptospira*

Leptospira spp. are spirochete gram negative bacteria distributed in different environments and are reported from more than 160 mammalian hosts worldwide. Although the genus *Leptospira* is divided into 20 different species, leptospirosis in humans is mainly caused by *L. interrogans*. There are more than 200 serovars of this pathogenic *Leptospira* species, some of which are host-species specific and others can infect several different hosts.

Pathogenic *Leptospira* species are maintained in the renal tubules of wild and domestic animals and are excreted in the urine of infected hosts. Transmission to humans occurs through mucous membranes and skin lesions after exposure to water, soil or food contaminated with infected urine. Direct person-to-person transmission, although possible, is rare.

Clinical symptoms in humans appear after an incubation period ranging from 2 to 30 days. Leptospirosis may present a wide range of symptoms from general flu-like symptoms such as fever, chills, muscle aches to serious onsets like meningitis, liver damage and vasculitis. This most severe form of leptospirosis is known as Weils disease. The lack of specific clinical signs for human leptospirosis often account for misdiagnoses.

Clinical leptospirosis may occur in domestic animals such as cattle, sheep, pigs, horses and dogs. Symptoms include liver damage, kidney failure, abortions and stillbirths. However, most cases in domestic animals are subclinical. Other animal hosts, such as rodents, never develop a clinical form of infection, become active carriers and are an important reservoir of *Leptospira* spp.

Animals

Portugal reported data on *Leptospira* spp. in cattle, pigs, goats and dogs from the Azores. Fifteen bovine animals (4.3%) out of 346 were positive.

3.13 FOOD-BORNE OUTBREAKS

3.13.1 General overview

The reporting of investigated food-borne outbreaks has been mandatory for EU MSs since 2005. Since 2007, new harmonised specifications on the reporting of these outbreaks at Community level have been applied[1]. However, the food-borne outbreak investigation and reporting systems at national level are not harmonised within the EU. Therefore, differences in the numbers of the reported outbreaks, the types of outbreaks and causative agents do not necessarily reflect different levels of food safety between MSs. It is more probable that the high number of reported outbreaks indicates the effectiveness and sensitivity of the national system for investigating and identification of the outbreaks.

Reports in 2008 provide information on the total number of reported food-borne outbreaks caused by different causative agents, including food-borne outbreaks where the causative agent was unknown. In verified outbreaks, laboratory results in foodstuffs or analytical epidemiological evidence disclosed a link between human cases and implicated foodstuffs, and detailed information covering type of outbreak, number of human cases, hospitalisations and deaths, implicated foodstuffs, setting, contributing factors and type of evidence were reported. For the outbreaks where this link is supported by weaker evidence (possible outbreaks), only the causative agent, human cases, hospitalisations and deaths were reported.

In this section (3.13.1 General overview) all reported food-borne outbreaks are included in all tables and figures. In subsequent sections, outbreaks are presented more in detail categorised by the causative agent. However, all waterborne outbreaks are addressed separately in section 3.13.11.

Due to the new reporting system applied in 2007, fewer but more precisely detailed outbreaks are reported in 2007-2008 compared to previous years, where detailed information was also reported for possible food-borne outbreaks.

In 2008, 25 MSs and two non-MSs provided data on food-borne outbreaks. An overview of countries reporting data on food-borne outbreaks is provided in Table OUT1. No outbreak data were received from Bulgaria and Cyprus.

[1] Report of the Task Force on Zoonoses Data Collection on harmonising the reporting of food-borne outbreaks through the Community reporting system in accordance with Directive 2003/99/EC, *The EFSA Journal* (2007) 123, 1-16

3.13 FOOD-BORNE OUTBREAKS

Table OUT1. Overview of countries reporting data on food-borne outbreaks, 2008

Data	Total number of MSs reporting	Countries
Salmonella	25	**All MSs** except BG, CY
		Non-MSs: CH, NO
Campylobacter	20	**MSs**: AT, BE, CZ, DE, DK, EE, ES, FI, FR, HU, IE, IT, LT, LU, MT, NL, PL, SE, SK, UK
		Non-MSs: CH, NO
Pathogenic *E. coli*	11	**MSs**: AT, BE, DE, ES, FR, IE, MT, PL, PT, SE, UK
Yersinia	6	**MSs**: AT, DE, FI, FR, LT, NL
Other bacterial agents	9	**MSs**: AT, BE, DK, ES, FR, GR, IT, SE, UK
Bacterial toxins	17	**MSs**: BE, DE, DK, ES, FI, FR, HU, IT, LT, NL, PL, PT, RO, SE, SI, SK, UK
		Non-MSs: CH, NO
Viruses	18	**MSs**: AT, BE, CZ, DE, DK, ES, FI, FR, HU, IT, LT, LV, MT, NL, PL, SE, SK, UK
		Non-MSs: CH, NO
Parasites	14	**MSs**: BE, DE, ES, FI, FR, GR, HU, IE, LT, PL, RO, SE, SK, UK
Other causative agents	17	**MSs**: AT, BE, DE, DK, ES, FR, GR, HU, IE, LT, LV, NL, PL, RO, SE, SK, UK
		Non-MSs: CH, NO

In 2008, a total of 5,332 food-borne outbreaks were reported by the 25 reporting MSs, including both possible and verified outbreaks (Table OUT2). This represented a 7.0% decrease compared to 2007, where the MSs reported 5,733 outbreaks. Overall, 45,622 human cases, 6,230 hospitalisations and 32 deaths (case fatalities) were related to the reported outbreaks for 2008 (Table OUT3).

In total, the average number of outbreaks reported in 2008 per 100,000 population was 1.1 per outbreak (Table OUT2). As in 2007, Malta had the highest reporting rate of 15.6 per 100,000 population followed by Lithuania (6.8) and Austria (4.4). Within the EU, the causative agent (aetiology) was known in 74.2% of the outbreaks, ranging from 20.1% to 100% among MSs. Fifteen MSs reported the causative agent in more than 75% of their outbreaks.

In 2008, a few MSs reported the majority of outbreaks; France and Germany reported 20.3% and 20.0% of all outbreaks, respectively. Together, France, Poland and Spain accounted for 72.1% of all verified outbreaks. The two non-MSs, Norway and Switzerland, reported 73 outbreaks in 2008, of which nine were verified (Table OUT2).

In 2008, a total of 32 deaths was reported related to the food-borne outbreaks (Table OUT3); a large *Salmonella* outbreak in Denmark was responsible for 11 cases. The remaining deaths were associated with other *Salmonella* serovars, mushrooms, *Staphylococcus* or *Clostridium*. In 2007, fatalities were only reported for verified outbreaks (19 cases) which is equivalent to reports regarding verified outbreaks in 2008 (20 cases).

Verified outbreaks reported by MSs involved 14,001 human cases. Of these, 14.7% were admitted to hospital and 20 cases died (0.14%) (Table OUT3). In the non-MSs, Norway and Switzerland, verified outbreaks affected 263 cases with 15 hospitalisations and no fatalities.

France reported 30.7% of all verified outbreaks as well as the highest number of cases (21.7% of all cases). Portugal, Latvia and Romania had the highest proportion of hospitalised cases: 67.6%, 67.4% and 62.2% of total number of cases per MS, respectively.

3.13 FOOD-BORNE OUTBREAKS

The number of cases and hospitalisations per outbreak varied considerably between MSs, and depend on the pathogen causing the outbreak as well as the setting. In 2008, MSs reported on average 15.7 cases per outbreak, varying from 7.5 to 114.4 cases, and on average 2.3 hospitalisations per outbreak.

Salmonella remained the most commonly known causative agent in food-borne outbreaks reported in the EU. In 2008, *Salmonella* was responsible for 35.4% of all reported outbreaks and 55.1% of all verified outbreaks. As in 2007, food-borne viruses were the second most common known cause of food-borne outbreaks, and in 2008, 13.1% of all reported outbreaks and 4.3% of all verified outbreaks were caused by food-borne viruses. *Campylobacter* caused 9.2% of all reported outbreaks and 2.4% of verified. As for 2007, 25.9% of all outbreaks were reported with an unknown causative agent (Table OUT4)

Salmonella, bacterial toxins and viruses were the agents responsible for most human cases related to verified food-borne outbreaks reported in 2008. *Salmonella* caused 7,724 human cases, bacterial toxins caused 2,994 human cases and viruses caused 1,162 human cases.

A very large outbreak of *Salmonella* Typhimurium was recorded in Denmark in 2008. A total of 1,224 cases of *S*. Typhimurium U292, belonging to the same Multi Locus Variable-Number Tandem Repeat Analyses (MLVA) cluster, were registered in what has been the largest known *Salmonella* outbreak in Denmark to date. The first cases were detected in February. During the summer, the total number of cases increased with 30 to 60 new cases every week, gradually decreasing over the autumn and winter. This outbreak has been the subject of a very large and intensive still ongoing investigation, including measures such as a large number of travelling questionnaires, case-control and cohort analyses, investigations of a number of slaughterhouses and food production facilities, comparative molecular sub-typing of relevant isolates from many different sources, structured microbiological analyses of food samples from patients' homes, investigation of shopping records obtained from supermarket computers, epidemiological and trace-back analyses of embedded outbreaks where several persons have been ill after participating in the same event. Only few cases with the outbreak strain have been detected outside of Denmark. The main hypothesis remains that the outbreak originates from a pig reservoir in a series of different foodstuffs.

The overall proportion of verified outbreaks decreased from 31.1% in 2007 to 16.7% in 2008 (Table OUT4). The decrease is mainly caused by a meticulous evaluation of the Spanish outbreaks in order to classify verified and possible outbreaks. For each causative agent, the highest proportion of verified outbreaks was reported for parasites and for the group of other bacterial agents: 54.3% and 55.0%, respectively (Figure OUT1).

The extent to which MSs are able to classify outbreaks as verified is highly dependent on the MS specific outbreak investigation and reporting system, and the type of information that is available centrally in the MS. This is reflected in the large variation in the proportion of verified outbreaks out of the total number of outbreaks reported by MSs (Figure OUT2). Twenty-one MSs and two non-MSs (Norway and Switzerland) reported both verified and possible outbreaks. In contrast, Italy, Luxembourg, Malta, and the United Kingdom only reported possible outbreaks and therefore provided no detailed information on implicated foodstuffs, settings or contributing factors. Compared to data reported from 2007, it appears that many MSs improved their classification of outbreaks.

3.13 FOOD-BORNE OUTBREAKS

Table OUT2. Reported food-borne outbreaks, 2007-2008

Country	2008						2007 [1]					
	N	% of EU total	Reporting rate per 100,000	Possible outbreaks (n)	Verified outbreaks (n)	% with aetiology[2]	N	% of EU total	Reporting rate per 100,000	Possible outbreaks (n)	Verified outbreaks (n)	% with aetiology[2]
Austria	368	6.9	4.4	354	14	100	438	7.6	5.3	427	11	99.8
Belgium	104	2.0	1.0	89	15	29.8	75	1.3	0.7	54	21	46.7
Czech Republic	23	0.4	0.2	22	1	87.0	37	0.6	0.4	33	4	86.5
Denmark	82	1.5	1.5	66	16	85.4	57	1.0	1.1	0	57	100
Estonia	51	1.0	3.8	46	5	98.0	28	0.5	2.1	26	2	100
Finland	41	0.8	0.8	33	8	53.7	32	0.6	0.6	0	32	71.9
France	1,081	20.3	1.7	808	273	60.0	984	17.2	1.6	0	984	60.7
Germany	1,068	20.0	1.3	1,038	30	100	1,405	24.5	1.7	1,343	62	100
Greece	55	1.0	0.5	54	1	83.6	55	1.0	0.5	55	0	72.7
Hungary	114	2.1	1.1	79	35	89.5	269	4.7	2.7	217	52	97.4
Ireland	25	0.5	0.6	23	2	92.0	20	0.3	0.5	15	5	70.0
Italy	245	4.6	0.4	245	0	100	-	-	-	-	-	-
Latvia	45	0.8	2.0	35	10	95.6	233	4.1	10.2	218	15	75.1
Lithuania	228	4.3	6.8	216	12	75.9	196	3.4	5.8	186	10	68.4
Luxembourg	2	0.0	0.4	2	0	100	-	-	-	-	-	-
Malta	64	1.2	15.6	64	0	48.4	57	1.0	14.0	57	0	31.6
Netherlands	324	6.1	2.0	289	35	20.1	345	6.0	2.1	308	37	17.7
Poland	484	9.1	1.3	329	155	77.7	562	9.8	1.5	407	155	66.9
Portugal	35	0.7	0.3	24	11	71.4	-	-	-	-	-	-
Romania	46	0.9	0.2	9	37	95.7	42	0.7	0.2	5	37	88.1
Slovakia	75	1.4	1.4	66	9	69.3	114	2.0	2.1	97	17	74.6
Slovenia	17	0.3	0.8	16	1	52.9	17	0.3	0.9	0	17	94.1
Spain	551	10.3	1.2	337	214	63.3	619	10.8	1.4	365	254	56.0
Sweden	154	2.9	1.7	148	6	29.2	123	2.1	1.4	111	12	37.4
United Kingdom	50	0.9	0.1	50	0	92.0	25	0.4	0.0	25	0	84.0
EU Total	**5,332**	**100**	**1.1**	**4,442**	**890**	**74.2**	**5,733**	**100**	**1.1**	**3,949**	**1,784**	**74.4**
Norway	63		1.3	59	4	66.7	82		1.8	53	29	62.2
Switzerland	10		0.1	5	5	90.0	11		0.2	4	7	63.6

1. 2007 data have been updated in comparison to published data following recent communication received from a MS.

2. Percent of outbreaks where the causative agent has been identified and reported.

3.13 FOOD-BORNE OUTBREAKS

Table OUT3. Human cases in verified and possible food-borne outbreaks, 2008

Country	Verified outbreaks				Possible outbreaks			
	N	Human cases			N	Human cases		
		Cases	Hospitalised	Deaths		Cases	Hospitalised	Deaths
Austria	14	219	72	0	354	1,157	280	0
Belgium	15	261	21	0	89	738	15	0
Czech Republic	1	102	16	1	22	628	44	2
Denmark	16	1,831	7	15	66	957	36	0
Estonia	5	133	11	0	46	111	56	0
Finland	8	313	15	0	33	676	9	0
France	273	3,045	252	0	808	9,086	455	5
Germany	30	735	101	2	1,038	5,723	686	0
Greece	1	111	10	0	54	405	138	0
Hungary	35	808	159	0	79	1,850	227	1
Ireland	2	15	4	0	23	113	22	0
Italy	-	-	-	-	245	807	-	-
Latvia	10	310	209	0	35	375	229	0
Lithuania	12	142	54	0	216	759	578	0
Luxembourg	-	-	-	-	2	-	-	-
Malta	-	-	-	-	64	374	17	0
Netherlands	35	578	61	0	289	1,240	11	0
Poland	155	1,891	448	0	329	3,911	1,053	0
Portugal	11	136	92	0	24	321	180	0
Romania	37	460	286	1	9	71	70	1
Slovakia	9	236	49	0	66	-	-	-
Slovenia	1	18	6	0	16	827	35	0
Spain	214	2,372	181	1	337	-	-	-
Sweden	6	285	7	0	148	1,393	13	0
United Kingdom	-	-	-	-	50	99	15	3
EU Total	**890**	**14,001**	**2,061**	**20**	**4,442**	**31,621**	**4,169**	**12**
Norway	4	81	0	0	59	892	79	0
Switzerland	5	182	15	0	5	111	5	0

3.13 FOOD-BORNE OUTBREAKS

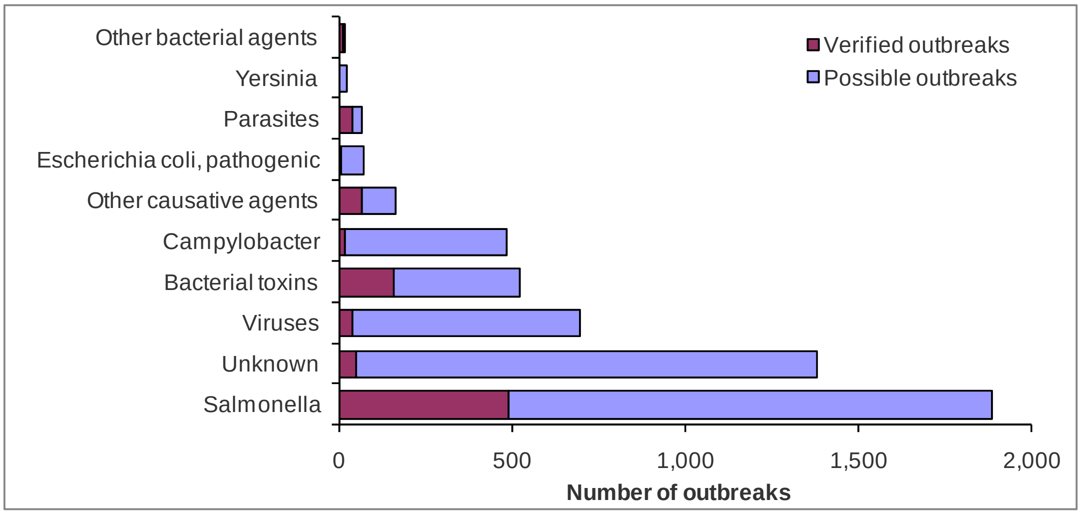
Table OUT4. Causative agents in food-borne outbreaks in the EU, 2008

Causative agent	2008				2007 [1]			
	N	%	Verified outbreaks (n)	Possible outbreaks (n)	N	%	Verified outbreaks (n)	Possible outbreaks (n)
Salmonella	1,888	35.4	490	1,398	2,253	39.3	517	1,736
Unknown	1,380	25.9	53	1,327	1,486	25.9	492	992
Viruses	697	13.1	38	659	675	11.8	104	571
Campylobacter	488	9.2	21	467	465	8.1	29	436
Bacterial toxins	525	9.8	159	366	464	8.1	411	53
Other causative agents	167	3.1	68	99	206	3.6	154	52
Escherichia coli, pathogenic	75	1.4	10	65	65	1.1	26	39
Parasites	70	1.3	38	32	58	1.0	35	23
Yersinia	22	0.4	2	20	20	0.3	2	20
Other bacterial agents	20	0.4	11	9	41	0.7	14	27
EU Total	**5,332**	**100**	**890**	**4,442**	**5,733**	**100.0**	**1,784**	**3,949**

1. 2007 data has been updated in comparison to published data following recent communication received from a MS.

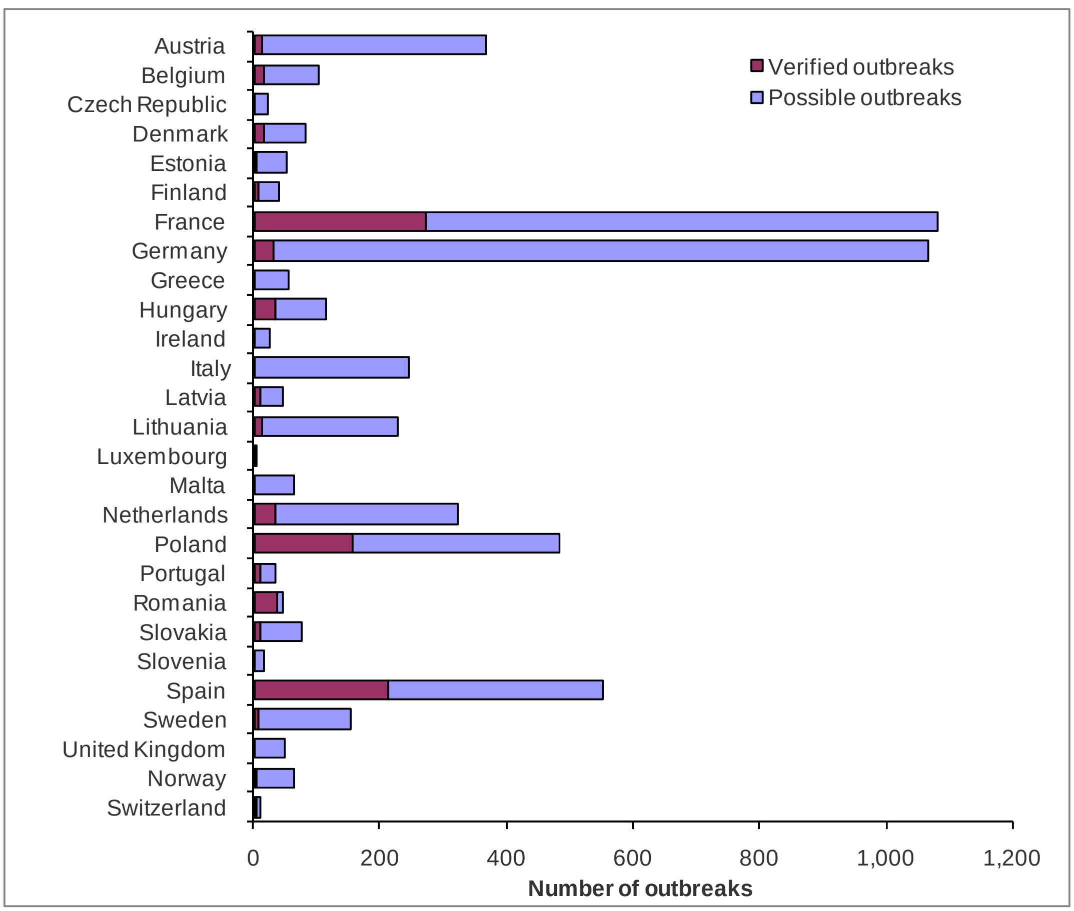
3.13 FOOD-BORNE OUTBREAKS

Figure OUT1. Causative agents in food-borne outbreaks in the EU, 2008



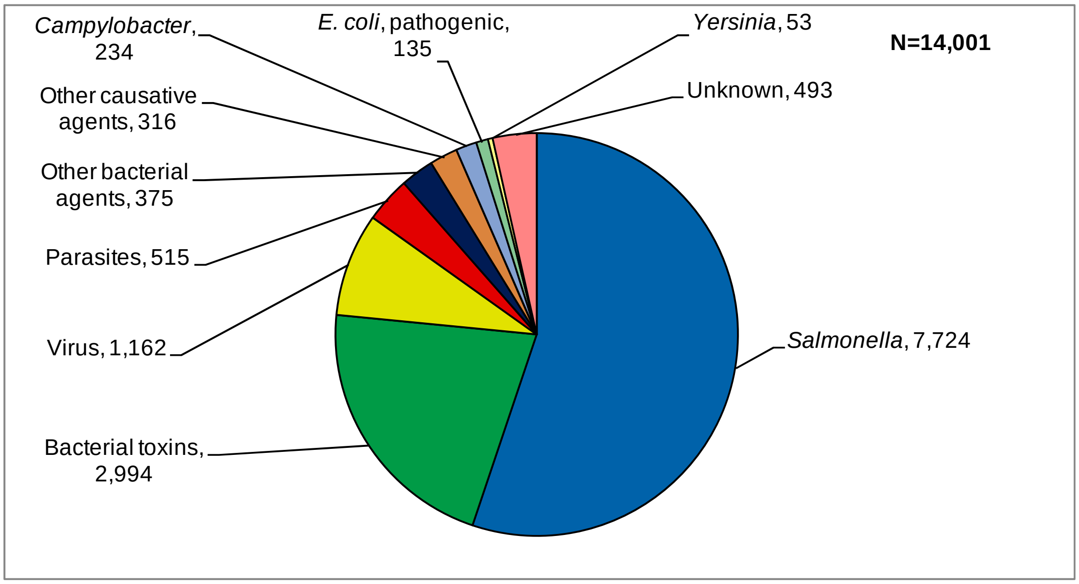
Note: food-borne viruses include calicivirus, flavivirus, rotavirus, hepatitis A virus and other unspecified food-borne viruses. Bacterial toxins include toxins produced by *Bacillus, Clostridium* and *Staphylococcus.* Other causative agents include mushroom toxins, marine biotoxins, histamine, mycotoxins, and other unspecified agents. Parasites include primarily *Trichinella,* but also *Cryptosporidia.* Other bacterial agents include *Brucella, Francisella*, *Listeria* and *Shigella*

Figure OUT2. Number of verified and possible food-borne outbreaks in MSs and non-MSs, 2008



3.13 FOOD-BORNE OUTBREAKS

Figure OUT3. Distribution of total number of human cases per causative agent in verified outbreaks in the EU, 2008



Note: includes data from 890 outbreaks: Austria (14), Belgium (15), Czech Republic (1), Denmark(16), Estonia (5), Finland (8), France (273), Germany (30), Greece (1), Hungary (35), Ireland (2), Latvia (10), Lithuania (12), Netherlands (35), Poland (155), Portugal (11), Romania (37), Slovakia (9), Slovenia (1), Spain (214), Sweden (6).

Food-borne viruses include calicivirus, flavivirus, rotavirus, 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, and other unspecified agents. Parasites include primarily *Trichinella,* but also *Cryptosporidia.* Other bacterial agents include *Brucella, Francisella, Listeria* and *Shigella*

The type of outbreak is either defined as household outbreak, where only members of one single household are affected, or general outbreak where members of more than one household are affected. Of the 890 verified outbreaks in 2008, 51.2% were general outbreaks, 43.7% were household outbreaks and 5.1% were unknown. It should be kept in mind that the reporting and investigation systems in some MSs do not include household outbreaks at all.

Types of evidence supporting verified outbreaks are summarised in Table OUT5. More than one type of evidence can be notified for one outbreak. The causative agent was detected from the implicated foodstuffs in 52.9% of outbreaks and it was laboratory characterised both from the implicated foodstuff and human cases in 6.1% of outbreaks. Analytical epidemiological evidence supported the link between human cases and food in 71.5% of verified outbreaks. Often more than one type of evidence was included for a specific outbreak.

Thirteen MSs detected the causative agent in implicated foodstuffs in more than 70% of their verified outbreaks. Eighteen MSs reported analytical epidemiological outbreak investigations that verified the link between human cases and implicated foodstuffs in some of their verified outbreaks (2.7%-100%).

In 90.1% of the 890 verified outbreaks, detailed information on implicated foodstuffs was provided. The most common single foodstuff category reported was eggs and egg products, responsible for 23.1% of the outbreaks, while pig meat was reported as the implicated foodstuff in 10.2% of the outbreaks, mixed meals or buffet meals, bakery products, fish and fish products were the source in 9.2%, 9.0% and 5.5% of the verified outbreaks, respectively (Figure OUT4).

In total, 54.7% of verified outbreaks were reported by France and Spain, thus the relative importance of the implicated foodstuffs at EU level is highly dependent on the distribution of implicated foodstuffs in these two

MSs. In Spain, 36.9% of verified outbreaks were caused by eggs and egg products. In France, 16.1% of verified outbreaks were caused by egg and egg products. This is an increase compared 2007 where “egg and egg products” were involved in 9.2% of verified outbreaks in France.

The country of origin of the implicated foodstuff was unknown in 54.8% of reported verified outbreaks and domestically produced foodstuffs were reported as the source in the 44.7% of verified outbreaks. All Spanish outbreaks were reported to originate from domestically produced foodstuffs. Intra-community traded foodstuffs were reported as the source in 0.5% of the outbreaks.

The setting of the outbreak was provided in 86.7% of verified outbreaks (Figure OUT5). Households were reported as the setting in 38.0% of outbreaks. Apart from private households, the most common settings in verified outbreaks with a large number of human cases were restaurants/cafés etc. (23.1%) as well as schools and kindergarten (5.3%).

The place where the contamination or improper handling of the implicated foodstuffs occurred (other than setting) was only provided in 33.8% of the verified outbreaks. The categories “households”, “primary production” and “catering services, restaurants” were the most commonly reported places of origin of the problem; 11.9%, 11.3% and 6.9%, respectively.

Inadequate heat treatment, use of unprocessed contaminated ingredients, and storage time/temperature abuse were the most frequent contributory factors reported in 15.8%, 9.2%, and 5.6% of outbreaks, respectively.

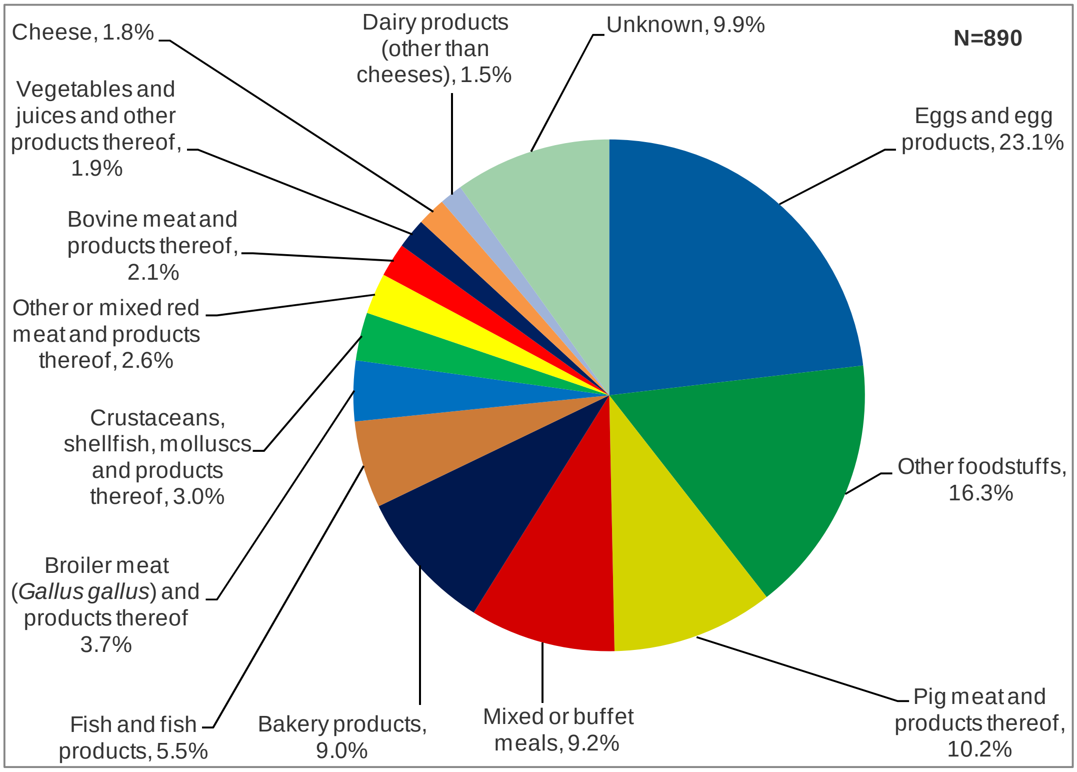
Table OUT5. Evidence in verified outbreaks in the EU, 2008

Country	N	Causative agent detected in implicated foodstuff	Laboratory characterisation of isolates [1]	Analytical epidemiological evidence
Austria	14	12	6	3
Belgium	15	13	4	7
Czech Republic	1	1	1	-
Denmark	16	11	6	5
Estonia	5	1	1	5
Finland	8	4	2	5
France	273	175	-	251
Germany	30	26	12	7
Greece	1	-	-	1
Hungary	35	30	9	5
Ireland	2	1	1	2
Latvia	10	8	-	3
Lithuania	12	10	-	4
Netherlands	35	26	-	10
Poland	155	49	-	109
Portugal	11	11	1	7
Romania	37	36	-	1
Slovakia	9	9	8	-
Slovenia	1	1	1	-
Spain	214	42	-	209
Sweden	6	5	2	2
EU Total	**890**	**471**	**54**	**636**
Norway	4	4	-	-
Switzerland	5	5	3	3

1. Causative agent detected in both human cases and implicated foodstuffs is further characterised to confirm that the isolates from human cases and food are identical

3.13 FOOD-BORNE OUTBREAKS

Figure OUT4. Distribution of implicated foodstuffs in verified outbreaks in the EU, 2008

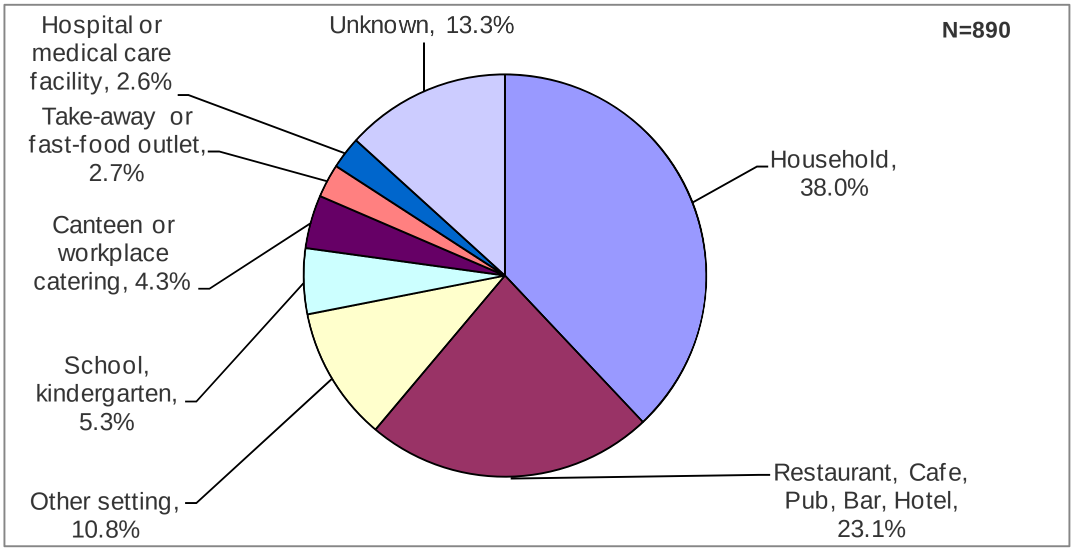


Note: includes data from 890 outbreaks: Austria (14), Belgium (15), Czech Republic (1), Denmark (16), Estonia (5), Finland (8), France (273), Germany (30), Greece (1), Hungary (35), Ireland (2), Latvia (10), Lithuania (12), Netherlands (35), Poland (155), Portugal (11), Romania (37), Spain (214), Slovenia (1), Slovakia (9), Sweden (6).

Other foodstuffs (N=145) include: cereal products including rice and seeds/pulses/nuts/almonds (10), other or unspecified poultry meat and products thereof (4), turkey meat and products thereof (4), sweets and chocolate (4), milk (4), fruit, berries and juices and other products thereof (2), sheep meat and products thereof (2), herbs and spices (1) and other foods (114).

3.13 FOOD-BORNE OUTBREAKS

Figure OUT5. Distribution of settings in verified outbreaks in the EU, 2008



Note: includes data from 890 outbreaks: Austria (14), Belgium (15), Czech Repupblic (1), Denmark (16), Estonia (5), Finland (8), France (273), Germany (30), Greece (1), Hungary (35), Ireland (2), Lithuania (12), Latvia (10), Netherlands (35), Poland (155), Portugal (11), Romania (37), Slovakia (9), Slovenia (1), Spain (214), Sweden (6).

Other settings (N=96) include: residential institution (nursing home, prison, boarding school) (20), temporary mass catering (fairs, festivals) (16), camp, picnic (8), mobile retailer/market/street vendor (1) and other settings (51).

Detailed information on causative agents in selected implicated foodstuffs

A more detailed view of the causative agents related to outbreaks caused by pig, bovine, and broiler meat, eggs and bakery products revealed an interesting pattern (Figures OUT6-OUT13), although it is important to remember that for some of the food categories only a limited number of outbreaks were reported.

A large proportion (42.2%) of 83 outbreaks caused by pig meat and products thereof was due to *Trichinella* and solely reported by Romania. An almost identical proportion of outbreaks was caused by *Salmonella* spp. (36.1%) of which *S*. Typhimurium was dominant (Figure OUT6). The proportion of human cases caused by the consumption of pig meat and products thereof was also dominated by *Trichinella.* (Figure OUT7).

Only 28 outbreaks were caused by the consumption of broiler meat and products thereof and in 18 of these was the causative agent *Salmonella,* especially *S*. Enteritidis (Figure OUT8). The proportion of human cases caused by the consumption of broiler meat and products thereof is mainly due to *S*. Enteritidis (57.7%) of which the majority was reported by Poland (Figure OUT9). Despite the dominant role of *Campylobacter* in notified single human cases, the pathogen is only seldom involved in verified outbreaks (6 outbreaks).

Egg and egg products are the foodstuff category responsible for most food-borne outbreaks (127 outbreaks), and *Salmonella* completely dominates these outbreaks (99.2%) (Figure OUT10). The majority of outbreaks are associated with *S*. Enteritidis (77.2%). The dominating role of *S*. Enteritidis was even more prominent (88.5%) when the proportion of human cases attributed to egg related outbreaks is summarised (Figure OUT11). Poland and France reported most of the egg related *S*. Enteritidis outbreaks.

Food-borne outbreaks where bakery products were implicated were caused by *S*. Enteritidis in 53 out of 58 outbreaks (Figure OUT 12). In the majority of the outbreaks, fine bakery products containing several non-heat-treated ingredients was the source. Generally, outbreaks caused by bakery products only result in a limited number of human cases per outbreak (Figure OUT13).

3.13 FOOD-BORNE OUTBREAKS

Figure OUT6. Distribution of outbreaks caused by pig meat and products thereof in the EU, 2008

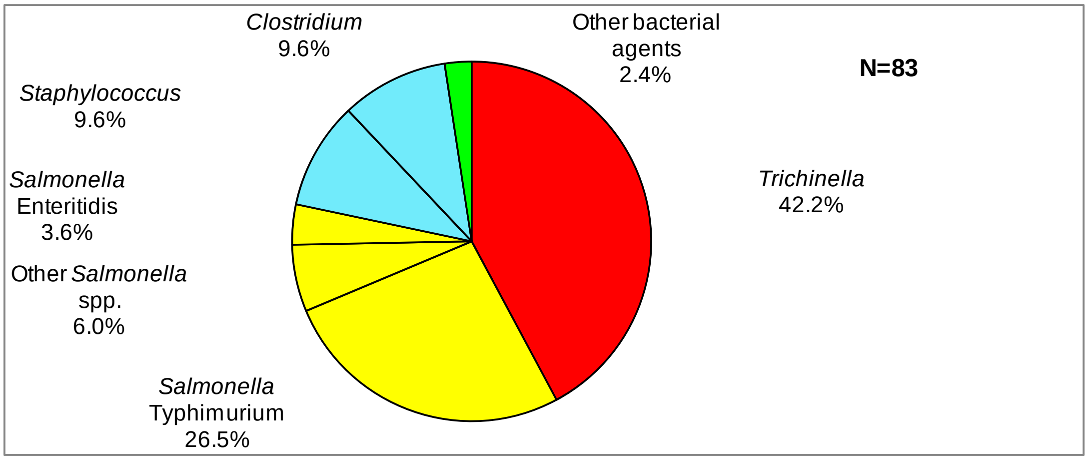


Figure OUT7. Distribution of human cases caused by pig meat and products thereof in the EU, 2008

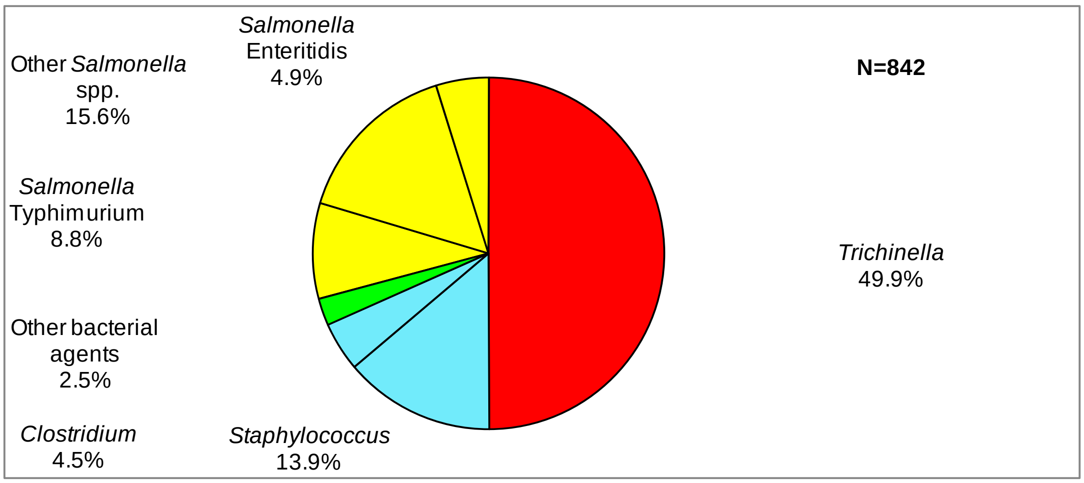
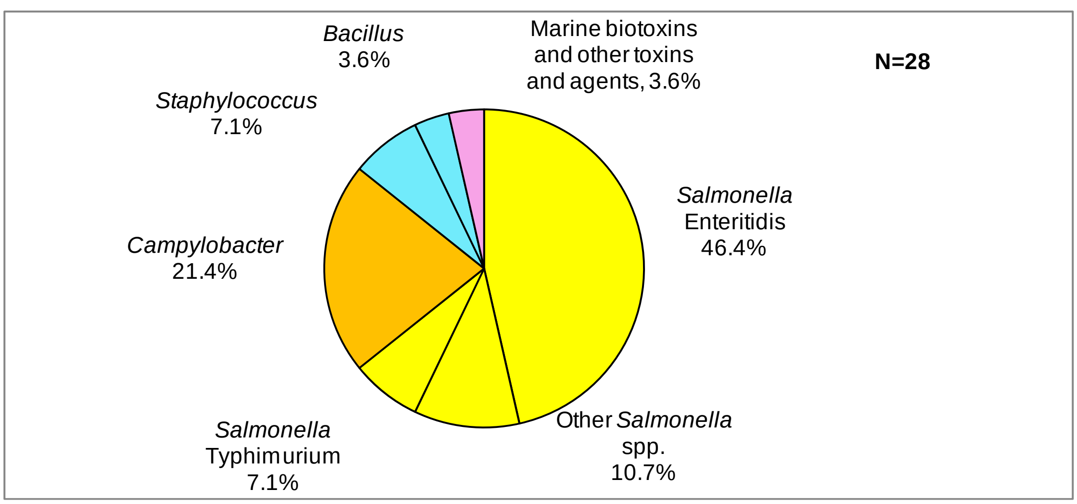


Figure OUT8. Distribution of outbreaks caused by broiler meat (Gallus gallus) and products thereof in the EU, 2008



3.13 FOOD-BORNE OUTBREAKS

Figure OUT9. Distribution of human cases caused by broiler meat (*Gallus gallus*) and products thereof in the EU, 2008

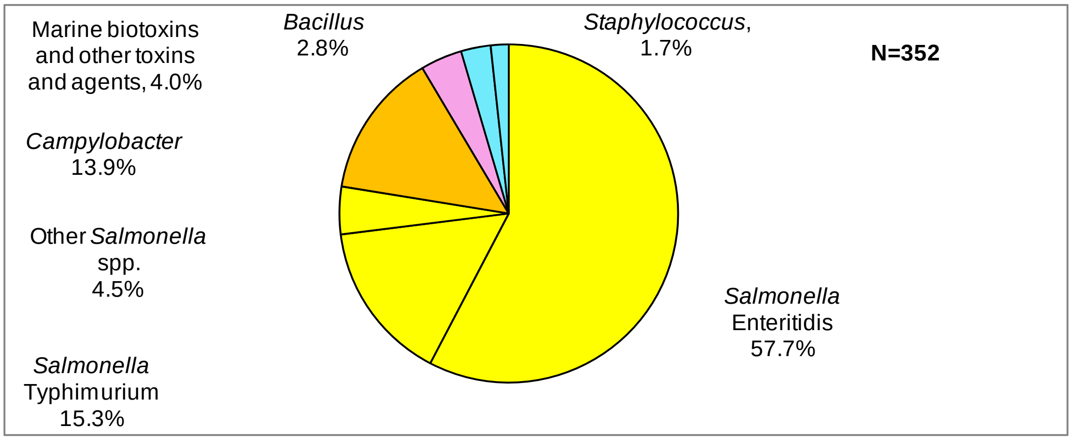


Figure OUT10. Distribution of outbreaks caused by egg and egg products in the EU, 2008

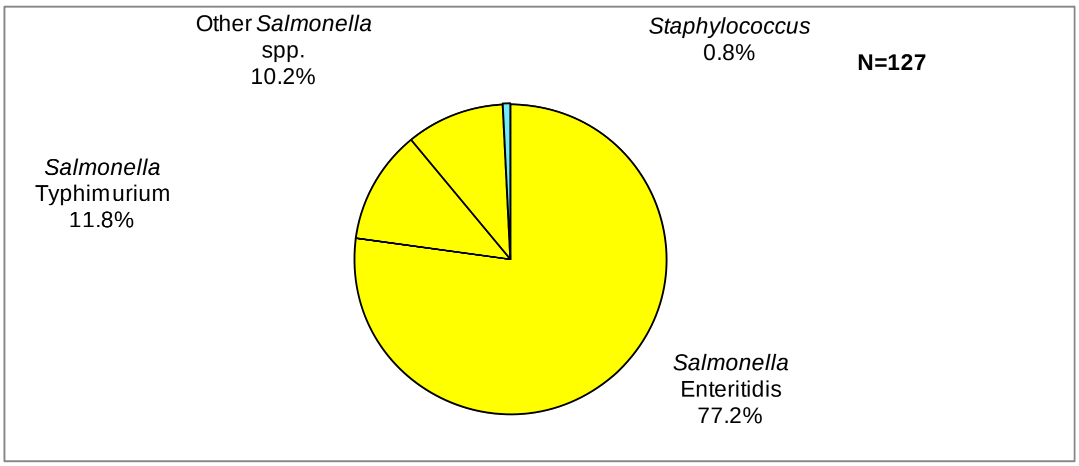
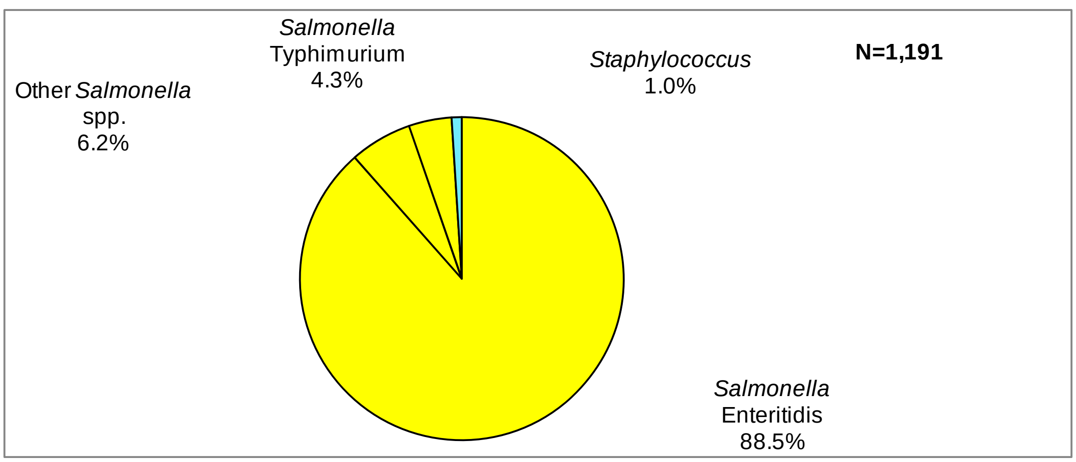


Figure OUT11. Distribution of human cases caused by egg and egg products in the EU, 2008



3.13 FOOD-BORNE OUTBREAKS

Figure OUT12. Distribution of outbreaks caused by* Salmonella *Enteritidis in bakery products in the EU, 2008

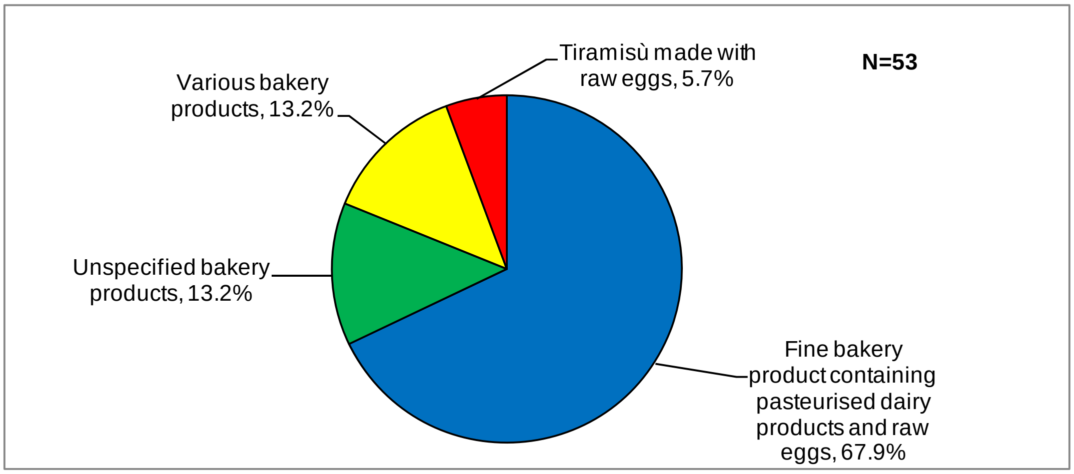
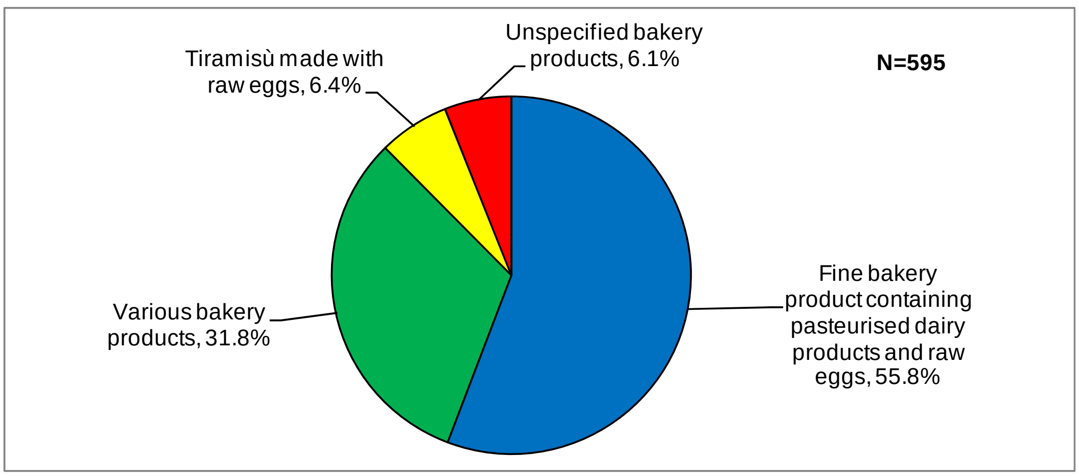


Figure OUT13. Distribution of human cases caused by* Salmonella *Enteritidis in bakery products in the EU, 2008



3.13 FOOD-BORNE OUTBREAKS

3.13.2 *Salmonella*

Twenty-five MSs reported a total of 1,888 food-borne outbreaks of human salmonellosis, which constituted 35.4% of the total number of reported food-borne outbreaks in the EU.

In 2008, Austria, France, Germany, Italy, Poland and Spain accounted for 80.3% of all *Salmonella* outbreaks. In total, 0.39 outbreaks per 100,000 population were reported, ranging from 0.02 outbreak per 100,000 population in Finland to 4.63 outbreaks per 100,000 population in Malta. Norway and Switzerland reported a total of 12 outbreaks (Table OUT6).

The total number of *Salmonella* outbreaks within the EU has decreased markedly over the last four years, and the decrease continued in 2008. In 2007, a total of 2,253 *Salmonella* outbreaks was reported and in 2008 there were 1,888 outbreaks. This decrease was most notable in *Salmonella* outbreaks reported by Austria, Germany, Hungary, and Poland. The overall decrease in *Salmonella* outbreaks is probably related to the general decrease of notified human salmonellosis cases that has been observed within the EU over the last five years.

In the EU, a total of 490 verified *Salmonella* outbreaks was reported by MSs corresponding to 26.0% of the total reported *Salmonella* outbreaks. The verified outbreaks were reported primarily by France, Poland and Spain. In total, 17.6% of human cases in verified outbreaks reported by MSs were hospitalised and the case fatality rate among human cases was 0.2% (Table OUT6).

S. Enteritidis was the predominant serovar associated with the *Salmonella* outbreaks which is similar to previous years. In 2008, *S.* Enteritidis accounted for 60.0% of all verified *Salmonella* outbreaks, 54.8% of all human *Salmonella* cases, 74.1% of all hospitalisations and 16.7% of all case fatalities in 2008. *S.* Typhimurium was associated with 16.9% of the verified outbreaks, 26.2% of all human cases, 10.5% of all hospitalisations and 83.3% of all deaths in 2008, mainly due to 11 deaths from one Danish outbreak caused by phagetype U292. For 19.6% of the verified outbreaks caused by *Salmonella,* the serovar was not reported or was unknown. Only 50 outbreaks included information of the isolated phage type (Table OUT7).

The type of evidence verifying the outbreak was detection from the implicated foodstuff in 55.5% of outbreaks and laboratory characterisation both from the implicated foodstuff and human cases in 9.0% of outbreaks. Analytical epidemiological evidence was presented in 73.7% of outbreaks (Table OUT8). Often more than one type of evidence was included for a specific outbreak.

3.13 FOOD-BORNE OUTBREAKS

Table OUT6. Verified and possible food-borne outbreaks caused by* Salmonella*, 2008

Country	Total outbreaks		Verified outbreaks				Possible outbreaks			
	N	Reporting rate per 100,000	N	Human cases: Cases	Human cases: Hospitalised	Human cases: Deaths	N	Human cases: Cases	Human cases: Hospitalised	Human cases: Deaths
Austria	223	2.68	9	67	19	0	214	823	213	0
Belgium	3	0.03	2	35	2	0	1	4	1	0
Czech Republic	17	0.16	1	102	16	1	16	271	28	1
Denmark	18	0.33	7	1,499	1	15	11	58	8	0
Estonia	46	3.43	5	133	11	0	41	99	46	0
Finland	1	0.02	1	86	-	0	0	0	0	0
France	161	0.25	129	818	162	0	32	293	25	1
Germany	528	0.64	21	565	94	2	507	2,362	468	0
Greece	43	0.38	0	0	0	0	43	160	90	0
Hungary	30	0.30	15	618	106	0	15	861	202	0
Ireland	10	0.23	2	15	4	0	8	36	9	0
Italy	184	0.31	0	0	0	0	184	459	-	-
Latvia	15	0.66	10	310	209	0	5	33	20	0
Lithuania	76	2.26	8	123	35	0	68	357	216	0
Luxembourg	1	0.21	0	0	0	0	1	-	-	-
Malta	19	4.63	0	0	0	0	19	48	9	0
Netherlands	21	0.13	9	412	61	0	12	45	8	0
Poland	201	0.53	146	1,390	430	0	55	234	116	0
Portugal	4	0.04	2	45	5	0	2	45	5	0
Romania	6	0.03	4	39	32	0	2	9	9	0
Slovakia	21	0.39	7	178	30	0	14	-	-	-
Slovenia	8	0.39	1	18	6	0	7	144	24	0
Spain	219	0.48	109	1,253	138	0	110	-	-	-
Sweden	8	0.09	2	18	2	0	6	51	1	0
United Kingdom	25	0.04	0	0	0	0	25	64	7	0
EU Total	**1,888**	**0.39**	**490**	**7,724**	**1,363**	**18**	**1,398**	**6,456**	**1,505**	**2**
Norway	8	0.17	0	0	0	0	8	146	39	0
Switzerland	4	0.05	3	166	8	0	1	20	3	0

3.13 FOOD-BORNE OUTBREAKS

Table OUT7. Salmonella serovars reported for verified food-borne outbreaks in the EU, 2008

Serovar	Phagetypes	Outbreaks		Human cases		
		N	% of EU total	N	Hospitalised	Deaths
S. Enteritidis	PT 8	13	2.7	592	49	1
	PT 4	10	2.0	218	48	1
	PT 2	6	1.2	493	76	0
	PT 21	4	0.8	34	7	0
	PT 6	3	0.6	42	2	0
	PT 1b	2	0.4	51	8	0
	PT 13	1	0.2	17	4	0
	PT 21c	1	0.2	10	4	0
	PT 4b	1	0.2	5	5	0
	Unspecified	253	51.6	2,771	807	1
S. Typhimurium	DT 104	1	0.2	100	41	-
	DT 120	1	0.2	53	-	-
	DT 135	1	0.2	109	-	-
	DT 15a	1	0.2	27	3	-
	DT 193	1	0.2	25	11	0
	PT 1	1	0.2	5	0	0
	U 288	1	0.2	39	-	4
	U 292	1	0.2	1,224	-	11
	U 312	1	0.2	24	-	-
	Unspecified	74	15.1	418	88	0
S. Panama		2	0.4	105	26	0
S. Newport		2	0.4	93	0	0
S. Bovismorbificans		2	0.4	88	10	0
S. Virchow		2	0.4	57	8	0
S. Hadar		2	0.4	20	3	0
S. Derby		1	0.2	10	-	-
S. Napoli		1	0.2	13	2	0
S. Agona		1	0.2	11	3	0
S. Saintpaul		1	0.2	10	5	0
S. group B		1	0.2	3	3	0
S. Bredeney		1	0.2	2	0	0
S. enterica subsp. *arizonae*		1	0.2	4	1	0
Salmonella spp., unspecified		96	19.6	1,051	149	0
EU Total		**490**	**100**	**7,724**	**1,363**	**18**

3.13 FOOD-BORNE OUTBREAKS

Table OUT8. Evidence in verified Salmonella *outbreaks, 2008*

Country	N	Causative agent detected in		Laboratory characterisation of isolates [1]	Analytical epidemiological evidence
		Implicated foodstuff	Human cases		
Austria	9	9	3	3	-
Belgium	2	2	2	2	-
Czech Republic	1	1	1	1	-
Denmark	7	6	6	6	1
Estonia	5	1	5	1	5
Finland	1	-	1	-	1
France	129	128	14	-	116
Germany	21	18	21	10	5
Hungary	15	12	12	9	3
Ireland	2	1	2	1	2
Latvia	10	8	6	-	3
Lithuania	8	6	8	-	4
Netherlands	9	1	8	-	8
Poland	146	41	144	-	106
Portugal	2	2	1	1	1
Romania	4	3	4	-	1
Slovakia	7	7	7	7	-
Slovenia	1	1	1	1	-
Spain	109	23	101	-	105
Sweden	2	2	2	2	-
EU Total	**490**	**272**	**349**	**44**	**361**
Switzerland	3	3	3	3	1

1. *Salmonella* spp. is detected in both human cases and implicated foodstuffs. Laboratory characterisation for all isolates may include serotyping according to the Kaufmann White scheme, antimicrobial resistance pattern and genotyping (PFGE). Laboratory characterisation of *S.* Typhimurium isolates may include phage typing, and for common phage types (e.g. DT 104), molecular typing (plasmid profiling) and genotyping (MLVA). Laboratory characterisation of *S.* Enteritidis isolates may include phage typing, and for common phage types (e.g. PT4), molecular typing (ribotyping speciation) and genotyping (e.g. MLVA, AFLP, MLST)

Detailed information from verified outbreaks

For some of the following analyses, detailed information on outbreaks was only available from the 381 outbreaks, because some MSs reported aggregated data (109 outbreaks).

Information on the type of outbreak was available for 97.9% of verified outbreaks. It was almost evenly distributed between general outbreaks (43.4%) and household outbreaks (54.5%). However, general outbreaks caused 81.0% of human cases, 64.6% of all cases admitted to hospitals, and 17 out of 18 case fatalities.

Figure OUT14 shows the distribution of the most common foodstuffs implicated in all verified *Salmonella* outbreaks in 2008. Overall, information on implicated foodstuffs was provided in 91.6% of verified *Salmonella* outbreaks. As in previous years, eggs and egg products were the foodstuffs most frequently associated with *Salmonella* outbreaks, causing 40.8% of verified outbreaks (Figure OUT15). The proportion of outbreaks caused by eggs and egg products was at the same level as in 2007. Inadequately heat-treated bakery products using raw eggs were the second most common single source of *Salmonella* infections (13.5% of verified outbreaks). Pig meat products were the third most important food category in the *Salmonella* outbreaks and the number of outbreaks caused by this category increased from 28 outbreaks in 2007 to 35 outbreaks in 2008.

3.13 FOOD-BORNE OUTBREAKS

S. Enteritidis caused the highest number of human cases in outbreaks related to egg and egg products, bakery products using raw eggs, and in mixed or buffet meals (Figure OUT16). The majority of human cases in the *S.* Typhimurium cases (69.7%) were of an unknown source mainly due to one large unsolved outbreak from Denmark (Figure OUT17).

Two Belgian outbreaks with *S*. Enteritidis PT 21 were reported after consumption of tiramisù made with raw eggs. One outbreak was reported from a restaurant resulting in 22 human cases. The isolate was laboratory characterised in both the implicated foodstuff and in the human cases. The other outbreak was a household outbreak, causing 13 human cases.

The Czech Republic reported food-borne outbreak of *S*. Enteritidis PT 8, pulsetype SEXBA 05 in a residential home for people with disabilities, affecting 102 people, of whom 16 were hospitalised and one died. The implicated foodstuff was egg and the epitype was laboratory characterised in both human and food isolates. Several contributory factors were reported: inadequate heat treatment, infected food handler, problems with storage time, and temperature abuse.

In Switzerland, there was a nationwide outbreak caused by *S*. Typhimurium. Molecular typing of clinical and food isolates revealed that pig meat or products thereof were probably responsible for the infections. In total, 150 cases were infected and about 34% of the cases were infected with the same strain detected in the quality control of pork at a company, on a pig carcass from a slaughterhouse and in an imported (from Germany) spare rib sample. More detailed information is available in *Eurosurveillance, Vol. 13, Issue 44, October 30, 2008.*

Information about the origin of the foodstuff was only reported in 30.0% of all verified *Salmonella* outbreaks and all but three originated from domestically produced foodstuffs.

Households were the most important settings reported in verified *Salmonella* outbreaks (figure OUT18), involving a total of 1,993 cases; 30.3% of these cases were admitted to hospital. Schools and kindergartens only accounted for 4.1% of outbreaks, however these were often large and severe involving 893 cases and 189 hospitalisations.

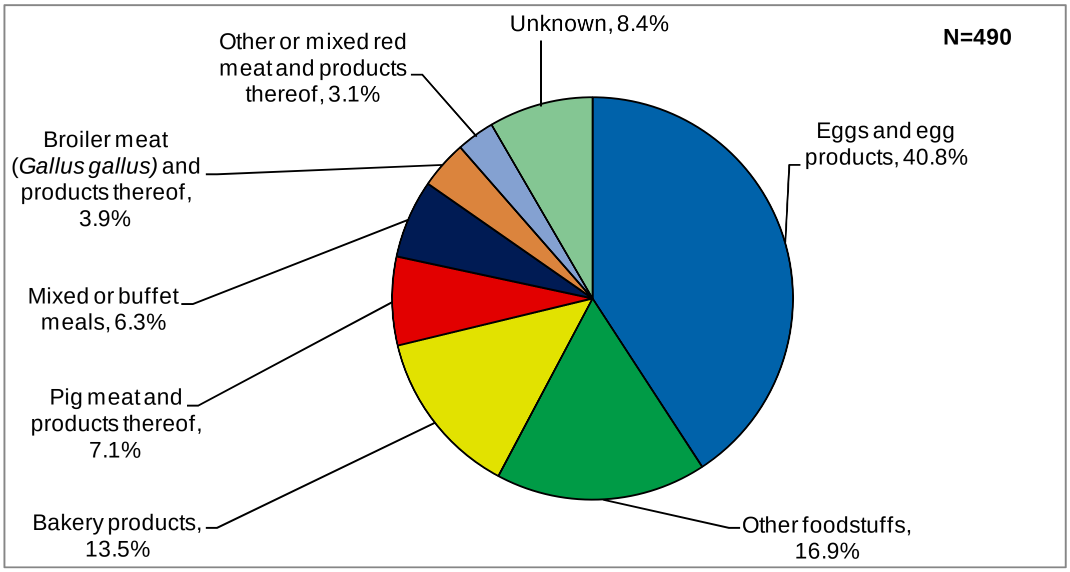
The place of origin of the problem was only reported for 53.4% of all verified outbreaks caused by *Salmonella*. Problems in households (N=86) and in primary production (N=63) caused 20.7% of all human cases. Four case fatalities were attributed to problems at the processing plant. The origin of the problem for the remaining fatalities was unknown.

More than one contributing factor can be notified per verified outbreak. Inadequate heat treatment (99 outbreaks) and unprocessed contaminated ingredients (62 outbreaks) were the most common causes reported. An infected food handler was reported as the contributory factor in eight outbreaks.

When comparing the data on implicated foodstuffs from 2007 and 2008 (Figure OUT15), the proportion of eggs and egg products seems to have slightly decreased and the proportion of outbreaks caused by pig meat, broiler meat and bovine meat have increased in 2008.

3.13 FOOD-BORNE OUTBREAKS

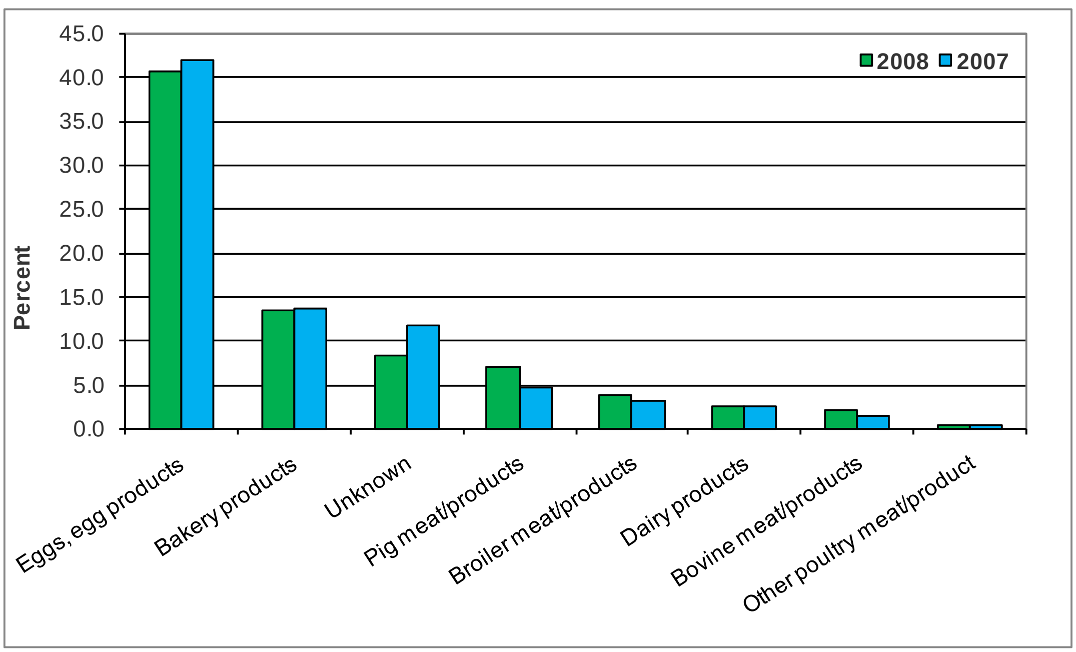
Figure OUT14. Distribution of implicated foodstuffs in verified outbreaks caused by **Salmonella** ***in the EU, 2008***



Note: includes data from 490 outbreaks: Austria (9), Belgium (2), Czech Republic (1), Denmark (7), Estonia (5), Finland (1), France (129), Germany (21), Hungary (15), Ireland (2), Lithuania (8), Latvia (10), Netherlands (9), Poland (146), Portugal (2), Romania (4), Slovakia (7), Slovenia (1), Spain (109), Sweden (2).

Other foodstuffs (N=83) include: bovine meat and products thereof (11), dairy products (other than cheeses) (9), crustaceans, shellfish, molluscs and products thereof (7), fish and fish products (5), cheeses (4), sweets and chocolate (4), vegetables and juices and other products thereof (4), other unspecified poultry meat and products thereof (2), cereal products including rice and seeds/pulses (nuts, almonds) (2), fruit, berries and juices and other products thereof (1), other foods (34).

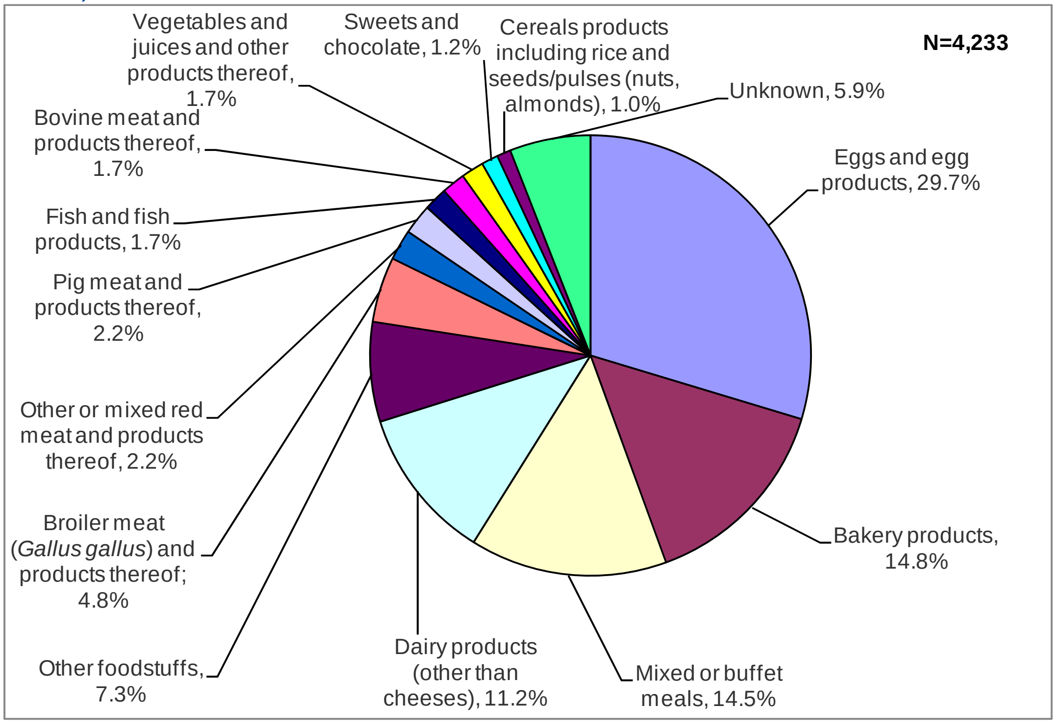
Figure OUT15. Selected implicated foodstuffs in reported outbreaks caused by **Salmonella** ***in the EU, 2007-2008***



Note: For 2008, includes data from 387 (79.0%) verified outbreaks: Austria (9), Belgium (2), Czech Republic (1), Denmark (6), Estonia (5), France (108), Germany (13), Hungary (3), Ireland (2), Latvia (7), Lithuania (2), Netherlands (4), Poland (125), Romania (2), Spain (91), Slovakia (5), Slovenia (1), Sweden (1). For 2007, includes data from 471 (79.8%) verified outbreaks: Austria (5), Belgium (2), Germany (28), Denmark (4), Estonia (2), Finland (3), France (124), Hungary (2), Ireland (1), Latvia (9), Lithuania (2), Netherlands (3), Poland (94), Romania (1), Spain (173), Slovakia (8), Slovenia (9), Sweden (1).

3.13 FOOD-BORNE OUTBREAKS

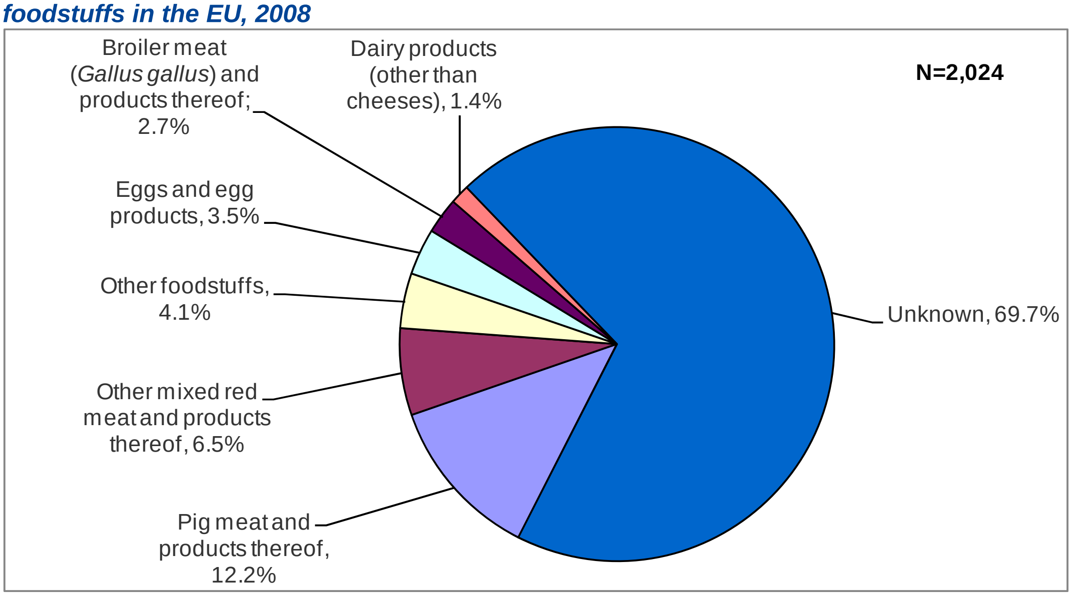
Figure OUT16. Proportion of human cases caused by* Salmonella *Enteritidis in different foodstuffs in the EU, 2008



Note: includes data from 294 outbreaks: Austria (8), Belgium (2), Czech Republic (1), Denmark (1), Estonia (5), France (27), Germany (18), Hungary (13), Latvia (10), Lithuania (8), Netherlands (4), Poland (138), Portugal (2), Romania (2), Slovakia (6), Slovenia (1), Spain (48).

Other foodstuffs (N=310) include: crustaceans, shellfish, molluscs and products thereof (58), cheese(4), other or unspecified poultry meat and products thereof (3) and other foodstuffs (245).

Figure OUT17. Proportion of human cases caused by* Salmonella *Typhimurium in different foodstuffs in the EU, 2008

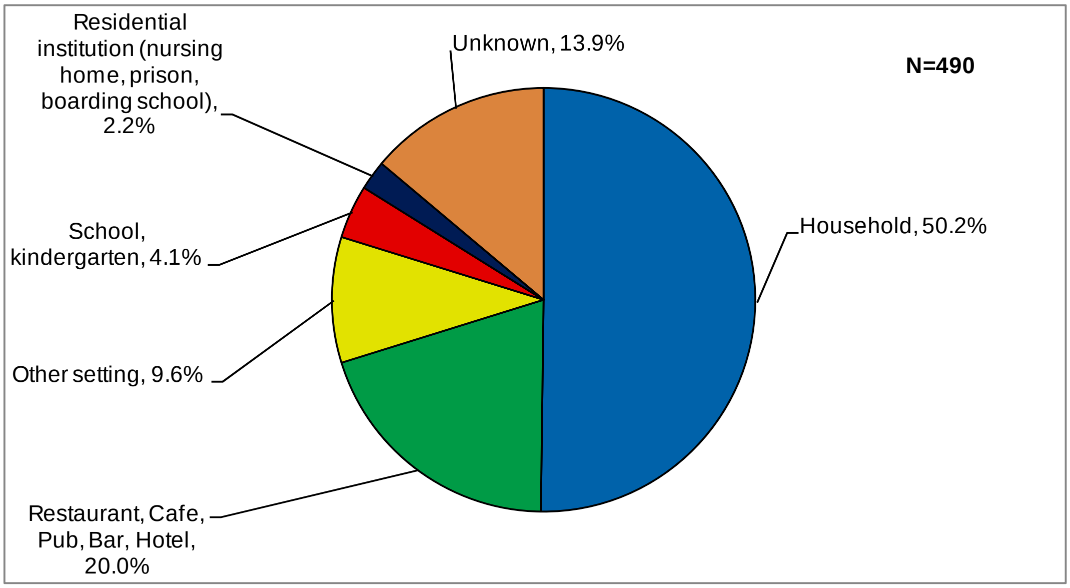


Note: includes data from 83 outbreaks: Germany (1), Denmark (5), Spain (7), France (60), Hungary (2), Ireland (1), Netherlands (3), Poland (2), Slovakia (1), Sweden (1).

Other foodstuffs (N=83) include: mixed or buffet meals (16), bovine meat and products thereof (11), bakery products (8), cheese (5) crustaceans, shellfish, molluscs and products thereof (3),and other foodstuffs (40).

3.13 FOOD-BORNE OUTBREAKS

Figure OUT18. Distribution of settings in verified outbreaks caused by* Salmonella *in the EU, 2008



Note: includes data from 490 outbreaks: Austria (9), Belgium (2), Czech Republic (1), Denmark (7), Estonia (5), Finland (1), France (129), Germany (21), Hungary (15), Ireland (2), Lithuania (8), Latvia (10), Netherlands (9), Poland (146), Portugal (2), Romania (4), Spain (109), Slovakia (7), Slovenia (1), Sweden (2).

Other settings (N=47) include: hospital or medical care facility (8), temporary mass catering (fairs, festivals) (7), take-away or fast-food outlet (6), canteen or workplace catering (5), camp, picnic (1), mobile retailer, market/street vendor (1) and other settings (19).

3.13.3 *Campylobacter*

Twenty MSs reported a total of 488 food-borne outbreaks of human campylobacteriosis, which constituted 9.2% of the total number of reported food-borne outbreaks (Table OUT9). In 2008, Austria and Germany accounted for 72.3% of reported *Campylobacter* outbreaks. The overall reporting rate in the EU was 0.10 per 100,000 population, ranging from <0.01 in the Czech Republic, Poland and the United Kingdom to 1.70 per 100,000 population in Malta. The two non-MSs reported four *Campylobacter* outbreaks. In the EU, only 21 (4.3%) of the 488 reported *Campylobacter* outbreaks were classified as verified. The verified outbreaks were reported primarily by France reporting 11 verified outbreaks. In total, 234 human cases were reported of which 12 were hospitalised. There were no case fatalities.

The type of evidence verifying the outbreaks was the detection of the agents from the implicated foodstuff in 16 outbreaks and the causative agent was laboratory characterised both from the implicated foodstuff and human cases in three outbreaks. Analytical epidemiological evidence was presented in 16 outbreaks.

Table OUT9. Verified and possible food-borne outbreaks caused by* Campylobacter*, 2008

Country	Total outbreaks		Verified outbreaks				Possible outbreaks			
	N	Reporting rate per 100,000	N	Human cases			N	Human cases		
				Cases	Hospitalised	Deaths		Cases	Hospitalised	Deaths
Austria	118	1.42	1	2	1	0	117	252	42	0
Belgium	6	0.06	1	6	0	0	5	25	6	0
Czech Republic	1	<0.01	-	-	-	-	1	15	14	0
Denmark	5	0.09	1	28	6	0	4	15	0	0
Estonia	4	0.30	0	-	-	-	4	8	7	0
Finland	2	0.04	1	2	0	0	1	68	6	0
France	12	0.02	11	81	5	0	1	3	1	0
Germany	235	0.29	1	45	0	0	234	662	43	0
Hungary	45	0.45	0	-	-	-	45	113	4	0
Ireland	1	0.02	0	-	-	-	1	2	0	0
Italy	23	0.04	0	-	-	-	23	82	-	-
Lithuania	1	0.03	0	-	-	-	1	2	2	0
Luxembourg	1	0.21	0	-	-	-	1	-	-	-
Malta	7	1.70	0	-	-	-	7	18	3	0
Netherlands	8	0.05	3	24	0	0	5	14	1	0
Poland	2	<0.01	1	3	0	0	1	2	2	0
Slovakia	1	0.02	0	-	-	-	1	-	-	-
Spain	8	0.02	1	43	0	0	7	-	-	-
Sweden	2	0.02	0	-	-	-	2	10	1	0
United Kingdom	6	<0.01	0	-	-	-	6	-	-	-
EU Total	**488**	**0.10**	**21**	**234**	**12**	**0**	**467**	**1,291**	**132**	**0**
Norway	3	0.06	0	-	-	-	3	18	2	0
Switzerland	1	0.01	0	-	-	-	1	2	1	0

3.13 FOOD-BORNE OUTBREAKS

Detailed information from verified outbreaks

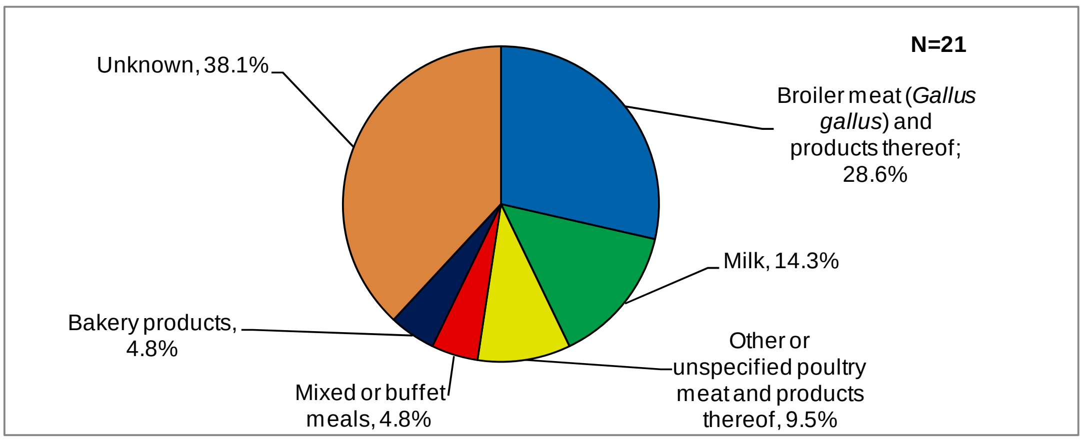
Outbreaks due to *Campylobacter* are not common in the EU and in 2008 only 21 verified food-borne outbreaks were reported by MSs; 15 outbreaks were categorised as general and they caused 87.6% of human cases and nine hospitalisations.

Information on implicated foodstuffs was reported for 13 verified *Campylobacter* outbreaks only; in eight of the verified outbreaks the implicated foodstuff was unknown (Figure OUT19). Broiler meat and products thereof were reported as the implicated foodstuff in six outbreaks, and milk and dairy products in three outbreaks. These findings are similar to reports from 2007.

Restaurants, cafés, pubs, bars or hotels were reported as the setting in seven outbreaks and households in six outbreaks (Figure OUT20). In total, the setting was reported for 20 of the verified outbreaks.

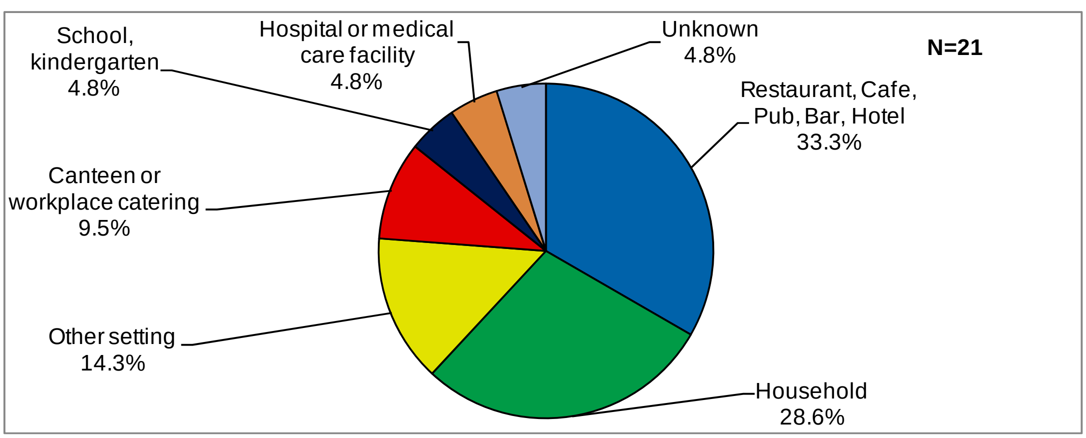
Cross-contamination, the use of unprocessed contaminated ingredients, and inadequate heat treatment were reported as contributory factors in the verified *Campylobacter* outbreaks.

Figure OUT19. Distribution of implicated foodstuffs in verified* Campylobacter *outbreaks in the EU, 2008



Note: includes data from 21 outbreaks: Austria (1), Belgium (1), Denmark (1), Finland (1), France (11), Germany (1), Netherlands (3), Poland (1), Spain (1).

Figure OUT20. Distribution of settings in verified* Campylobacter *outbreaks in the EU, 2008



Note: includes data from 21 outbreaks: Austria (1), Belgium (1), Denmark (1), Finland (1), France (11), Germany (1), Netherlands (3), Poland (1), Spain (1).

3.13.4 Verotoxigenic *Escherichia coli* and other food-borne pathogenic *Escherichia coli*

Eleven MSs reported a total of 75 food-borne outbreaks with human pathogenic *E. coli;* 1.4% of the total number of reported food-borne outbreaks in the EU. In 2008, Austria and Germany accounted for 52.0% of pathogenic *E. coli* outbreaks*.* The overall reporting rate in the EU was 0.02 per 100,000 population, ranging from <0.01 per 100,000 population in France, and the United Kingdom to 0.49 per 100,000 population in Malta (Table OUT10). The total number of pathogenic *E. coli* outbreaks within the EU increased by 15.4% compared to 2007 (65 outbreaks), although fourteen MSs reported in 2007.

Only 10 of the reported *E. coli* outbreaks were verified and the number of human cases was dominated by Spain reporting 86 out of 135 cases (63.7%) (Table OUT10). In total, eight cases were hospitalised and no case fatalities were reported.

Verification of outbreaks was reported as the detection of the causative agent from implicated foodstuffs in six outbreaks and the causative agent was laboratory characterised from the implicated foodstuff and human cases in two outbreaks. Analytical epidemiological evidence was presented in nine outbreaks. Several MSs reported more than one type of evidence.

Table OUT10. Verified and possible food-borne outbreaks caused by pathogenic* Escherichia coli*, 2008

Country	Total outbreaks		Verified outbreaks				Possible outbreaks			
	N	Reporting rate per 100,000	N	Human cases: Cases	Human cases: Hospitalised	Human cases: Deaths	N	Human cases: Cases	Human cases: Hospitalised	Human cases: Deaths
Austria	11	0.13	0	-	-	-	11	31	9	0
Belgium	3	0.03	1	6	4	0	2	5	2	0
France	4	<0.01	3	15	2	0	1	20	2	0
Germany	28	0.03	1	23	2	0	27	70	8	0
Ireland	7	0.16	0	-	-	-	7	21	7	0
Malta	2	0.49	0	-	-	-	2	4	2	0
Poland	5	0.01	0	-	-	-	5	41	4	0
Portugal	2	0.02	1	5	-	0	1	5	-	0
Spain	7	0.02	4	86	0	0	3	-	-	-
Sweden	2	0.02	0	-	-	-	2	7	6	0
United Kingdom	4	<0.01	0	-	-	-	4	-	-	-
EU Total	**75**	**0.02**	**10**	**135**	**8**	**0**	**65**	**204**	**40**	**0**

Detailed information from verified outbreaks

A total of 10 verified pathogenic *E. coli* outbreaks was reported by MSs*.* However, detailed information on outbreaks was only available for six outbreaks, because some MSs reported aggregated data (four outbreaks). Three of the six outbreaks were reported as general outbreaks and caused 34 of human cases and six out of eight hospitalisations.

Information on the implicated foodstuff was provided for five outbreaks. Bovine meat and products thereof were reported as the source in three outbreaks involving 17 cases and five of the hospitalisations.

3.13 FOOD-BORNE OUTBREAKS

Belgium reported an outbreak of *E. coli* O157:H7 at a psychiatric institution. Four patients were hospitalised with the symptoms of bloody diarrhoea and two of them developed haemolytic uraemic syndrome (HUS). *E. coli* O157:H7 was isolated from the human cases and raw minced meat. Further laboratory characterisation showed all isolates were positive for *stx2*, *eae* and enterohaemolysine, and all strains were urease positive by specific biochemical characterisation. PFGE revealed that minced meat was the origin of the outbreak. During the same period a sharp increase in human pathogenic *E. coli* infections was noticed but no link could be made with the outbreak in the psychiatric institution or the consumption of minced meat from the contaminated batch.

In Germany, a primary school excursion to a dairy farm resulted in an outbreak with verocytotoxin-producing *Escherichia coli* (VTEC) affecting 23 cases. Consumption of raw milk at the farm was identified as the likely source of infection by analytical epidemiology. Two pupils were diagnosed with haemolytic uremic syndrome (HUS). Extensive investigation and laboratory characterisation identified the causative agent (EHEC 0157:H7, *stx2*, E-hlyA, *eae*-y) in human stool specimens and in samples of bovine faeces. *Escherichia coli* O2:H27, *Listeria monocytogenes* and *Campylobacter jejuni* were all found in analysed milk samples but negative for EHEC O157:H7. In Germany, the sale of fresh raw milk directly to consumers at a farm is permitted. However, the competent authority has to be informed and consumers have to be provided with advice to boil the milk before consumption.

The origin of the foodstuff was only provided for one verified pathogenic *E. coli* outbreak (domestic) and household was the setting in three outbreaks. The place of origin of the problem was reported in three outbreaks; for 23 human cases (one outbreak) the problem originated from primary production. Unprocessed contaminated ingredient and cross-contamination was reported as the contributing factor in two different outbreaks, no information was provided for the other outbreaks.

3.13.5 *Yersinia*

Six MSs reported a total of 22 food-borne outbreaks of human yersiniosis, which constituted 0.4% of the total number of reported outbreaks in the EU. Germany reported 45.5% of the outbreaks. The overall reporting rate was <0.01 per 100,000 population (Table OUT11).

Finland and France were the only MSs to report verified *Yersinia* outbreaks; the two outbreaks had 53 human cases and 11 hospitalisations (Table OUT11). In the Finnish outbreak, the implicated foodstuff was contaminated raw grated carrots served in a school/kindergarten. In the French outbreak, the implicated foodstuff was served at a restaurant but the source was unknown.

Table OUT11. Verified and possible food-borne outbreaks caused by* Yersinia*, 2008

Country	Total outbreaks		Verified outbreaks				Possible outbreaks			
	N	Reporting rate per 100,000	N	Human cases			N	Human cases		
				Cases	Hospitalised	Deaths		Cases	Hospitalised	Deaths
Austria	4	0.05	0	-	-	-	4	11	3	0
Finland	2	0.04	1	50	10	0	1	4	0	0
France	1	<0.01	1	3	1	0	0	-	-	-
Germany	10	0.01	0	-	-	-	10	25	2	0
Lithuania	4	0.12	0	-	-	-	4	8	8	0
Netherlands	1	0.01	0	-	-	-	1	-	-	-
EU Total	**22**	**<0.01**	**2**	**53**	**11**	**0**	**20**	**48**	**13**	**0**

Finland reported a food-borne outbreak with *Y. pseudotuberculosis* serotype O:1 caused by stored, domestic grated carrots from the summer of 2007. The carrots were distributed and served in schools, hospital, homes for the elderly and work place canteens. In total, 50 cases of *Y. pseudotuberculosis* O:1 infection was confirmed. The contaminated carrots were traced back to the farm and to the vegetable processing plant. *Y. pseudotuberculosis* O:1 was recovered from carrots, from surface samples in cold storage and the processing plant. In the spring of 2003, 2004 and 2006, *Y. pseudotuberculosis* serotype O:1 outbreaks were also associated with the consumption of domestic grated carrots. In all outbreaks, carrots were harvested the previous summer or autumn, and stored from six to ten months before eating. The exact mechanism for contamination of carrots remains unknown, but it is likely to originate from soil contaminated with animal faeces. *Y. pseudotuberculosis* can grow at low temperatures, and during prolonged storage (from six to ten months) the bacteria can multiply sufficiently to cause an infection.

To prevent future outbreaks, instructions to improve the hygiene practices on growing, storage and handling of raw carrots have been drafted. Furthermore, regular surface sampling for *Y. pseudotuberculosis* is now recommended (as of 1 January 2009) when domestic cold storage carrots are processed.

3.13.6 Other bacterial agents

Nine MSs reported a total of 20 food-borne outbreaks caused by other bacterial agents, which constituted 0.4% of the total number of reported outbreaks in the EU (Table OUT12). Eleven of the outbreaks were verified. Four different pathogen species were involved in different outbreaks (Table OUT13). Greece reported a large *Brucella melitensis* outbreak where 10 of 111 cases were hospitalised and Sweden reported a large *Shigella sonnei* outbreak with 145 cases and five hospitalisations. *Shigella* was the pathogen involved in most verified outbreaks: nine out of 11.

Evidence was verified for eight outbreaks by detection of the agent from the implicated foodstuff and by characterisation of the causative agent from the implicated foodstuff and human cases in one outbreak. Analytical epidemiological evidence was presented in ten outbreaks.

Table OUT12. Total and possible food-borne outbreaks caused by other bacterial agents, 2008

Country	Total outbreaks		Possible outbreaks			
	N	Reporting rate per 100,000	N	Human cases		
				Cases	Hospitalised	Deaths
Austria	2	0.02	0	-	-	-
Belgium	1	<0.01	1	2	1	0
Denmark	1	0.02	1	3	1	0
France	7	0.01	0	-	-	-
Greece	1	<0.01	0	-	-	-
Italy	1	<0.01	1	34	0	0
Spain	3	<0.01	3	-	-	-
Sweden	1	0.01	0	-	-	-
United Kingdom	3	<0.01	3	7	7	3
EU Total	**20**	**<0.01**	**9**	**46**	**9**	**3**

Table OUT13. Verified food-borne outbreaks caused by other bacterial agents, 2008

Agent	Country	Verified outbreaks			
		N	Human cases		
			Cases	Hospitalised	Deaths
Brucella melitensis	Greece	1	111	10	0
	EU Total	**1**	**111**	**10**	**0**
Listeria monocytogenes	Austria	1	14	7	0
	EU Total	**1**	**14**	**7**	**0**
Shigella flexneri	France	1	5	3	0
	EU Total	**1**	**5**	**3**	**0**
Shigella sonnei	Austria	1	53	1	0
	France	5	41	2	0
	Sweden	1	145	5	0
	EU Total	**7**	**239**	**8**	**0**
Shigella spp., unspecified	France	1	6	0	0
	EU Total	**1**	**6**	**0**	**0**

3.13 FOOD-BORNE OUTBREAKS

Detailed information from verified outbreaks

Information on the type of outbreak was available for all verified outbreaks. Eight out of the 11 outbreaks were reported as general and three were household outbreaks.

Information on the implicated foodstuffs was provided in six verified outbreaks. Two outbreaks were attributed to *Shigella sonnei* in vegetables (salad and carrots) causing 198 human cases and six hospitalisations.

In Sweden, a *Shigella sonnei* outbreak affected 145 people of which five were hospitalised. The analytical epidemiological investigation pointed out that raw grated carrots served in a restaurant were the source of infection but the source of contamination still remains unknown.

In 2008, Greece reported one food-borne outbreak caused by *B. melitensis* affecting 111 people of which ten were hospitalised. The implicated foodstuff was soft cheese made from non-pasteurised milk from sheep and goat and epidemiologically linked to the cases.

Six different settings and eight contributory factors were reported for the 11 outbreaks. For four outbreaks the place of origin was reported; in the two *S. sonnei* and the *Listeria* outbreaks catering companies were reported as the place of origin, and in the *B. melitensis* outbreak the place of origin of the problem was primary production.

3.13.7 Bacterial toxins

Bacterial toxins can cause damage to humans by destroying cells or disrupting normal cellular metabolism. Both Gram negative and Gram positive bacteria produce highly potent toxins.

Most bacterial toxins can be destroyed by heating. However, exceptions include certain heat-resistant staphylococcal enterotoxins. Further, the emetic toxin of *Bacillus cereus* has high heat tolerance and cannot be destroyed by normal heat treatment.

Clostridium botulinum toxin is the cause of a rare but potentially deadly intoxication and occurs when the anaerobic bacterium grows in foods and produces botulinum toxin, a powerful paralytic toxin.

Clostridium perfringens bacteria multiply especially in food prepared from meat and its toxins cause abdominal cramps and diarrhoea.

Bacillus cereus may produce emetic and diarrheagenic toxins. Depending on the type of toxin, *Bacillus cereus* may cause severe nausea, vomiting and watery diarrhoea.

Staphylococcus aureus produces toxins that cause intense vomiting in humans.

Outbreaks caused by bacterial toxins in 2008

Ten MSs reported a total of 124 food-borne outbreaks caused by *Bacillus* spp. and two non-MSs reported nine *Bacillus* spp. outbreaks (Table OUT14). Only 45 of the *Bacillus* outbreaks were verified (36.3%) with 1,132 cases; 41 cases were hospitalised (Table OUT15). The total number of outbreaks caused by *Bacillus* spp. toxins within the EU had increased by 18.1% compared to 2007 (105 outbreaks).

Twelve MSs reported 110 food-borne outbreaks caused by *Clostridium* spp. (Table OUT14) and 30.0% of the outbreaks were verified (Table OUT15). One non-MS reported three *Clostridium* outbreaks. Two case fatalities were reported from two different possible outbreaks. Three MSs reported together four verified outbreaks caused by *Clostridium botulinum* with a total of 20 cases, 16 of which were hospitalised, but no fatalities were reported.

Sixteen MSs reported 291 food-borne outbreaks caused by *Staphylococcus* spp., which constituted 5.5% of the total number of reported outbreaks in the EU in 2008; 27.8% of the outbreaks were verified (Table OUT15). Two non-MSs reported eight *Staphylococcus* spp. outbreaks. Two cases died in one possible *Staphylococcus* outbreak.

In total, 6,878 human cases caused by bacterial toxins were reported, accounting for 15.1% of the total number of human cases reported in the EU.

Bacterial toxins caused 159 verified outbreaks in the EU. The type of evidence verifying outbreaks was the detection of the pathogen from the implicated foodstuff in 45.9% of outbreaks and by analytical epidemiological evidence in 67.9% of outbreaks. Several MSs reported more than one type of evidence.

3.13 FOOD-BORNE OUTBREAKS

Table OUT14. Total and possible food-borne outbreaks caused by bacterial toxins, 2008

Agent	Country	Total outbreaks		Possible outbreaks			
					Human cases		
		N	Reporting rate per 100,000	N	Cases	Hospitalised	Deaths
Bacillus	Belgium	2	0.02	0	-	-	-
	Denmark	3	0.05	0	-	-	-
	Finland	3	0.06	2	14	0	0
	France	83	0.13	67	835	32	0
	Italy	3	<0.01	3	111	0	0
	Netherlands	15	0.09	0	-	-	-
	Poland	2	<0.01	0	-	-	-
	Portugal	3	0.03	1	24	24	0
	Spain	7	0.02	5	0	0	0
	Sweden	3	0.03	1	4	0	0
	EU Total	**124**	**0.03**	**79**	**988**	**56**	**0**
	Norway	8	0.17	8	54	0	0
	Switzerland	1	0.01	1	5	0	0
Clostridium	Belgium	1	<0.01	0	-	-	-
	Denmark	5	0.09	4	117	1	0
	France	56	0.09	42	727	24	1
	Germany	4	<0.01	0	-	-	-
	Hungary	5	0.05	2	240	2	0
	Italy	6	0.01	6	42	0	0
	Netherlands	2	0.01	0	-	-	-
	Poland	4	0.01	4	10	10	0
	Portugal	8	0.08	6	16	16	0
	Romania	3	0.01	2	4	4	1
	Spain	13	0.03	8	0	0	0
	United Kingdom	3	<0.01	3	0	0	0
	EU Total	**110**	**0.02**	**77**	**1,156**	**57**	**2**
	Norway	3	0.06	2	4	2	0
Staphylococcus	Belgium	2	0.02	0	-	-	-
	Denmark	1	0.02	0	-	-	-
	Finland	1	0.02	0	-	-	-
	France	211	0.33	168	1,453	139	2
	Germany	1	<0.01	0	-	-	-
	Hungary	3	0.03	1	15	9	0
	Italy	2	<0.01	2	8	0	0
	Lithuania	2	0.06	2	4	4	0
	Netherlands	6	0.04	0	-	-	-
	Poland	10	0.03	7	131	4	0
	Portugal	8	0.08	4	49	47	0
	Romania	3	0.01	2	17	17	0
	Slovakia	2	0.04	1	0	0	0
	Slovenia	1	0.05	1	40	0	0
	Spain	32	0.07	17	0	0	0
	Sweden	6	0.07	5	23	0	0
	EU Total	**291**	**0.06**	**210**	**1,740**	**220**	**2**
	Norway	7	0.15	5	11	1	0
	Switzerland	1	0.01	0	-	-	-

3.13 FOOD-BORNE OUTBREAKS

Table OUT15. Verified food-borne outbreaks caused by bacterial toxins, 2008

Agent	Country	N	Human cases		
			Cases	Hospitalised	Deaths
Bacillus cereus	Belgium	2	10	3	0
	Denmark	3	37	0	0
	Finland	1	5	0	0
	France	16	347	5	0
	Netherlands	15	122	0	0
	Poland	2	453	2	0
	Portugal	2	31	31	0
	Spain	2	7	0	0
	Sweden	2	120	0	0
	EU Total	**45**	**1,132**	**41**	**0**
Clostridium botulinum	Germany	1	5	5	0
	Portugal	2	6	6	0
	Romania	1	9	5	0
	EU Total	**4**	**20**	**16**	**0**
Clostridium perfringens	Belgium	1	100	0	0
	Denmark	1	2	0	0
	France	13	320	1	0
	Germany	3	81	0	0
	Hungary	3	86	0	0
	Netherlands	2	6	0	0
	Spain	4	233	2	0
	EU Total	**27**	**828**	**3**	**0**
	Norway	1	4	0	0
Clostridium spp., unspecified	France	1	3	3	0
	Spain	1	2	0	0
	EU Total	**2**	**5**	**3**	**0**
Staphylococcus aureus	Denmark	1	42	0	0
	Finland	1	15	0	0
	France	23	276	32	0
	Germany	1	10	0	0
	Hungary	2	22	3	0
	Netherlands	6	14	0	0
	Poland	3	38	9	0
	Portugal	4	49	47	0
	Romania	1	21	21	0
	Slovakia	1	42	3	0
	Spain	8	64	1	0
	Sweden	1	2	0	0
	EU Total	**52**	**595**	**116**	**0**
	Norway	1	5	4	0
	Switzerland	1	5	4	0
Staphylococcus spp., unspecified	Belgium	2	32	10	0
	France	20	314	7	0
	Spain	7	68	9	0
	EU Total	**29**	**414**	**26**	**0**

3.13 FOOD-BORNE OUTBREAKS

Detailed information from verified outbreaks

Detailed information on outbreaks was only available for the 137 outbreaks, because some MSs reported aggregated data (22 outbreaks).

Information on the type of outbreak was available for 135 of the verified outbreaks; 94 were general outbreaks accounting for 2,239 of the human cases (85.5%); of which 154 were hospitalised (6.9%).

Seventeen different implicated foodstuffs were reported for the verified outbreaks caused by bacterial toxins. Mixed and buffet meals were the most common and associated with 44 outbreaks of the 122 verified outbreaks with detailed information on implicated foodstuff.

In Germany, an outbreak due to *Clostridium botulinum* type B toxin affected a group of people at a private party. Five people showed gastrointestinal symptoms of which four developed severe neurologic symptoms. All were treated in hospital and one person required mechanical ventilation. *Clostridium botulinum* toxin was isolated from sera in two patients. Laboratory investigations confirmed smoked, raw ham as the source of intoxication. The ham was produced by a butcher for non-commercial use by a farmer, using the meat of a self-reared and slaughtered pig. Samples of the ham used by the cases were found positive for *C. botulinum*, however type B *C. botulinum* was not detected in meat products at the butchery.

The origin of the foodstuff was only reported in 13 of verified bacterial toxin outbreaks and all originated from domestically produced foodstuffs.

The majority of reported settings in verified outbreaks were restaurants (34 outbreaks) and school/kindergarten (16 outbreaks) with 289 and 572 human cases, respectively.

The place of origin of the problem was reported for 32 of the verified outbreaks caused by bacterial toxins. Seventeen of the verified outbreaks were attributed to restaurants or catering services.

Inadequate chilling and storage time/temperature were the most common contributory factor, reported in 19 and 27 verified outbreaks, respectively. These factors are especially important for *Bacillus cereus* outbreaks.

The Netherlands reported a food-borne outbreak of *B.* cereus in fried rice served at a take-away/fast-food outlet affecting 40 people. The preparation of large quantities of food followed by inadequate chilling was the contributing factor to the outbreak.

3.13.8 Viruses

Viral infections account for up to one third of cases of food-borne infections in developed countries. Food-borne viral infections are usually of intermediate (one to three days) incubation period, causing illnesses which are self-limited in otherwise healthy individuals. Since most viruses are host specific, food-borne outbreaks caused by viruses are primarily a result of direct or indirect human contamination of the foodstuffs.

Calicivirus (including norovirus) causes approximately 90% of epidemic non-bacterial outbreaks of gastroenteritis around the world and is responsible for many food-borne outbreaks of gastroenteritis. Norovirus affects people of all ages. The virus is transmitted by food or water contaminated with human faeces and by person-to-person contact. Outbreaks of norovirus disease often occur in closed or semi-closed communities, such as long-term care facilities, hospitals, prisons, dormitories, and cruise ships where once the virus has been introduced, the infection spreads very rapidly by either person-to-person transmission or through contaminated food. Many norovirus outbreaks have been traced to food that was handled by one infected person.

Rotavirus is the leading, single cause of severe diarrhoea among infants and young children. Rotavirus is transmitted by the faecal-oral route. It infects cells that line the small intestine and produces an enterotoxin, which induces gastroenteritis, leading to severe diarrhoea and sometimes death through dehydration. Although rotavirus accounts for up to 50% of hospitalisations for severe diarrhoea in infants and children, its importance is still not widely recognised within the public health community, particularly in low-income countries.

The hepatitis A virus is distinguished from other viral agents by its prolonged (two to six week) incubation period and its ability to spread beyond the stomach and intestines, into the liver. It often induces jaundice, or yellowing of the skin, and in rare cases leads to chronic liver dysfunction. The virus has often been associated with the consumption of contaminated fresh-cut vegetables and fruit.

Outbreaks caused by viruses in 2008

Eighteen MSs reported a total of 697 food-borne outbreaks caused by viruses (Table OUT16). Germany and Poland accounted for 52.5% of the virus outbreaks. The overall reporting rate in EU was 0.14 outbreaks per 100,000 population, ranging from <0.01 per 100,000 population in the United Kingdom to 2.26 per 100,000 population in Lithuania. Two non-MSs reported 13 outbreaks. For the second year in a row, the total number of food-borne outbreaks caused by viruses increased by 3.3% compared to 2007 (675 outbreaks).

In total, 5.5% of the reported viral outbreaks were verified (Table OUT17). France accounted for 14 of 30 verified calicivirus (including norovirus) outbreaks.

The type of evidence verifying the outbreak was detection of the agent in implicated foodstuffs in 19 outbreaks and the causative agent was laboratory characterised both from the implicated foodstuff and human cases in two outbreaks. Analytical epidemiological evidence was presented in 32 of the outbreaks. Several MSs reported more than one type of evidence.

3.13 FOOD-BORNE OUTBREAKS

Table OUT16. Total and possible food-borne outbreaks caused by virus, 2008

Country	Total outbreaks		Possible outbreaks			
	N	Reporting rate per 100,000	N	Human cases		
				Cases	Hospitalised	Deaths
Austria	9	0.11	7	38	11	0
Belgium	8	0.07	6	424	0	0
Czech Republic	2	0.02	2	183	2	1
Denmark	31	0.57	28	623	25	0
Finland	12	0.23	10	249	0	0
France	50	0.08	33	545	31	0
Germany	235	0.29	235	2,505	160	0
Hungary	2	0.02	2	17	1	0
Italy	26	0.04	26	71	-	-
Latvia	25	1.10	25	295	168	0
Lithuania	76	2.26	76	204	191	0
Malta	3	0.73	3	142	0	0
Netherlands	11	0.07	11	197	-	-
Poland	131	0.34	131	2,120	613	0
Slovakia	24	0.44	24	-	-	-
Spain	31	0.07	19	-	-	-
Sweden	19	0.21	19	775	1	0
United Kingdom	2	<0.01	2	16	0	0
EU Total	**697**	**0.14**	**659**	**8,404**	**1,203**	**1**
Norway	12	0.25	11	458	35	0
Switzerland	1	0.01	1	80	1	0

Table OUT17. Verified food-borne outbreaks caused by virus, 2008

Agent	Country	Verified outbreaks			
		N	Human cases		
			Cases	Hospitalised	Deaths
Calicivirus (including norovirus)	Austria	1	77	40	0
	Belgium	1	15	0	0
	Denmark	3	223	-	-
	Finland	2	68	1	0
	France	14	486	8	0
	Spain	9	151	0	0
	EU Total	**30**	**1,020**	**49**	**0**
	Norway	1	70	0	0
Flavivirus	Austria	1	6	4	0
	EU Total	**1**	**6**	**4**	**0**
Hepatitis A virus	Belgium	1	49	0	0
	Spain	3	55	18	0
	EU Total	**4**	**104**	**18**	**0**
Virus not specified	France	3	32	2	0
	EU Total	**3**	**32**	**2**	**0**

3.13 FOOD-BORNE OUTBREAKS

Detailed information from verified outbreaks

A total of 38 verified food-borne virus outbreaks was reported by MSs. However, for some analyses detailed information on outbreaks was only available for the 26 outbreaks, because some MSs reported aggregated data (12 outbreaks).

Information on the type of outbreak was available for 26 outbreaks; 23 were reported as general outbreaks causing 94.5% of all human cases and all hospitalisations. In four of the verified outbreaks, domestic foodstuffs were reported as the origin. Information on implicated foodstuffs was provided in 16 of the verified outbreaks, mainly dominated by mixed or buffet meals and crustaceans, shellfish, molluscs and products thereof. But for 10 of the outbreaks the implicated foodstuff was unknown.

A large number of human cases, 35.8% of all cases from verified outbreaks, originated from problems in restaurants or catering services. Several contributory factors were linked to the virus outbreaks, but the one most common was an infected food handler (five outbreaks).

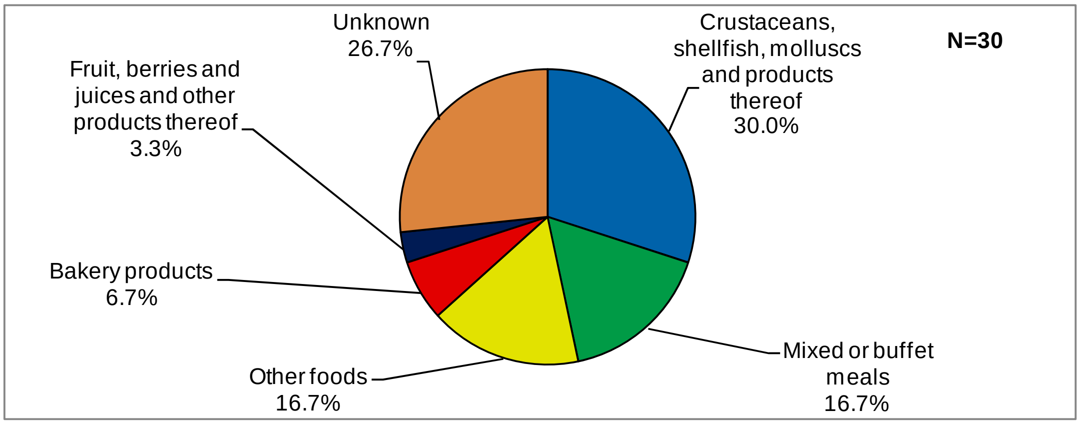
Calivirus (including norovirus)

Information on the implicated foodstuff was provided in 22 of 30 verified outbreaks caused by calivirus (including norovirus). As in previous years, crustaceans, shellfish, molluscs and products thereof, and buffet meals were the most frequently associated foodstuffs. However, for eight of the 22 outbreaks, the implicated foodstuff was unknown (Figure OUT21). The distribution of implicated foodstuffs in verified outbreaks is similar to 2007.

Calicivirus (including norovirus) caused 87.0% of all general outbreaks and for the 30 verified outbreaks, the settings most often reported were restaurants (9 outbreaks), canteen or workplace (five), and hospital or medical care facility (five) (Figure OUT22).

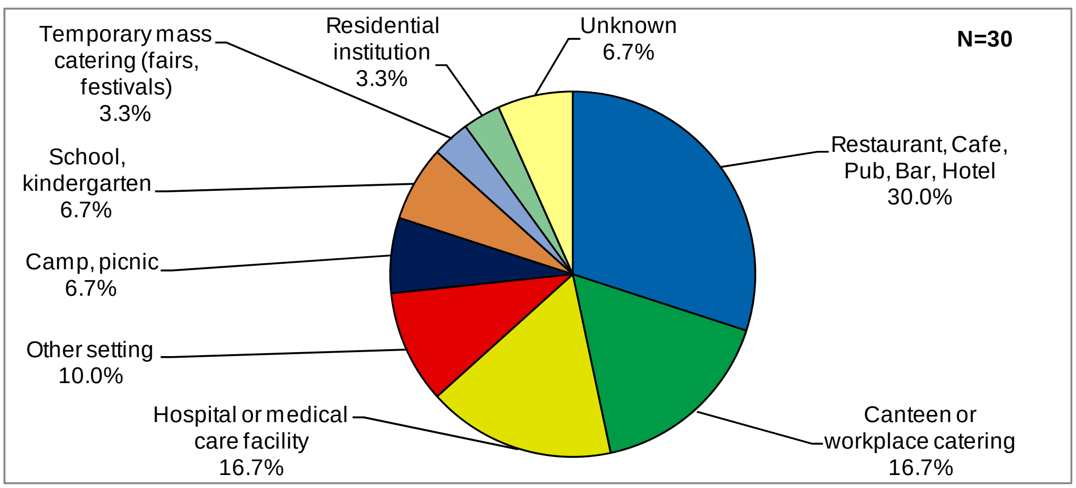
3.13 FOOD-BORNE OUTBREAKS

Figure OUT21. Distribution of implicated foodstuffs in verified outbreaks caused by calicivirus (including norovirus) in the EU, 2008



Note: includes data from 30 outbreaks: Austria (1), Belgium (1), Denmark (3), Finland (2), France (14), Spain (9).

Figure OUT22. Distribution of settings in verified outbreaks caused by calicivirus (including norovirus) in the EU, 2008



Note: includes data from 30 outbreaks: Austria (1), Belgium (1), Denmark (3), Finland (2), France (14), Spain (9).

3.13.9 Parasites

Trichinella infections in humans are typically acquired by eating raw or inadequately cooked meat contaminated with infectious larvae. The most common sources of human infection are pig meat, wild boar meat and other game meat. The first phase of trichinellosis symptoms may include nausea, diarrhoea, vomiting, fatigue, fever and abdominal discomfort. Thereafter, a second phase of symptoms including muscle pains, headaches, fevers, eye swelling, aching joints, chills, cough, itchy skin, diarrhoea or constipation may follow. In more severe cases, difficulties with coordinating movements as well as heart and breathing problems may occur. A small proportion of cases die from trichinellosis infection.

Cryptosporidiosis is a parasitic disease caused by the protozoan parasite *Cryptosporidium parvum.* Infection is initiated by the ingestion of resistant oocysts from contaminated food or water. The main symptom is self-limiting diarrhoea that lasts up to two weeks. Transmission occurs through animal-to-human or human-to-human contact.

Outbreaks caused by parasites in 2008

Fourteen MSs reported a total of 70 food-borne outbreaks caused by parasites and they accounted for 1.3% of the total reported food-borne outbreaks in 2008; Germany and Romania reported 71.4% of parasitic outbreaks (Table OUT18). The total number of outbreaks caused by parasites in the EU increased by 20.7% in 2008 compared to 2007 especially due to 31 outbreaks reported by Romania. In total, 38 of the parasitic outbreaks were verified, 37 were *Trichinella* outbreaks reported by four MSs and one was a *Cryptosporidium parvum* outbreak reported by Finland (Table OUT19). Romania accounted for 31 of the *Trichinella* outbreaks with a total of 391 cases. Generally, the hospital admission rate was very high for parasitic outbreaks; 51.5% of all cases were hospitalised.

The type of evidence verifying the outbreak was detection of the agent in implicated foodstuffs in 36 outbreaks and the causative agent was laboratory characterised both from the implicated foodstuff and human cases in one outbreak. Analytical epidemiological evidence was presented in two of the outbreaks.

Table OUT18. Total and possible food-borne outbreaks caused by parasites, 2008

Country	Total outbreaks		Possible outbreaks			
				Human cases		
	N	Reporting rate per 100,000	N	Cases	Hospitalised	Deaths
Belgium	1	<0.01	1	10	0	0
Finland	1	0.02	0	0	0	0
France	1	<0.01	0	-	-	-
Germany	19	0.02	19	81	4	0
Greece	1	<0.01	1	6	2	0
Hungary	1	<0.01	1	5	5	1
Ireland	3	0.07	3	7	4	0
Lithuania	7	0.21	3	17	11	0
Poland	1	<0.01	1	4	0	0
Romania	31	0.14	0	-	-	-
Slovakia	1	0.02	0	-	-	-
Spain	1	<0.01	1	-	-	-
Sweden	1	0.01	1	21	0	0
United Kingdom	1	<0.01	1	-	-	-
EU Total	**70**	**0.01**	**32**	**151**	**26**	**1**

3.13 FOOD-BORNE OUTBREAKS

Table OUT19. Verified food-borne outbreaks caused by parasites, 2008

Agent	Country	Verified outbreaks			
		N	Human cases		
			Cases	Hospitalised	Deaths
Cryptosporidium parvum	Finland	1	87	4	0
	EU Total	**1**	**87**	**4**	**0**
Trichinella pseudospiralis	France	1	2	2	0
	EU Total	**1**	**2**	**2**	**0**
Trichinella spiralis	Slovakia	1	16	16	0
	EU Total	**1**	**16**	**16**	**0**
Trichinella spp., unspecified	Lithuania	4	19	19	0
	Romania	31	391	224	1
	EU Total	**35**	**410**	**243**	**1**

Detailed information from verified outbreaks

Detailed outbreak information was available for all 38 outbreaks. Information on the type of outbreak was available for 37 of verified outbreaks; six of them were general outbreaks. They caused 43.3% of human cases and 52.8% of hospitalisations. Twenty-eight of the Romanian *Trichinella* outbreaks were of household type.

Information on the implicated foodstuff was provided in all verified parasitic outbreaks and for 28 of the 37 verified *Trichinella* outbreaks consumption of wild boar meat was the source. Additionally, seven other *Trichinella* outbreaks were attributed to pig meat and products thereof. These outbreaks accounted for 83.1% of human cases and 98.5% of hospitalisations.

One *Cryptosporidium* outbreak in Finland was caused by a pre-cut salad mix and involved 87 cases, representing 16.9% of the total number of human cases infected with parasites.

The origin of the foodstuff was reported in 37 out of 38 verified parasitic outbreaks and domestically produced foodstuffs was the origin in 36 of them and intra-Community trade in one. Households were reported as the settings in 35 of the outbreaks, and two were reported as canteen or workplace.

The place of origin of the problem was reported in 94.7% of all verified outbreaks caused by parasites. In 97.2% of these outbreaks, the origin of the problem was reported to be the household. Unprocessed contaminated raw pig meat was listed as a contributory factor in 31 of the outbreaks; i.e. the meat was not tested for *Trichinella* prior to consumption.

Romania reported one large *Trichinella* outbreak resulting in 108 cases all of which were hospitalised. The cause of the outbreaks was pig meat which had not undergone examination for *Trichinella*. The species was laboratory detected in human cases and the implicated foodstuff. The pig meat was served in a canteen/workplace catering and not sufficiently heat-treated.

3.13.10 Other causative agents

In this report the 'other causative agents' include histamine, marine biotoxins and mushroom toxins as well as unspecified toxins.

Histamine is a biogenic amine involved in local immune responses as well as regulating physiological functions. It is found in virtually all animal body cells. Scombroid food poisoning results from eating spoiled (decayed) fish containing high amounts of histamine. Other chemicals have been found in decaying fish flesh, but their association to scombroid fish poisoning has not been clearly established. Symptoms consist of skin flushing, throbbing headache, oral burning, abdominal cramps, nausea, diarrhoea, palpitations, a sense of unease, and, rarely, prostration or loss of vision. It is most commonly reported with tuna, mahi-mahi, bonito, sardines, anchovies, and related species of fish that were inadequately refrigerated or preserved after being caught.

Outbreaks caused by other causative agent in 2008

Seventeen MSs reported a total of 167 food-borne outbreaks due to other causative agents such as histamine, marine biotoxins and mushroom toxins which constituted 3.1% of the total number of reported outbreaks (Table OUT20). Two non-MSs reported two outbreaks. In 2008, outbreaks occurring in France accounted for 37.7% of other causative agent outbreaks. The overall outbreak reporting rate in the EU was 0.03 per 100,000 population, ranging from <0.01 in four MSs to 0.21 per 100,000 population in Lithuania.

In total, 68 of the reported outbreaks caused by other causative agents were verified (40.7%) (Table OUT21). The verified outbreaks were primarily histamine outbreaks in France and Spain, and mushroom toxins in Hungarian outbreaks.

The type of evidence verifying the outbreak was detection of the agent in implicated foodstuffs in 32 outbreaks and analytical epidemiological evidence was presented in 45 of the outbreaks. Several MSs reported more than one type of evidence.

Table OUT20. Total and possible food-borne outbreaks caused by other causative agents, 2008

Country	Total outbreaks		Possible outbreaks			
				Human cases		
	N	Reporting rate per 100,000	N	Cases	Hospitalised	Deaths
Austria	1	0.02	1	2	2	0
Belgium	4	0.04	0	-	-	-
Denmark	6	0.13	6	37	0	0
France	63	0.11	41	185	36	0
Germany	8	<0.01	6	18	1	0
Greece	1	0.02	1	2	2	0
Hungary	14	0.16	0	0	0	0
Ireland	2	0.05	2	4	2	0
Latvia	3	0.13	3	26	26	0
Lithuania	7	0.21	7	36	33	0
Netherlands	1	<0.01	1	2	2	0
Poland	20	0.05	17	116	39	0
Romania	1	<0.01	1	18	18	0
Slovakia	3	0.06	3	-	-	-
Spain	28	0.06	5	0	0	0
Sweden	3	0.04	3	30	3	0
United Kingdom	2	<0.01	2	12	1	0
EU Total	**167**	**0.03**	**99**	**488**	**165**	**0**
Norway	1	0.04	1	5	0	0
Switzerland	1	0.01	0	-	-	-

3.13 FOOD-BORNE OUTBREAKS

Table OUT21. Verified food-borne outbreaks caused by other causative agents, 2008

Agent	Country	Verified outbreaks			
		N	Human cases		
			Cases	Hospitalised	Deaths
Histamine	Belgium	1	2	2	0
	France	18	82	6	0
	Germany	2	6	0	0
	Hungary	1	3	3	0
	Spain	15	73	1	0
	EU Total	**37**	**166**	**12**	**0**
	Switzerland	1	11	3	0
Marine biotoxins	Spain	1	25	0	0
	EU Total	**1**	**25**	**0**	**0**
Mushroom toxins	Hungary	13	56	47	0
	Poland	3	7	7	0
	Spain	4	11	5	1
	EU Total	**20**	**74**	**59**	**1**
Mycotoxins	Belgium	2	4	0	0
	Spain	2	5	2	0
	EU Total	**4**	**9**	**2**	**0**
Other causative agents	Belgium	1	2	0	0
	France	4	34	6	0
	Spain	1	6	0	0
	EU Total	**6**	**42**	**6**	**0**

Detailed information from verified outbreaks

A total of 68 verified outbreaks due to other causative agents were reported by MSs. However, detailed information on outbreaks was only available for 45 outbreaks because Spain reported aggregated data (23 outbreaks).

Information on the type of outbreaks was available for 43 of the verified outbreaks. Twenty outbreaks were general outbreaks and had 114 human cases in total. The 20 household outbreaks had 77 human cases in total.

Information on the implicated foodstuff was provided in 38 of the verified outbreaks; 17 outbreaks were caused by histamine in fish and fish products and 17 outbreaks were due to mushroom toxins.

In Hungary, an outbreak caused by the consumption of the mushroom *Armillariella mellea* in a household was reported. *A. mellea*, also known as the Honey Mushroom, is edible with a bitter taste that disappears with cooking. However, some people suffer digestive upsets. The outbreak may be the result of improper cooking or eating the mushroom raw or confusion with the more very poisonous *Galerina autumnalis*. The two species can be found growing together on the same log. It is in general recommended that only the caps should be eaten. Some humans may be intolerant to the species, especially when eaten in large quantities and collectors should be aware that it can cause gastrointestinal upset.

Information about the origin of the foodstuff was reported in 16 of the verified outbreaks and all were domestic. The most common setting were households (20 outbreaks) and restaurants (10 outbreaks), primarily caused by mushroom toxins and histamine, respectively. Further, in 19 of the verified outbreaks the place of origin of the problem was reported; 17 outbreaks originated from households and 15 of these household outbreaks were caused by mushroom toxins and one by histamine.

For histamine outbreaks, the contributory factors were unprocessed contaminated ingredients (11 outbreaks), storage time (two outbreaks), and inadequate chilling (three outbreaks).

3.13 FOOD-BORNE OUTBREAKS

3.13.11 Waterborne outbreaks

Waterborne outbreaks may potentially be large, especially if the public drinking water supply is contaminated. Hospitals and institutions hosting young children or elderly people are often the most severely affected settings in such situations. Laboratory detection of pathogens from water can be complicated, especially if the level of contamination is low. In waterborne outbreaks several zoonotic agents are often detected in the water as well as in human samples as a result of unspecific contamination, e.g. with sewage water. Contaminated water can spread pathogenic agents further to other foodstuffs (e.g. vegetables), either in primary production or during food preparation. The most common contamination of raw water sources is from human sewage and in particular human faecal pathogens and parasites. Public water sources are used in urban areas whereas private water supply is frequently seen in remote rural areas.

The EU legislation regarding drinking water quality[2] (called the water framework Directive) commits MSs to achieve good qualitative and quantitative status by 2015. MSs are encouraged to involve interested parties actively. Most water sources require treatment before use – even deep wells or springs. The treatment depends on the source of water.

In 2008, five MSs and two non-MSs reported 12 waterborne outbreaks (Table OUT22). Seven outbreaks originated from the contamination of a private water well and therefore reported only a small number of human cases per outbreak (2-15 human cases per outbreak). No deaths were recorded. Four different pathogens were isolated from these seven outbreaks: *Escherichia coli*, *Shigella, Francisella* and *Salmonella*.

Two outbreaks involved public water plants affecting 185 and 597 human cases, respectively. In the smaller outbreak the causative agents were *Campylobacter,* norovirus and *Escherichia coli* (VTEC, EHEC) and it was caused by technical problems in the tap water distribution system. The other large waterborne outbreak was caused by norovirus after a leakage in the sewage system and contamination of the tap water.

In Norway, an outbreak of *Francisella tularensis* caused 15 cases and several smaller outbreaks in municipalities in central Norway. The outbreaks were the result of contamination of private water sources with dead rodents or infected rodent faeces. However, the agent was not isolated from drinking water samples.

Hungary reported a waterborne outbreak caused by norovirus. In total, 597 human cases and four hospitalisations were reported. Analytical epidemiological evidence concluded that contaminated tap water was the source of infection. The outbreak was due to the very old plumbing of the town, and the sewage system was leaking. As a result, human faeces contaminated the water source and entered the tap water through a leakage in the water system.

[2] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. O.J. L 327, 22.12.2000, p.1.

3.13 FOOD-BORNE OUTBREAKS

Table OUT22. List of reported verified waterborne outbreaks in 2008

Isolated agents	Country	Verified outbreaks			Additional information
		Cases	Hospitalised	Deaths	
Campylobacter jejuni. Furthermore, human infections with Norovirus, VTEC, ETEC.	Switzerland	185	-	0	Technical problem in the tap water distribution system
Campylobacter spp.	France	15	0	0	Camp, picnic
Escherichia coli.	France	8	6	0	Other setting
Escherichia coli (VTEC 157)	Ireland	5	3	0	Contamination of family private well
Escherichia coli (VTEC 157)	Ireland	5	0	0	Contamination of family private well
Escherichia coli (VTEC 157)	Ireland	4	2	0	Contamination of family private well
Calicivirus (including norovirus)	Sweden	2000	-	-	
Calicivirus (including norovirus)	Hungary	597	4	0	The plumbing of the township was very old with no sewage system. Consequently, the tap water was contaminated through a leakage in the water pipes.
Shigella flexneri	France	3	3	0	Household
Francisella tularensis	Norway	15	3	0	The outbreak was caused by contamination of the private water sources with dead rodents or infected rodent faeces. The agent was only isolated from human cases.
Salmonella Enteritidis	Spain	8	0	0	Private water supply supplying more than one household.
Salmonella Typhi	Spain	2	1	0	Individual household supply (private well)

3.13.12 Discussion

MSs have been under the legal obligation to report food-borne outbreaks at Community level since 2005. The detailed data received in 2008 from MSs covered fewer outbreaks than in previous years but information was generally of a higher quality. A total of 5,332 outbreaks was reported which is a slight decrease of 7.0% compared to 2007. Overall, 45,622 human cases, 6,230 hospitalisations and 32 deaths were recorded in the outbreaks. The total number of verified outbreaks (N=890) decreased by 50.1% compared to 2007 (N=1,784) mainly due to fewer verified outbreaks reported by France and Spain. The dataset on verified outbreaks may be slightly biased due to few MSs providing most of the information.

Overall, 14,001 human cases were reported in the 890 verified outbreaks. As in previous years, the largest number of food-borne outbreaks was caused by *Salmonella*.

Food-borne viruses were reported, as in 2006 and 2007, as the second most common known cause of food-borne outbreaks in the EU. However, outbreaks caused by food-borne viruses are often difficult to investigate, both microbiologically and epidemiologically, and therefore only 5.5% of the outbreaks were verified. The use of the Kaplan criteria (Kaplan *et al*, 1982[3]) might help in identifying norovirus outbreaks.

Trichinella and *Salmonella* Typhimurium were the primary agents involved in outbreaks caused by the consumption of wild boar and pig meat and products thereof. Consumption of bovine meat resulted in few outbreaks but the majority of human cases were caused by *Clostridium perfringens*. *Salmonella* Enteritidis was the cause of most of the human cases in outbreaks related to eggs and egg products as well as to broiler meat.

Together 12 waterborne outbreaks were reported in 2008. Waterborne outbreaks have the potential to be large, especially if the public drinking water supply is contaminated. However, in 2008, most waterborne outbreaks were caused by contamination of private wells, and only two outbreaks were caused by contamination of public water sources.

For most verified outbreaks, information on type of outbreak, setting, number of human cases, hospitalisations and case fatalities was provided. The causative agent and implicated foodstuff were specified in more than 74% of verified outbreaks. Seemingly, it was more difficult for MSs to gather detailed information on contributing factors, origin of food and place of origin of the problem.

A great variation between reporting MSs in the share of verified outbreaks reported is remarkable as was the case for 2007. Italy, Luxembourg, Malta and the United Kingdom did not report any verified outbreaks, whereas France, Poland and Spain provided data on a large number of verified outbreaks.

Even though there may have been some different interpretations in the classification of the outbreaks between possible and verified, the results indicate that there are differences in MS ability to identify, investigate, combine available information and report food-borne outbreaks at national level. This is supported by the variation observed in the numbers of reported outbreaks per population between MSs. Therefore, it is likely that the MSs reporting the highest numbers of outbreaks are the countries having good systems for the investigation and reporting of the outbreaks, rather than having a lower food safety situation.

According to the definition of verified outbreaks, either isolates from the implicated food vehicle or analytical epidemiological evidence (case-control study or cohort study) are required. In the present report only outbreaks with sufficient information on evidence have been included in the analysis of verified outbreaks. The remaining outbreaks were presented as possible. Fortunately, the documentation of the outbreaks and the data quality has improved, however, unfortunately fewer verified outbreaks were reported.

[3] Kaplan, J.E., Gary, G.W., Baron, R.C., Singh, N., Schonberger, L.B., Feldman, R., Greenberg, H.B. 1982. Epidemiology of Norwalk gastroenteritis and the role of Norwalk virus in outbreaks of acute nonbacterial gastroenteritis. *Ann Intern Med*. 96,756–61.

4. MATERIALS AND METHODS

4.1 Data received in 2008

Human data

All human data used in the Community Summary Report for 2008 were provided by ECDC based on data submitted to the European Surveillance System (TESSy).

The European Surveillance System (TESSy) is a software platform that was adopted by ECDC for the collection of data on infectious diseases in April 2008. Both aggregated and case based data were reported to TESSy. Although aggregated data did not include individual case based information, both reporting formats were useful to calculate country-specific disease incidence and trends. In 2008, data were further classified into two data source types, including notification and laboratory data. Notification data were used for epidemiological analyses (e.g. incidence, age, importation status) while laboratory data were used for laboratory-specific analyses (e.g. top ten phage types of *Salmonella* Enteritidis).

Data on human zoonoses cases were received from all 27 MSs and additionally from three non-MSs: Norway, Iceland and Liechtenstein. Switzerland sent the data on human cases directly to EFSA.

Data on foodstuffs, animals and feedingstuffs

In 2008, data were collected on a mandatory basis for the following eight zoonotic agents: *Salmonella*, thermotolerant *Campylobacter*, *Listeria monocytogenes*, verotoxigenic *E. coli*, *Mycobacterium bovis*, *Brucella*, *Trichinella* and *Echinococcus.* Mandatory reported data also included antimicrobial resistance in isolates of *Salmonella* and *Campylobacter*, food-borne outbreaks and susceptible animal populations. Furthermore, based on epidemiological situations in each MS, data were reported on the following agents and zoonoses: *Yersinia*, *Lyssavirus (*rabies), *Toxoplasma*, *Cysticerci*, *Coxiella* (Q fever), *Leptospira, Francisella* and antimicrobial resistance in indicator *E. coli* isolates. Finally, data concerning compliance with microbiological criteria were also reported for staphylococcal enterotoxin, *Enterobacter sakazakii* and histamine.

In this report, data concerning the eight mandatory zoonotic agents, and *Yersinia,* Q fever, rabies, *Toxoplasma, Cysticerci, Francisella* and *Leptospira* are presented.

For the sixth consecutive year, countries submitted data on animals, food, feed and food-borne outbreaks using a web-based zoonoses reporting system maintained by EFSA.

All EU MSs submitted national zoonoses reports for 2008. In addition, reports were submitted by the two non-MSs Norway and Switzerland.

4.2 Statistical analysis of trends over time

Human data

Five-year trends for EU and for MSs were analysed with Poisson regression using 99% confidence level. Incidence rate ratios were calculated adjusting for clustering within the countries and taking into account the underlying population. The EU trend and the trends in the MSs were reported as significant if the 99% confidence interval for incidence rate ratio did not include number one. Data (number of confirmed cases and total population) at MS level were only included in the trend analysis when the MS reported human cases throughout the period 2004 to 2008, including zero reporting.

Due to a wide variation in the reported case counts of zoonotic infections among MSs, any comparisons between notification rates by countries should be made with caution. When making comparisons between MSs, one should take into account such factors as the variability of case definitions, reporting requirements, surveillance systems and microbiological methods employed by reporting countries.

The notification rate for each year is calculated as the ratio between the number of confirmed cases and the total population, per 100,000 inhabitants. Analyses were conducted using Stata/SE 10.0.

Changes in notification rates were visually explored for salmonellosis, campylobacteriosis and listeriosis, for each MS, by *trellis* graphs, using the *lattice* package in the R software (http://www.r-project.org). MS specific notification rate trend graphs for salmonellosis and campylobacteriosis use a unique scale for countries shown in the same row, however scales differ among rows. MSs were ordered according to the maximum value of the notification rate. Moreover, in each row, countries are shown in alphabetical order. Due to more similar listeriosis notification rates across MSs, the same scale is used for trend graphs for all reporting MSs.

Data on foodstuffs, animals and feedingstuffs

EU weighted means were estimated by weighting the MS-specific proportion of positive units with the reciprocal of the sampling fraction, that is the ratio between “the total number of units per MS per year” and the “number of tested units in the MS per year”. Because the total number of units in the population is not always available, the most reliable proxy was used. For broiler meat and for broiler flock samples, the population was defined as the total number of slaughtered broilers per MS in 2008. These numbers were reported by MS in the framework of the 2008 baseline survey in broiler flocks and broiler carcasses, and supplemented with EUROSTAT data from 2008. For cattle and small ruminants, the annually reported population data were used. Source of data for weighting is included under all figures with weighted means.

Changes in the proportions of positive tests for zoonotic agents in foodstuffs and animals during 2004 to 2008 were visually explored, for each MS, by *trellis* graphs, using the *lattice* package in the R software (http://www.r-project.org). In order to obtain yearly estimates of the ratios between positive and tested samples, for groups of examined MSs, the SURVEYMEANS procedure in the SAS System was used. The weight was applied for each observation, to take into account disproportionate sampling at MS level. Statistical significance of five-year trends was tested by a weighted logistic regression for binomial data, using the GENMOD procedure in SAS using a 5% significance level. As non-independence of observations within each MS could not be excluded, for example due to the possibility of sampling animals belonging to the same holdings, or meat samples from the same slaughterhouses, the REPEATED statement was used. This yielded inflated standard errors for the effect of the year of sampling, reducing the probability of detecting significant time trends, and corresponding to a cautious approach to statistical analyses. MSs with data from at least four years were included in the trend analysis.

4. MATERIALS AND METHODS

4.3 Data sources

In the following sections, the types of data submitted by the reporting countries are briefly described. Information on human surveillance systems is based on the countries reporting to ECDC for the Annual Epidemiological Report on Communicable Diseases in Europe 2009.

4.3.1 *Salmonella* data

Humans

The notification of salmonellosis in humans is mandatory in most MSs, Switzerland, Iceland, Liechtenstein and Norway, except in five MSs, where reporting is based on a voluntary (Belgium, Spain, France, the Netherlands) or other system (the United Kingdom) (Appendix Table SA19). In the United Kingdom, although reporting of food poisoning is mandatory, isolation and specification of the organism is voluntary. However, reporting of *Salmonella* is generally believed to be carried out by the majority of the laboratories testing for the organism in the United Kingdom. Diagnosis of human infections is generally done by culture from human stool samples.

Foodstuffs

In food, *Salmonella* is notifiable in 12 MSs (Austria, Belgium, Estonia, Spain, Finland, France, Hungary, Italy, Latvia, Slovakia, Slovenia and Sweden) and Norway (Appendix Table SA19, information missing from Bulgaria, Cyprus, the Czech Republic, Germany, Denmark, Greece, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal and Romania).

Commission Regulation (EC) No 2073/2005 on microbiological criteria for foodstuffs lays down food safety criteria for *Salmonella* in several specific food categories. This regulation came into force in January 2006. Sampling schemes for monitoring *Salmonella* in foodstuffs, e.g. place of sampling, sampling frequency, and diagnostic methods, vary between MSs and food types. For a full description of monitoring schemes and diagnostic methods in individual MSs, please refer to Appendix Tables SA7, SA10, SA13, SA16 and SA17. The monitoring schemes were based on different samples, such as neck skin samples, carcass swabs, caecal contents and meat cuttings; these were collected at slaughter, processing, meat cutting plants and at retail. Several MSs reported data that were collected as part of HACCP programmes, based on sampling at critical control points. These targeted samples could not be directly compared with those that were randomly collected for monitoring/surveillance purposes and were not included in data analysis and tables. Information on serotype distribution was not consistently provided by all MSs.

Animals

Salmonella in *Gallus gallus* and/or other animal species is notifiable in most MSs, Switzerland and Norway, except in Hungary (Appendix Table SA19, information missing from Malta and Romania). In Denmark clinical cases are not notifiable for poultry - only other animals. Monitoring of *Salmonella* in animals is mainly conducted through passive, laboratory based surveillance of clinical samples, active routine monitoring of flocks of breeding and production animals in different age groups, and tests on organs during meat inspection. Community Regulation (EC) No 2160/2003 prescribes a sample plan for the control of *S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow and *S.* Hadar in breeding flocks of *Gallus gallus* and for the control of *S.* Enteritidis and *S.* Typhimurium in laying hen flocks of *Gallus gallus* to ensure comparability of data among MSs. Non-MSs (EFTA members) must apply the regulation as well according to the Decision of the EEA Joint Committee No 101/2006. In Appendix Tables SA2-SA4, monitoring programmes and control strategies in breeding flocks of *Gallus gallus* that are applied in different MSs are shown; in Appendix Tables SA5-SA5a and SA6, monitoring programmes and control strategies in laying hen flocks are shown. No requirements for the monitoring and control of other commercial poultry production systems have been applicable in 2008, but most MSs have national programmes for broilers (Appendix Tables SA7 and SA8), ducks (Appendix Tables SA11 and SA13), geese (Appendix Tables SA12 and SA13) and turkeys (Appendix Tables SA9 and SA10). Some MSs also monitor *Salmonella* in pigs (Appendix Tables SA14-SA16), cattle (Appendix Tables SA17-SA18) and other animals.

4. MATERIALS AND METHODS

Feedingstuffs

There is no common sampling scheme for feed materials in the EU. Results from compulsory and voluntary monitoring programmes, follow-up investigations, industry quality assurance programmes, as well as surveys, are reported (Appendix, Table SA1). The MS monitoring programmes often include both random and targeted sampling of feedstuffs that are considered at risk. Samples of raw material, materials during processing and final products are collected from batches of feedstuffs of domestic and imported origin. The reported epidemiological units were either "batch" (usually based on pooled samples) or "single" (often several samples from the same batch). As in previous years, most MSs did not separate data from the different types of monitoring programmes or data from domestic and imported feed. Therefore, it must be emphasised that the data related to *Salmonella* in feedstuffs cannot be considered national prevalence estimates. Moreover, due to the lack of a harmonised surveillance approach, information is not comparable between countries. Data are, nevertheless, presented in the same tables. Information was requested on feed materials of animal and vegetable origin and of compound feedstuffs (mixture of feed materials intended for feeding specific animal groups). Data for the detection of *Salmonella* in fishmeal, meat and bone meal, cereals, oil seeds and products and compound feed for cattle, pigs and poultry in 2006 to 2008 are presented. Single sample and batch based data from the different monitoring systems were summarised. Data were excluded when the number of tested units was missing.

4.3.2 *Campylobacter* data

Humans

The notification of campylobacteriosis is mandatory in most MSs, Switzerland, Iceland, Liechtenstein and Norway, except in six MSs, where notification is based on a voluntary (Belgium, Spain, France, Italy and the Netherlands) or other system (the United Kingdom) (Appendix Table CA2, information missing from Greece and Portugal). Most MSs have had notification systems in place for many years. However, Cyprus and Ireland have implemented their notification systems in recent years (2004 to 2005). Diagnosis of human infections is generally done by culture from human stool samples (Appendix Table CA1). In some countries, isolation of the organism is followed by biochemical tests for speciation.

Foodstuffs

In food, *Campylobacter* is reported notifiable in ten MSs (Austria, Belgium, the Czech Republic, Estonia, Spain, Italy, Latvia, the Netherlands, Slovakia and Slovenia) and Norway (Appendix Table CA2, information missing from Bulgaria, Cyprus, Germany, France, Lithuania, Luxembourg, Malta, Poland, Portugal and Romania), however several other MSs report data. At processing, cutting and retail, sampling was predominantly carried out on fresh meat. Food samples were collected in several different contexts, i.e. continuous monitoring or control programmes, screenings, surveys and as part of HACCP programmes implemented within the food industry (Appendix Table CA1). HACCP data is, however, not included in the report.

Animals

Campylobacter is notifiable in *Gallus gallus* in Finland and Norway, and in all animals in Belgium, Estonia, Spain, Ireland, Latvia, Lithuania, the Netherlands, and Switzerland (Appendix Table CA2, information missing from Bulgaria, Cyprus, France, Germany, Malta, Poland and Romania). The most frequently used methods for detecting *Campylobacter* in animals at farm, slaughter and in food were bacteriological methods ISO 10272 and NMKL 119 as well as PCR methods (Appendix Table CA1). In some countries, isolation of the organism is followed by biochemical tests for speciation. For poultry sampled prior to slaughter, faecal material was collected either as cloacal swabs or sock samples (faecal material collected from the floor of poultry houses by pulling gauze over footwear and walking through the poultry house). At slaughter, several types of samples were collected, including cloacal swabs, caecal contents, and/or neck skin.

4.3.3 *Listeria* data

Humans

The notification of listeriosis in humans is mandatory in most MSs, Switzerland, Iceland, Liechtenstein and Norway except in four MSs, where notification is based on a voluntary system (Belgium, Spain, the Netherlands, The United Kingdom) (Appendix Table LI2, information missing from Portugal). Diagnosis of human infections is generally done by culture from blood, cerebral spinal fluid and vaginal swabs.

Foodstuffs

Notification of *Listeria* in food was required in 11 MSs (Austria, Belgium, Estonia, Spain, France, Hungary, Italy, Latvia, the Netherlands, Slovakia and Slovenia), however several other MSs report data (Appendix Table LI2, information missing from Bulgaria, Cyprus, the Czech Republic, Germany, Denmark, Greece, Lithuania, Malta, Poland, Portugal and Romania). Commission Regulation (EC) No 2073/2005 on microbiological criteria for foodstuffs lays down food safety criteria for *Listeria monocytogenes* in ready-to-eat (RTE) foods. This regulation came into force in January 2006. National monitoring programmes and diagnostic methods for testing samples for *Listeria monocytogenes* are found in Appendix Table LI1. Surveillance in RTE foods was performed in most MSs. However, due to differences in sampling and analytical methods, comparisons from year-to-year and between countries were difficult.

Animals

Listeria in animals was notifiable in 12 MSs (Belgium, Germany, Estonia, Spain, Finland, Greece, Latvia, Lithuania, the Netherlands, Slovakia, Slovenia and Sweden), Switzerland and Norway (Appendix Table LI2, information missing from Bulgaria, Cyprus, Ireland, Malta, Poland and Romania). Monitoring of *Listeria* in animals is mainly conducted through passive, laboratory-based surveillance of clinical samples, active routine monitoring or random national surveys.

4.3.4 Tuberculosis data

Humans

The notification of tuberculosis in humans is mandatory in all MSs, Switzerland, Iceland, Liechtenstein and Norway (Appendix Table TB1). This is the first year that data for human tuberculosis due to *Mycobacterium bovis* was collected in TESSy. Unlike for other diseases, the data for tuberculosis represents the year 2007. The main differences with the previous reporting system in EuroTB were some adjustments of variables to be compatible with the TESSy format. In several of the reporting MSs, the notification system for human tuberculosis does not distinguish the tuberculosis cases caused by different species of *Mycobacterium*.

Animals

Tuberculosis in animals is notifiable in all MSs, Norway and Switzerland (Appendix Table TB1, information missing from Bulgaria and Malta). In Greece, Hungary, Poland and Romania only bovine tuberculosis is notifiable, and in Ireland only ruminant animals. Rules for intra-Community bovine trade, including requirements for cattle herds and country qualification as officially free from tuberculosis are laid down in Council Directive 64/432/EC, as last amended by Commission Decision 2007/729/EC. By the end of 2008, 11 MSs (Austria, Belgium, the Czech Republic, Germany, Denmark, Finland, France, Luxembourg, the Netherlands, Slovakia and Sweden), Switzerland and Norway were officially bovine tuberculosis-free (OTF). In Italy, 16 provinces and four regions have been declared OTF. An overview of the OTF status is presented in Appendix Table TB-BR1. In 2008, eradication programmes in cattle herds in Estonia, Spain, Italy, Poland, and Portugal received co-financing (Commission Decision 2007/782/EC as amended by 2008/920/EC).

4.3.5 *Brucella* data

Humans

The notification of brucellosis in humans is mandatory in almost all MSs, Switzerland, Iceland, Liechtenstein and Norway, (Appendix Table BR1, information missing from Greece and Portugal). Five MSs have a voluntary (Belgium, Spain, France, Italy and the Netherlands) or other (The United Kingdom) surveillance system.

Foodstuffs

The notification of brucellosis in food is mandatory in most MSs (Austria, Belgium, Spain, Finland, Italy, the Netherlands, Slovenia and The United Kingdom) (Appendix Table BR1, information missing from Bulgaria, Cyprus, the Czech Republic, Germany, Denmark, France, Greece, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania and Slovakia). In 2008, the presence of *Brucella* was reported from samples of milk and other dairy products from Italy. The samples were taken as part of a surveillance programme and a survey.

Animals

Brucellosis in animals is notifiable in most MSs, Switzerland and Norway (Appendix Table BR1, information missing from Bulgaria, Cyprus, Malta and Romania). In Ireland, only tuberculosis in ruminant animals is notifiable.

Cattle: Rules for intra-Community bovine trade, including requirements for cattle herds and country qualification as officially free from brucellosis are laid down in Council Directive 64/432/EC, as last amended by Commission Decision 2007/729/EC. By the end of 2008, 12 MSs (Austria, Belgium, the Czech Republic, Germany, Denmark, Finland, France, Luxembourg, the Netherlands, Slovenia, Slovakia and Sweden), Switzerland and Norway, were officially free from brucellosis in cattle (OBF). OBF regions have been declared in Italy (eight regions and 13 provinces), Portugal (four islands of the Azores) and in the United Kingdom (Great Britain) (Appendix Table TB-BR1). In 2008, eradication programmes in cattle herds in Cyprus, Spain, Ireland, Italy, Portugal and The United Kingdom (Northern Ireland) received co-financing (Commission Decision 2007/782/EC as amended by 2008/920/EC).

Sheep and goats: Rules for intra-Community trade of ovine and caprine animals and country qualification as officially free from ovine and caprine brucellosis caused by *B. melitensis* (ObmF) are laid down in Council Directive 91/68/EC, as last amended by the Commission Decision 2006/104/EC. By the end of 2008, 16 MSs (Austria, Belgium, the Czech Republic, Germany, Denmark, Finland, Hungary, Ireland, Luxembourg, the Netherlands, Poland, Romania, Slovenia, Slovakia, Sweden and The United Kingdom), Switzerland and Norway, were officially free from ovine and caprine brucellosis caused by *B. melitensis* (ObmF). ObmF regions have been declared in Spain (the Canary Islands), France (64 departments), Italy (nine regions and seven provinces) and Portugal (the Azores) (Appendix Table TB-BR1). In 2008, eradication programmes for ovine and caprine brucellosis in Cyprus, Spain, Italy and Portugal received co-financing (Commission Decision 2007/782/EC as amended by 2008/920/EC).

4.3.6 Rabies data

Humans

The notification of rabies in humans is mandatory in all MSs, Switzerland, Iceland, Liechtenstein and Norway (Appendix Table RA3). Most countries examine human cases based on blood samples or cerebrospinal fluid. However, in case of post mortem examinations, the central nervous system is sampled. Identification is mostly based on antigen detection, isolation of virus and the mouse inoculation test (Appendix Table RA2).

Animals

In accordance with Council Directive 64/432/EC, rabies is notifiable in animals in all MSs (Appendix Table RA3, information missing from Bulgaria, Ireland, Luxembourg, Malta and Romania). In animals, most countries test samples from the central nervous system. Identification is mostly carried out using the fluorescent antibody test (FAT), which is recommended by both WHO[1] and OIE[2] and the mouse inoculation test. However, ELISA, PCR and histology are also used (Appendix, Table RA2).

Belgium, Switzerland, the Czech Republic, Finland, France, Ireland, Luxembourg, Norway (mainland) and The United Kingdom have declared themselves free from rabies. Cyprus, Spain (mainland and islands), Greece, Italy, Malta and Sweden consider themselves free from rabies. See Appendix Table RA3 for more information.

4.3.7 VTEC data

Humans

In humans, the notification of VTEC infections is mandatory in most MSs, Switzerland, Iceland and Norway except for the United Kingdom (Appendix Table VT1, information missing from Liechtenstein). In France, only cases with HUS are notified. Diagnosis of human gastrointestinal infections is generally done by culture from human stool samples.

Foodstuffs and animals

VTEC in food is notifiable in nine MSs (Austria, Belgium, Estonia, Spain, Italy, Latvia, the Netherlands, Slovakia and Slovenia) and in animals in seven MSs (Belgium, Estonia, Spain, Finland, Lithuania, Latvia and Sweden) (Appendix Table VT1, missing information from Bulgaria, Cyprus, Germany, Denmark, France, Greece, Hungary, Ireland, Lithuania, Malta, Poland, Portugal and Romania), however several other MSs report data. Food samples were collected in a variety of settings, such as slaughterhouses, cutting plants, dairies, wholesalers and at retail level, and included different samples such as carcass surface swabs, cuts of meats, minced meat, milk, cheeses, and other products. The majority of investigated products were raw but intended to undergo preparation before being consumed. The samples were taken as part of official control and monitoring programmes as well as random national surveys. The number of samples collected and types of food sampled varied among individual MSs. Most of the animal samples were collected at the slaughterhouse or at the farm.

[1] WHO Laboratory techniques in rabies
[2] O.I.E. Manual of Diagnostic Tests and Vaccines for Terrestrial Animals

4.3.8. *Yersinia* data

Humans

Notification of yersiniosis in humans is mandatory in most MSs, Switzerland, Liechtenstein and Norway (Appendix Table YE1, missing information from Greece, Iceland, the Netherlands and Portugal). Four MSs (Belgium, Spain, France and Italy) have a voluntary notification system and the United Kingdom has another system. Diagnosis of human gastrointestinal infections is generally done by culture from human stool samples.

Foodstuffs and animals

Yersinia in food is notifiable in eight MSs (Austria, Belgium, Estonia, Spain, Italy, the Netherlands, Slovenia and Slovakia), and in animals in six MSs (Belgium, Spain, Ireland, Latvia, Lithuania and the Netherlands) (Appendix Table YE1, missing information from Bulgaria, Cyprus, the Czech Republic, Germany, Denmark, France, Greece, Hungary, Lithuania, Latvia, Malta, Poland, Portugal and Romania). Primarily domestic animals were tested, but only results from pigs are presented in the report. Reporting of specific human pathogenic serotypes found in food and animals are often missing, and differences in sampling and analytical methods, and sensitivity, make comparison between countries difficult.

4.3.9 *Trichinella* data

Humans

The notification of *Trichinella* in humans is mandatory in most MSs, Liechtenstein and Norway (Appendix Table TR2, information missing from Denmark and Iceland). Three MSs (Belgium, France and the United Kingdom) have a voluntary surveillance system for trichinosis. In humans, diagnosis of *Trichinella* infections is primarily based on clinical symptoms and serology (ELISA and Western Blot). Comparatively, histopathology on muscle biopsies is rarely performed.

Foodstuffs and animals

Trichinella in foodstuffs is notifiable in most MSs and Norway, except for Ireland (Appendix Table TR2, information missing from Bulgaria, Cyprus, the Czech Republic, Germany, Denmark, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland and Romania). *Trichinella* in animals is notifiable in most MSs, Switzerland and Norway, except for Hungary (Appendix Table TR2, information missing from Bulgaria, France, Malta and Romania).

Rules for testing for *Trichinella* in slaughtered animals are laid down by Commission Regulation (EC) No 2075/2005. In accordance with this regulation, all finisher pigs, sows, boars, horses, wild boars and some other wild species must be tested for *Trichinella* at slaughter. The regulation allows for the possibility that MSs can apply for status as a region with negligible risk of trichinellosis, and in 2007 Denmark was the first MS to be assigned this status. Some MSs reported using digestion and compression methods as described in Directive 77/96/EC (see Appendix Table TR1 for more information).

4.3.10 *Echinococcus* data

Humans

The notification of echinococcosis in humans is mandatory in most MSs, Liechtenstein and Norway (Appendix Table EH2, information missing from Denmark, Iceland and Italy). The Netherlands has no surveillance system for echinococcosis. Three MSs (Belgium, France and the United Kingdom) have a voluntary surveillance system for echinococcosis.

Foodstuffs and animals

In food, *Echinococcus* is notifiable in ten MSs (Austria, Belgium, Estonia, Spain, Finland, Hungary, Italy, the Netherlands, Slovenia and Sweden) and Norway, and is notifiable in animals in most MSs, Switzerland and Norway, except for the the Czech Republic, France, Hungary, Luxembourg and the United Kingdom (Appendix Table EH2, information missing from Bulgaria, the Czech Republic, Cyprus, Germany, Denmark, France, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal and Romania).

Guidelines for the control of the *E. granulosus* through meat inspection of animal carcasses for human consumption are provided through Council Directive 64/433/EC, whereby visual inspection of all slaughtered animals is carried out by official veterinarians examining organs and muscles intended for human consumption. Whole carcasses or organs are destroyed in cases where *Echinococcus* cysts are found. An overview of the monitoring and diagnostic methods is set out in Appendix, Table EH1.

4.3.11 Q fever data

Humans

The notification of Q fever in humans is mandatory in most MSs and Norway (information missing from AT, Denmark, Iceland and Liechtenstein). Four MSs (Belgium, Spain, France and the United Kingdom) have a voluntary surveillance system for Q fever in humans.

Animals

Data reported is mostly based on suspicious sampling due to an increase in abortions in the herd.

4.3.12 Data on food-borne outbreaks

Food-borne 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. Situations, in which the observed human cases exceed the expected number of cases and where the same food source is suspected, is also indicative of a food-borne outbreak.

Information on the total number of food-borne outbreaks (including both possible and verified food-borne outbreaks) and the total number of verified food-borne outbreaks that occurred during the reporting year is provided by 25 MSs and two non-MSs. For possible food-borne outbreaks, the causative agent, human cases, hospitalisations, and deaths should be reported. For the verified food-borne outbreaks, an additional table is available to collect more detailed information. Aggregated data is presented in overview tables only, since such data will not allow more detailed analysis.

4. MATERIALS AND METHODS

4.4 Terms used to describe prevalence or proportion positive values

In the report a set of standardised terms are used to describe the proportion of positive sample units or the prevalence of zoonotic agents in animals and foodstuffs:

- Rare: <0.1%
- Very low: 0.1% to 1%
- Low: >1% to 10%
- Moderate: >10% to 20%
- High: >20% to 50%
- Very high: >50% to 70%
- Extremely high: >70%

- Majority of MSs: 60% (in 2008 this was 16 MSs)
- Most MSs: 75% (in 2008 this was 20 MSs)

APPENDIX 1

APPENDIX 1. LIST OF ABBREVIATIONS

cfu	Colonies Forming Unit
EBLV	European Bat *Lyssavirus*
EC	European Commission
ECDC	European Centre for Disease Prevention and Control
EEC	European Economic Community
EFSA	European Food Safety Authority
EU	European Union
EUROSTAT	Statistical Office of the European Communities
g	Gram
HACCP	Hazard Analysis and Critical Control Point
HUS	Haemolytic Uraemic Syndrome
MS	Member State
OBF	Officially Brucellosis Free
OBmF	Officially *Brucella melitensis* Free
OTF	Officially Tuberculosis Free
RTE	Ready-to-eat
spp.	Subspecies
TESSy	The European Surveillance System
VTEC	Verotoxigenic *Escherichia coli*
WHO	World Health Organization
ZCC	Zoonoses Collaboration Centre

APPENDIX 1

Member States of the European Union and other reporting countries in 2008

Member States of the European Union, 2008

Member State	ISO Country Abbreviations 2008 Report
Austria	AT
Belgium	BE
Bulgaria	BG
Cyprus	CY
Czech Republic	CZ*
Denmark	DK
Estonia	EE
Finland	FI
France	FR
Germany	DE
Greece	GR
Hungary	HU
Ireland	IE
Italy	IT
Latvia	LV
Lithuania	LT
Luxembourg	LU
Malta	MT
Netherlands	NL*
Poland	PL
Portugal	PT
Slovakia	SK
Slovenia	SI
Spain	ES
Romania	RO
Sweden	SE
United Kingdom	UK*

* In text, referred to as the Netherlands and the United Kingdom

Non- Member States reporting in 2008

Country	ISO Country Abbreviations 2008 Report
Iceland	IS
Liechtenstein	LI
Norway	NO
Switzerland	CH