Technical University of Denmark Microbiological contaminants in food in the European Union in 2004-2009

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EXTERNAL SCIENTIFIC REPORT

Microbiological contaminants in food in the European Union in 2004-2009[1]

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Abstract

An in-depth analysis of the most comprehensive dataset on microbiological contaminants in foodstuffs in the EU is presented in this report for the years 2004-2009. The report covers findings of *Salmonella*, *Campylobacter*, *Listeria*, *Yersinia*, verotoxigenic *Escherichia coli* (VTEC), *Brucella*, as well as histamine, *Enterobacter sakazakii* and staphylococcal enterotoxins in foodstuffs. Information on the latter three is presented for the first time and covers the period 2006-2009.

The total number of samples reported by Member States (MSs) was large, however when the data were broken down to the fine level of categorization required in this report, they were often too sporadic for calculations of EU or MS group totals. Conclusions regarding temporal trends are therefore based on the interpretation of descriptive tables and figures.

Generally, there were no clear changes in the proportion of positive samples at different sampling stages along the food chain. However, it should be emphasized that the vast majority of investigations on ready to eat food (RTE) products for all six years revealed no or very low levels of microbiological contaminants.

In 2008 and 2009, the proportion of *Salmonella* positive samples in meat and meat products tested at retail seemed to stabilize at the relatively low level of approximately 1% compared to previous years. This may be a consequence of the microbiological criteria that came into force in 2006.

For *Salmonella*, *Listeria*, histamine, *Enterobacter sakazakii* and staphylococcal enterotoxins microbiological criteria are set in the Regulation (EC) No 2073/2005 and most investigations were in compliance with the criteria.

KEY WORDS

Zoonoses, microbiological contaminants, *Salmonella*, *Campylobacter*, *Listeria*, *Yersinia*, verotoxigenic *Escherichia coli* (VTEC), *Brucella*, histamine, *Enterobacter sakazakii* and staphylococcal enterotoxins, microbiological food safety criteria.

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Summary

Zoonotic and non-zoonotic microbiological contaminants in foodstuffs can cause human disease. Zoonotic pertains to zoonoses, which are diseases that may be transmitted between animals and humans. Such infections can be acquired directly from animals or through ingestion of contaminated foodstuffs. Non-zoonotic contaminants are not transmissible between animals and humans. The severity of these diseases in humans can vary from mild symptoms to life-threatening conditions.

During the years 2004 to 2009, EU Member States (MSs) submitted information on zoonotic microbiological contaminants (*Salmonella*, *Campylobacter*, *Listeria*, *Yersinia*, verotoxigenic *Escherichia coli* (VTEC), *Brucella*) and non-zoonotic microbiological contaminants (histamine, *Enterobacter sakazakii* and staphylococcal enterotoxins) in food to the zoonoses database at the European Food Safety Authority (EFSA). Norway and Switzerland also provided information.

This report presents a detailed description of the sampling activity over the years, the quality of data reported by MSs, and an in-depth analysis of the occurrence of microbiological contaminants in domestically produced foodstuffs. From 2004-2009, MSs reported tests results from more than 5.5 million samples and non-MSs from more than 200,000 samples from different foodstuffs. Most of these investigations were assumed to reflect the occurrence of microbiological contaminants in domestically produced foodstuffs, however some of the data were reported as HACCP, own-check and outbreak/clinical investigations or described as import, selective or suspect sampling. Due to heterogeneity in the sampling schemes for such data, they are difficult to interpret with regard to the overall occurrence of microbiological contaminants in domestically produced foodstuffs and have therefore not been included in the analyses. However, the data can be of great value in relation to outbreak investigations and as input data for risk assessments.

Specific information on sampling stage and sampling unit is essential if MS data are to be comparable, and data without such information have therefore also been excluded from the detailed analyses of the microbiological contaminants in Chapter 3. Initially, 86% of the reported samples were assumed to be representative of the occurrence of microbiological contaminants in domestically produced food. However, when samples without specific sampling unit and/or sampling stage information were excluded, only 44% of all data reported for 2004 to 2009 could be considered for in-depth analyses. Furthermore, some investigations were reported without specific indication of e.g. animal species, type of vegetable or type of cheese. Due to the difficulty concerning the interpretation of these data, they were generally excluded from the analyses and discussions. Fortunately, since 2007 the quality of reported data has improved greatly.

The total number of samples reported by MSs was large, however when data were broken down to the fine level of categorization required in this report, data were often too sporadic for calculation of EU totals. The available data did not meet the criteria required for statistical analysis of temporal trends and therefore conclusions regarding temporal trends had to be made based on the interpretation of descriptive tables and figures alone.

For some foodstuffs, the occurrence of microbiological contaminants increased along the food production chain, which indicates either cross-contamination during production or microbiological growth during shelf-life. For other foodstuffs, the occurrence of microbiological contaminants decreased along the food production chain. This may be explained by reducing steps such as heat treatment, and may be illustrated by the example that RTE food in most cases was less frequently contaminated with *Salmonella* than non-RTE food.

Despite the large amount of data reported on *Salmonella*, very few clear temporal trends could be demonstrated. In 2008 and 2009, the proportion of *Salmonella* positive samples in meat tested at retail seemed to stabilize at a relatively low level of approximately 1% compared to previous years where the proportions were above 1.3%. This might be a consequence of the microbiological criteria that came into force in 2006. However, since meat from poultry, pigs, bovine animals and eggs is widely

consumed throughout the EU, the continued presence of *Salmonella* in these foodstuffs is likely to contribute considerably to *Salmonella* exposure.

The lowest level of compliance to the *Salmonella* food safety criteria were reported for minced meat and meat preparations made from poultry meat intended to be eaten cooked. During the period 2006 to 2009, number of investigations in compliance increased for minced meat, meat preparations and meat products from poultry meat intended to be eaten cooked (batched based data). No obvious trends were observed for the other food categories during this period.

For *Campylobacter*, poultry meat was the food vehicle with the highest proportions of positive samples compared to pig and bovine meat for all years. Generally, less data were reported on RTE products than on non-RTE products. In RTE products, *Campylobacter* was only reported in a few cases and at low proportions.

A substantial amount of data was reported on *Listeria monocytogenes* by MSs, especially from retail level. The majority of the samples were collected from different types of RTE meat products. *L. monocytogenes* was found more frequently in bovine meat products compared to pig meat products and poultry meat products.

Fishery products, soft cheeses and meat products were the food categories most frequently found to be in non-compliance with the *L. monocytogenes* food safety criteria. Relative high levels of non-compliance were also found among samples reported as 'Other RTE products' tested at processing. From 2006 to 2009, a decrease in number of investigations in non-compliance was observed in fish and fishery products tested both at processing and retail, as well as for soft cheeses tested at processing

Data on *Yersinia* were most often reported in pig meat. Very little data were reported specifically on *Yersinia enterocolitica* and most of these originated from non-RTE pig and bovine meat sampled at retail. Unfortunately, information regarding the presence of human pathogenic biotypes was available from only a few investigations.

VTEC was reported from several different types of foods, but generally the occurrence of VTEC, and particularly VTEC O157 was low. Information on serogroup was sparse, but five (O26, O91, O103, O111 and O157) of the six serogroups considered the most important regarding pathogenicity to humans, were reported. Data on VTEC in fruit and vegetables were very limited, but several investigations indicated that vegetables were a source of human VTEC O157 infections.

Data on the three non-zoonotic microbiological contaminants histamine, *Enterobacter sakazakii* and staphylococcus enterotoxins were analysed for the first time for the years 2006-2009. The Regulation (EC) No 2073/2005 on microbiological criteria for foodstuffs came into force in 2006 and this was the first year MSs reported data on these contaminants. However, little data have been reported and the data clearly reflect the foodstuffs included in the microbiological criteria. Due to the small amount of available data, all data, except for HACCP related data were included for analyses. Presence of histamine was reported in fish and fishery products and few MSs reported high levels, especially at retail. Some of these results were not in compliance with the microbiological criteria. For *Enterobacter sakazakii*, the majority of data were reported on dried infant formulae and dried dietary foods for special medical purpose intended for infants below six months of age. Several MSs reported positive findings in these products which are in non-compliance with the microbiological criteria. Positive findings for staphylococcus enterotoxins were reported for samples of milk, cheese and other dairy product. Positive findings in cheeses, milk powder and whey powder are in non-compliance with the microbiological criteria. A full evaluation of the microbiological criteria for the three non-zoonotic microbiological contaminants was not possible due to missing information.

For most microbiological contaminant-food stuff combinations, very little consistency was observed concerning reporting from individual MSs during the period. Therefore, statistical trends could not be evaluated at EU or MS group level. There were no clear changes in the proportion of positive samples

at different sampling stages along the food chain. However, it should be emphasized that the vast majority of investigations on RTE products for all six years revealed no or very low levels of microbiological contaminants.

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Background as provided by EFSA

The European Union (EU) system for the monitoring and collection of information on zoonoses is based on the Zoonoses Directive 2003/99/EC[2], which obligates the EU Member States (MSs) to collect, evaluate and report data on zoonoses, zoonotic agents, antimicrobial resistance and food-borne outbreaks to the European Commission each year. Data are reported through a web based reporting system maintained by European Food Safety Authority (EFSA).

In the context of the reporting under Directive 2003/99/EC, MSs and other reporting countries (non-MSs) have provided information on the zoonotic microbiological contaminants *Salmonella, Campylobacter, Listeria, Yersinia,* verotoxigenic *Escherichia coli* (VTEC), *Brucella* included in the present report. Further, several MSs have also provided data on the non-zoonotic microbiological contaminants histamine, *Enterobacter sakazakii* and staphylococcal enterotoxins in food. EFSA has been assigned the tasks of examining the data and publishing the annual EU Summary Report from the results. The report is prepared in collaboration with the European Centre for Disease Control and Prevention (ECDC), who provides and analyses the data on the human zoonoses cases, and with the assistance of EFSA's Zoonoses Collaborating Centre. The EU Summary Report with 2009 data was published on EFSA website in January 2011[3].

The annual EU Summary Reports on zoonoses cover a wide range of different agents in humans, food, animals and feed. Therefore, the space available for the analyses of the zoonotic agents and other microbiological contaminants in food in these reports is limited and typically only descriptive summaries of the most relevant data reported have been included each year. This means that not all the data and not all the different aspects of the data have been analysed and reported. For example, the data received have not been broken down to the finest level of food categorisations due to the space limitations in the report. Furthermore, the data on the non-zoonotic microbiological contaminants from the years 2006 to 2009 have never been analysed.

Food is the most important vehicle for zoonotic infections in human across the Europe, and comprehensive and in-depth analyses of the available data would provide additional information on occurrence of these contaminants in different types of foods at different stages of the food chain. The analyses may also provide an overview of MSs current sampling and testing activities in these fields. Furthermore, the pooling of the datasets from all the years could enable appropriate comparison of the data derived from different sampling stages.

[2] 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)

[3] The European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and food-borne outbreaks in 2009, The EFSA Journal 2011; 9(3):2090.

Terms of reference as provided by EFSA

The purpose of the assignment is to analyse in depth the occurrence of microbiological contaminants in food from data submitted by the EU MSs and reporting non-MSs under the Directive 2003/99/EC during the years 2004 to 2009 and to submit a report on the results.

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Introduction and Objectives

INTRODUCTION

The EU system for the monitoring and collection of information on zoonoses is based on the Zoonoses Directive 2003/99/EC[4], which obligates EU 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 investigate food-borne outbreaks in their territory. National reports must be transmitted to the European Commission covering the data collected. EFSA is assigned the tasks of examining these data and publishing results in EU summary reports.

This report presents data related to the occurrence of zoonotic and non-zoonotic microbiological contaminants in food collected in the framework of Directive 2003/99/EC during the period 2004 - 2009.

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.

[4] 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. 31-40.

OBJECTIVES

The specific objectives are:

To analyse in-depth data reported under the Directive 2003/99/EC by the EU MSs and reporting non-MSs on the occurrence of microbiological contaminants in food in years 2004-2009.

To prepare a report from the results of these analyses including:

in-depth descriptive analyses of the occurrence of zoonotic microbiological contaminants (*Salmonella, Campylobacter*, *Listeria, Yersinia*, verotoxigenic *Escherichia coli* (VTEC), *Brucella*) and non-zoonotic (histamine, *Enterobacter sakazakii*, staphylococcal enterotoxins) microbiological contaminants in different food categories based on a dataset provided by EFSA,

comparison of the occurrence of the contaminants in different reporting years and sampling stages including, when possible, statistical analyses of trends over years,

analyses of the information provided on agent species, serotypes and serovars in different foodstuff categories when the data were available and relevant,

an overview of the numbers of units tested for different contaminant-foodstuff combinations at different sampling stages over the years 2004 to 2009 and addresses the limitations of data.

1. Materials and Methods

1.1. Data origin

Information reported by MSs and non-MSs on the five zoonotic microbiological contaminants (*Salmonella*, thermotolerant *Campylobacter*, *Listeria monocytogenes*, *Yersinia*, verotoxigenic *E. coli* and *Brucella*) and three non-zoonotic microbiological contaminants (histamine, *Enterobacter sakazakii* and staphylococcal enterotoxin) in food included in the present report was reported during the years 2004-2009 as part of the mandatory reporting according to Directive 2003/99/EC[5]. Countries have submitted data on food using a web-based zoonoses reporting system maintained by EFSA. An overview of countries reporting in different years is provided in Table MM1.

[5] 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.

Table MM1. Number of Member States and non-Member States submitting data on food, 2004-2009

Years	Reporting MSs	Reporting non-MSs	
2004	all 25 MSs	One non-MS	(Norway)
2005	23 MSs (Hungary and Malta did not report)	Two non-MSs	(Norway and Switzerland)
2006	23 MSs (Cyprus and Malta did not report)	Four non-MSs	(Bulgaria, Norway, Romania and Switzerland)
2007[(a)]	26 MSs (Cyprus did not report)	Two non-MSs	(Norway and Switzerland)
2008	26 MSs (Cyprus did not report)	Two non-MSs	(Norway and Switzerland)
2009	all 27 MSs	Two non-MSs	(Norway and Switzerland)

(a): In 2007, Bulgaria and Romania joined the European Union.

In some MSs, microbiological contaminants in food are notifiable, in other MSs they are not notifiable or no information has been reported; for detailed information on this issue please refer to the appendices in the annual EU Summary Reports 2004-2009.

For the zoonotic microbiological contaminants, differences in sampling strategies and analytical methods have made comparisons from year-to-year and between countries difficult. For a description of monitoring schemes and diagnostic methods in individual MSs, please refer to the appendices in the annual EU Summary Reports 2004-2009. For the non-zoonotic microbiological contaminants, the sampling strategy and analytical methods used are laid down in the EU Regulation (EC) No 2073/2005 as amended, however the very sporadic reporting's have made comparison between MS difficult.

1.2. Criteria for data inclusion

Data presented in this report were selected in order to describe occurrence of zoonotic and non-zoonotic microbiological contaminants in domestically produced foods and to detect temporal trends whenever possible.

A descriptive analysis of the sampling and testing activities in MSs during the period 2004 to 2009 is presented for the first time (Chapter 2). For this particular analysis, all data were included in order to give an overview of the quality of data reported by MSs.

For the analyses of the occurrence of microbiological contaminants, the following data were not considered to reflect prevalence of microbiological contaminants in domestically produced food and therefore excluded from this part of the report (Chapter 3):

data on imported foods, because this report focus on the occurrence of microbiological contaminants in domestically produced food (except for data on histamine),

biased data, such as outbreak related data and data from selective, clinical and suspect sampling collected due to suspicion or animal disease, because these data do not reflect the occurrence at national level,

data from caecal and faecal samples, as well as environmental samples, because this data were considered non-food samples,

data described as HACCP/own-check, because these data may be biased or from non-food samples,

baseline data, because these data were collected in a very specific context and were not comparable to the national surveillance data. Further, these data have been analysed in-depth and published in separate reports,

data with missing information on sampling stage, because there is uncertainty as to how these data should be interpreted for increases or decreases of the microbiologic contaminants occur along the food chain from slaughterhouse to retail,

data with missing information on sampling unit, because sensitivity differs importantly when single and batch samples are monitored.

The minimum number of samples for a foodstuff/sampling stage combination to justify inclusion in a table was kept at 25 as in EU Summary Reports; if a MS reported data from several identical investigations and these summed up to 25 or more, the information was included in the relevant table.

There were some exceptions to the above mentioned inclusion criteria. All data on *Salmonella* and VTEC serovars were included due to the scarcity of such data. Also, all data on the non-zoonotic microbiological contaminants (histamine, *Enterobacter sakazakii*, staphylococcal enterotoxins) were included, because as these data have not previously been described or presented. Non-MSs were not included in these calculations.

Furthermore, data from at least five MSs should be available to warrant the presentation of data in a table or a figure as in the EU Summary Reports. For MS-group totals to be calculated, a minimum of five MSs must be included and for results to be considered applicable for the whole EU a minimum of 20 MSs are required.

Data from national surveys were not included in the tables and figures but when relevant they were mentioned in the text. Survey data often target a very specific area and are not comparable to the national surveillance data.

Information on the food category, food sub-category, foodstuffs, sampling stages, and ready-to-eat (RTE) status were included in tables when relevant and available. Data derived from single samples and batches were presented separately throughout the report except for data on *Salmonella* and VTEC serovars. The total number of samples presented for a food category may vary in different tables and figures depending on the level of information included.

In the tables, results from several investigations were summarized when representing the same foodstuff category, sampling stage and sampling unit. An investigation is a data entry into the EFSA's zoonoses database and represents an aggregation done at MSs level of samples of same characteristics.

1.3. Temporal trend analysis

Trend analysis at EU or country group level were to be carried out when data complied with the suggestions set in the report on **Technical specifications for monitoring European Union trends in zoonotic agents in foodstuffs** and animal populations[6] using weighted regression analysis as in the EU Summary Report from 2009[7]. Only MSs with sufficient data according to the suggestions set out in the technical report were considered for analysis for temporal trends at EU or MSs group level (Table MM2). The availability of appropriate data on national food productions of countries included in the weighted regression analysis was a prerequisite to test a temporal trend at EU level. In line with the annual EU summary report, five MSs with sufficient data are required to carry out the analysis. After validation of data, it became clear the above criteria were not met for any food stuff/contaminant combination. Therefore, no temporal trend analysis was carried out in the present report.

[6] Technical specifications for monitoring Community trends in zoonotic agents in foodstuffs and animal populations, EFSA Journal 2010; 8(3):1530.

[7] The European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and food-borne outbreaks in 2009, The EFSA Journal 2011; 9(3):2090.

Table MM2. Minimum sampling size and minimum number of reporting years[8] for MS inclusion in temporal trend analysis

Proportion of positive	No of years	No of samples per year
50% at first data point and 10% decreasing	3	245
	4	65
2% at first data point and 10% decreasing	5	615
	6	375

1.4. Data sources

Salmonella data

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 and was modified by Regulation (EC) No 1441/2007, entering into force in December 2007.

Sampling schemes for monitoring *Salmonella* in foodstuffs e.g. place of sampling, sampling frequency and diagnostic methods vary between MSs and food types. Data presented were collected at all sampling stages; farm, slaughterhouse, processing and retail, and covered both single sample and batch based data. The monitoring schemes were based on different types of samples, such as neck skin samples, carcass swabs, meat cuttings, meat preparation and ready-to-eat (RTE) products.

Information on *Salmonella* serotype distribution was not consistently provided by all MSs. Most MSs reported a subset designated "other serotypes". For some MSs, this may include isolates belonging to the ten most common serovars in EU and the relative EU occurrence of some serovars was underestimated. This may affect the ranking of *Salmonella* serovars within each relevant food category because this was calculated by summing the number of each serotype across all countries.

Isolates of S. Typhimurium include the monophasic variants with antigenic formulas S. 1,4,5,12:i:-, S. 4,12:i:- and S. 4,5,12:i:- as suggested in the Scientific Opinion on monitoring and assessment of the public health risk of "*Salmonella* Typhimurium-like" strains[8].

Campylobacter data

Data presented for *Campylobacter* were predominantly sampling of fresh meat at processing/cutting plants and retail and collected in connection with continuous monitoring or control programmes.

Listeria data

Commission Regulation (EC) No 2073/2005 on microbiological criteria for foodstuffs lays down food safety criteria for *Listeria monocytogenes* in RTE foods. This regulation came into force in January 2006.

The majority of data were based on single samples and RTE food products. Surveillance in RTE food products was performed in most MSs. Samples were collected at all sampling stages and covered a wide range of products; e.g. fresh meat, meat products, vegetables, milk, fish.

[8] Scientific Opinion of monitoring and assessment of the public health risk of "*Salmonella* Typhimurium-like" strains. EFSA Journal 2010;8(10):1826.

Yersinia data

The majority of samples for analysis for *Yersinia* were collected at retail and mainly from meat from pigs and bovine animals, e.g. fresh meat, meat preparations, meat products and minced meat. The reporting of specific human pathogenic serotypes/biotypes found in food was often missing.

VTEC data

Samples for analysis for VTEC were collected at all sampling stages such as slaughterhouses, cutting plants, dairies, wholesalers and retail, and included different samples such as carcass surface swabs, cuts of meats, minced meat, milk, cheese, and other products. The majority of investigated products were raw and intended to undergo preparation before consumption. The samples were taken as part of official control and monitoring programmes as well as random national surveys.

Brucella data

Only three MSs reported data on *Brucella* and provided information on milk and cheese. For a description of monitoring schemes and diagnostic methods in individual MSs, please refer to the appendices in the annual EU Summary Reports 2004-2009.

Histamine data

The EU Regulation (EC) No 2073/2005 as amended lays down food safety criteria for histamine in certain fish and fish products from fish species associated with a high amount of histidine.

MSs reported data on histamine for the first time in 2006 and the data were analysed and reported for the first time in the present report. In total, 19 MSs and one non-MS provided data during the period 2006-2009. Due to the limited dataset, data on imported food and data based on suspect sampling and surveys were included in the analyses as well as data with no information on sampling stage (e.g. slaughterhouse, retail). Further, investigations with less than 25 samples were also included.

Data based on HACCP and own-check sampling or with no information on sampling unit (single/batch) were excluded.

Enterobacter sakazakii data

The EU Regulation (EC) No 2073/2005 as amended lays down food safety criteria for *Enterobacter sakazakii* in dried infant formulae and dried dietary foods for special medical purpose intended for infants below six months of age.

MSs reported data on *Enterobacter sakazakii* for the first time in 2006 and the data were analysed and reported for the first time in the present report. In total, 14 MSs have provided data during the years 2006-2009. Due to the limited dataset, data on imported food and data based on suspect sampling and surveys were included in the analyses as well as data with no information on sampling stage (e.g. slaughterhouse, retail). Further, investigations with less than 25 samples were also included.

Data based on HACCP and own-check sampling or with no information on sampling unit (single/batch) were excluded.

Staphylococcal enterotoxins data

The EU Regulation (EC) No 2073/2005 as amended lays down food safety criteria for staphylococcal enterotoxins in cheeses, milk powder and whey powder.

MSs reported data on staphylococcal enterotoxins for the first time in 2006 and the data were analysed and reported for the first time in the present report. In total, 14 MSs provided data from 2006 to 2009. Due to the limited dataset, data on imported food and data based on suspect sampling and surveys were included in the analyses as well as data with no information on sampling stage (e.g. slaughterhouse, retail). Further, results with less than 25 samples were also included. For all food categories except milk, cheese and other dairy products, MSs only reported single sample.

Data based on HACCP and own-check sampling or with no information on sampling unit (single/batch) were excluded. Data on *S.* aureus, methicillin resistant (MRSA) was not included.

1.5. Terms used to describe occurrence/prevalence or proportion-positive values

In the report a set of standardised terms are used to characterize 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%

2. Overview of sampling and testing activities in EU

EFSA's zoonoses database on Zoonosis contains the most comprehensive collection of data on zoonotic agents, antimicrobial resistance and other microbiological contaminants in food and animals in the EU. Since 2004, MSs have allocated substantial resources for reporting information from an extensive number of samples, detailed descriptions of monitoring systems and general evaluations of the national situation to the EFSA's zoonoses web database.

This chapter contains a general presentation of the quantity and quality of foodstuff data reported into the EFSA's Database by MSs during the period 2004-2009, based on an updated dataset extracted by EFSA on 16 February 2011. A general section presenting all submitted data will be followed by individual sections for each microbiological contaminant included in the report. Such an overview of sampling intensity and data quality has not previously been presented in detail and will provide an outline on how the numbers of reporting MSs and the volume of data have changed over the years. Most results will be presented in summary figures, either as number of reporting MSs or numbers of samples tested (pooled for sampling unit and often also for sampling stages). Appendix A presents microbiological contaminant specific tables listing reporting countries and numbers of reported single samples, batches and unspecified sampling unit for each sampling stage for different food stuffs.

EFSA's zoonoses web-based reporting system allows reporting officers in each MS to enter data concerning microbiological contaminants in foodstuffs, animals and feedstuffs collected through a variety of different systems, i.e. official monitoring and control programmes, HACCP and own-check programmes, surveys and baseline-studies. EFSA's web application has a detailed hierarchical structure and data are entered into the database by use of a number of predefined tables, pick-lists for variables, and text templates. The reporting officer may also add comments and footnotes to the tables if relevant. However, the same type of information, such as sampling unit or sampling stage, can be entered not only in the designated fields, but also in free-text fields. In order to include as much relevant information as possible, the dataset was scanned for misplaced information. Thus, tables presented in this report, cannot be completely reconstructed by using data directly from the database. It should also be noted that corrections requested by MSs during consultation of the annual EU summary reports that were not entered into the web database by 16 February 2011, as well as corrections requested by MSs during the consultation of the present report, were not included in this chapter. From December 2010 to January 2011, each reporting country was asked to validate the data reported on foodstuffs from 2004-2009 and corrections were implemented in the dataset used for the present report. During this period the EFSA's zoonoses web application was not open for amendments of historical data.

In EFSA's database, results are reported in an aggregated form, presenting numbers of tested and positive samples from national investigations covering specific foodstuffs and sampling conditions in a single record. In this report, each separate data line/record entered into the EFSA's database was considered one investigation. In the tables and figures, results from more investigations can be summarized when representing the same foodstuff category, sampling stage as well as sampling unit.

2.1. General overview

EFSA's Zoonosis database on foodstuffs contains results of investigations which represents the occurrence of microbiological contaminants in domestically produced foodstuffs. Data on HACCP, own controls and outbreak/clinical investigations or described as import, selective or suspect sampling are difficult to interpret with regard to the prevalence of microbiological contaminants in domestically produced foods are also reported by MSs . However, these data contain important information for outbreak investigations as well as they can serve as valuable input data for risk assessments.

Only relatively few MSs have in individual years reported data that could be described as non-representative of the occurrence of contaminants in domestically produced foods (Figure DA1), however the number of MSs reporting data from HACCP and own control programs, import control, as well as data submitted by MSs as being collected in a biased way, (e.g. as clinical or outbreak investigations, suspect sampling or selective sampling) have increased over the years. This probably reflects that more MSs are collecting samples and reporting to EFSA, but could also be due to a better reporting of the information on sampling context. For the analyses in the present report, data with no information on sampling context were assumed to be representative for the occurrence of microbiological contaminants in domestically produced foods and thus included in the analysis (Figure DA1).

Tables DA1 and DA2 present the total number of investigations and samples reported by MSs and non-MS per year from 2004 to 2009, and Tables DA3 and DA4 in Appendix A present the number of investigations and samples per country pooled for the six year period. Over the years, 9% of the investigation submitted by MSs (representing 12% of samples) originated from HACCP and own control programmes, these data were reported by eight MSs. Twenty MSs reported investigations from import control, however import only represent 1% of the reported investigations and 1% of the samples. Only 2% of the investigations (0.2% of samples) submitted by 16 MSs were described as being collected in a biased way, e.g. as clinical or outbreak investigations, suspect or selective sampling. Most of the included investigations described as baseline data originated from the baseline survey on broiler carcasses conducted in 2008. A few investigations were not food-related (0.4%) and referred to sampling in animals (caecum, faeces, and lymph nodes) or environmental samples.

Overall during 2004 to 2009, 12% of the investigations (14% of samples) submitted by MSs and 16% of the investigations (16% of samples) submitted by non-MSs could be described as non-representative of the occurrence of contaminates in domestically produced foods.

It should be noted that an increase of investigations in terms of number of records reported by MSs over the years may reflect the reporting of non-aggregated data by some MSs rather than a true increase in the number of reported investigations.

Table DA1. Total number of investigations[(a)] in the food section of the EFSA database, listed as HACCP, baseline, biased, import, non-food and data included for further analysis, 2004-2009

	HACCP	Baseline	Biased[(b)]	Import	Non-food[(c)]	Included in analysis
MSs[(d)]						
2004	165	-	1	33	31	1,643
2005	97	-	8	7	7	2,159
2006	195	-	19	3	12	2,493
2007	248	1	26	5	3	2,884
2008	547	27	152	83	11	3,989
2009	416	2	93	74	4	3,064
Non-MSs[(d)]						
2004	-	-	-	5	1	13
2005	2	-	-	-	2	12
2006	-	-	-	1	6	121
2007	-	-	-	-	2	24
2008	24	4	-	2	1	31
2009	-	-	-	-	-	43
MSs total	1668	30	299	205	68	16,232
Non-MSs total	26	4	-	8	12	244

(a): An investigation is a data line/record entered into the EFSA's database. An investigation may consist of single sample or batch based data.
(b): Biased: Clinical investigations, suspect sampling, and selective sampling.
(c): Non-food: Samples that refers to animal status (caecum, faeces, lymph nodes) and environmental samples.
(d): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA2. Total number of samples (single samples and batches) in the food section of the EFSA database, listed as HACCP, baseline, biased, import, non-food and data included for further analysis, 2004-2009

	HACCP	Baseline	Biased[(a)]	Import	Non-food[(b)]	Included in analysis
MSs[(c)]						
2004	47,635	-	1	26,837	15,587	785,741
2005	30,397	-	1,820	435	13,652	640,516
2006	29,911	-	1,237	1,938	15,250	727,620
2007	26,087	659	518	257	949	999,705
2008	321,974	9,982	3,999	2,338	2,633	788,355
2009	194,373	760	3,604	1,648	3,414	746,084
Non-MSs[(c)]						
2004	-	-	-	16,925	650	21,651
2005	2,354	-	-	-	1,726	17,491
2006	-	-	-	111	3,686	99,602
2007	-	-	-	-	142	15,368
2008	4,774	1,590	-	1,264	337	7,563
2009	-	-	-	-	-	12,584
MSs total	650,377	11,401	11,179	33,453	51,485	4,688,021
Non-MSs total	7,128	1,590	-	18,300	6,541	174,259

(a): Biased: Clinical investigations, suspect sampling, and selective sampling.
(b): Non-food: Samples that refers to animal status not food (caecum, faeces, lymph nodes) and environmental samples.
(c): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

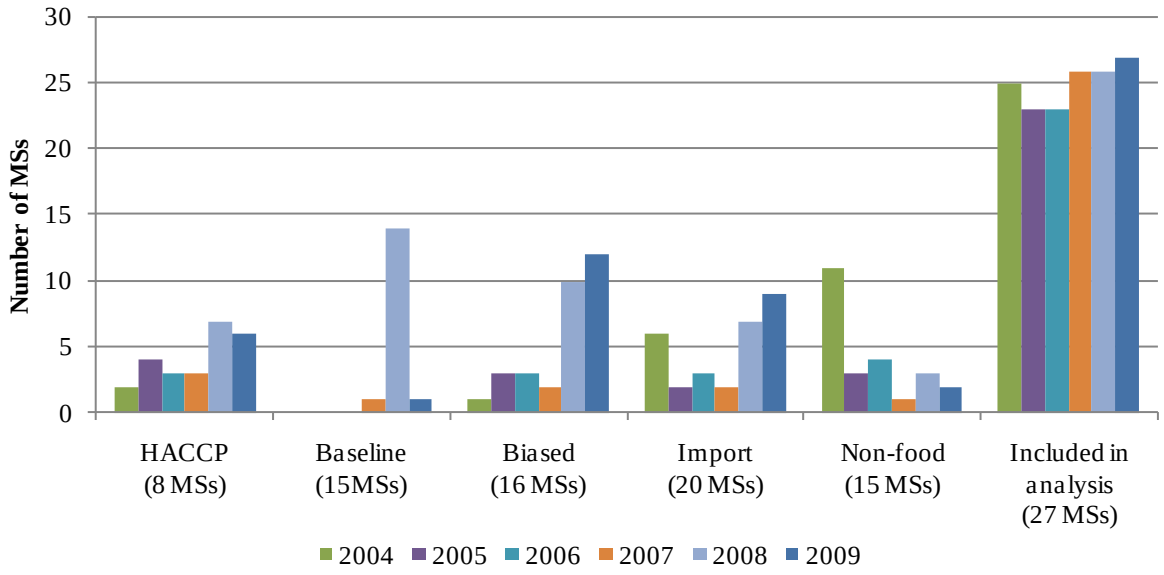

Figure DA1. Number of MSs reporting data in the food section of the EFSA database, listed as HACCP, baseline, biased[(a)], import, non-food[(b)] and data included for further analysis, 2004-2009

Note: Total number of reporting MSs during 2004 to 2009 is indicated in parenthesis.
(a): Biased: Clinical investigations, suspect sampling, and selective sampling.
(b): Non-food: Samples that refers to animal status not food (caecum, faeces, lymph nodes) and environmental samples.

The following figures and tables only include data from samples assumed to represent the occurrence of microbiological contaminates in domestically produced food, meaning only data from the column 'included in analysis' in Table DA2. Please note that samples with unspecified sampling unit or unspecified sampling stage were included in this chapter, but excluded from the data analysis in chapter 3, that present the occurrences of microbiological contaminants in different food categories.

In this chapter most results are presented in figures, whereas the corresponding tables are presented in Appendix A. Reference to the relevant tables is included in the footnotes for each figure. For figure DA1 and DA2 there is no corresponding tables.

Figure DA2 presents the number of reported samples assumed to represent the occurrence of microbiological contaminations in domestically produced foodstuff categories, showing that the majority of samples originated from meat and meat products (54%), followed by milk, cheese and dairy (27%).

Figure DA3 shows the number of samples for each of the included microbiological contaminants assumed to represent the occurrence in domestically produced food. The table includes 4.7 million samples, where the majority of samples were tested for *Salmonella* (62%) and *L. monocytogenes* (19%), but also a large number of samples were tested for *Brucella* (9%). A substantial part of these samples had no information on either sampling stage or sampling unit, which is essential if data from different MSs are to be compared. Data without this information were therefore excluded from the contaminant specific analyses in Chapter 3. In total, 60% to 70% of the samples assumed to represent the occurrence of *Salmonella*, *Campylobacter* and *L. monocytogenes* and 85% of the *Brucella* samples were excluded from the analyses in Chapter 3. For most of the microbiological contaminants, the

proportion of samples with specific sample stage information has increased since the web-based reporting was introduced (Figure DA4). Overall, the proportion of samples excluded from the analysis has decreased from 69% in 2004 to 26% in 2009, representing an increase in quality of reported data despite the overall total loss of 2.3 million samples during the entire period.

MSs reported data on histamine, staphylococcal enterotoxins and *Enterobacter sakazakii* for the first time in 2006. In this overview chapter, figures and tables only include data from samples assumed to represent the occurrence of contaminants in domestically produced food, however this subset of data were relative limited. Therefore, data on imported food and data based on suspect sampling and surveys, as well as data with no information on sampling stage, has been included in analysis on the occurrence of non-zoonotic contaminants in food (Chapter 3).

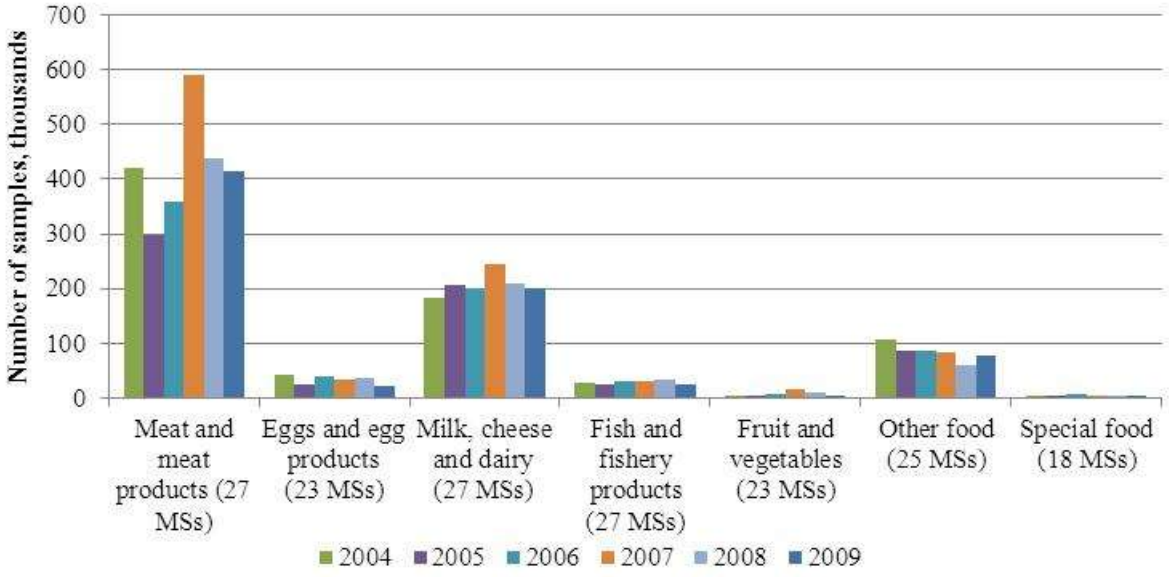

Figure DA2. Number of samples[(a)] included in the analysis of microbiological contaminants per food categories, reported by MSs, 2004-2009

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

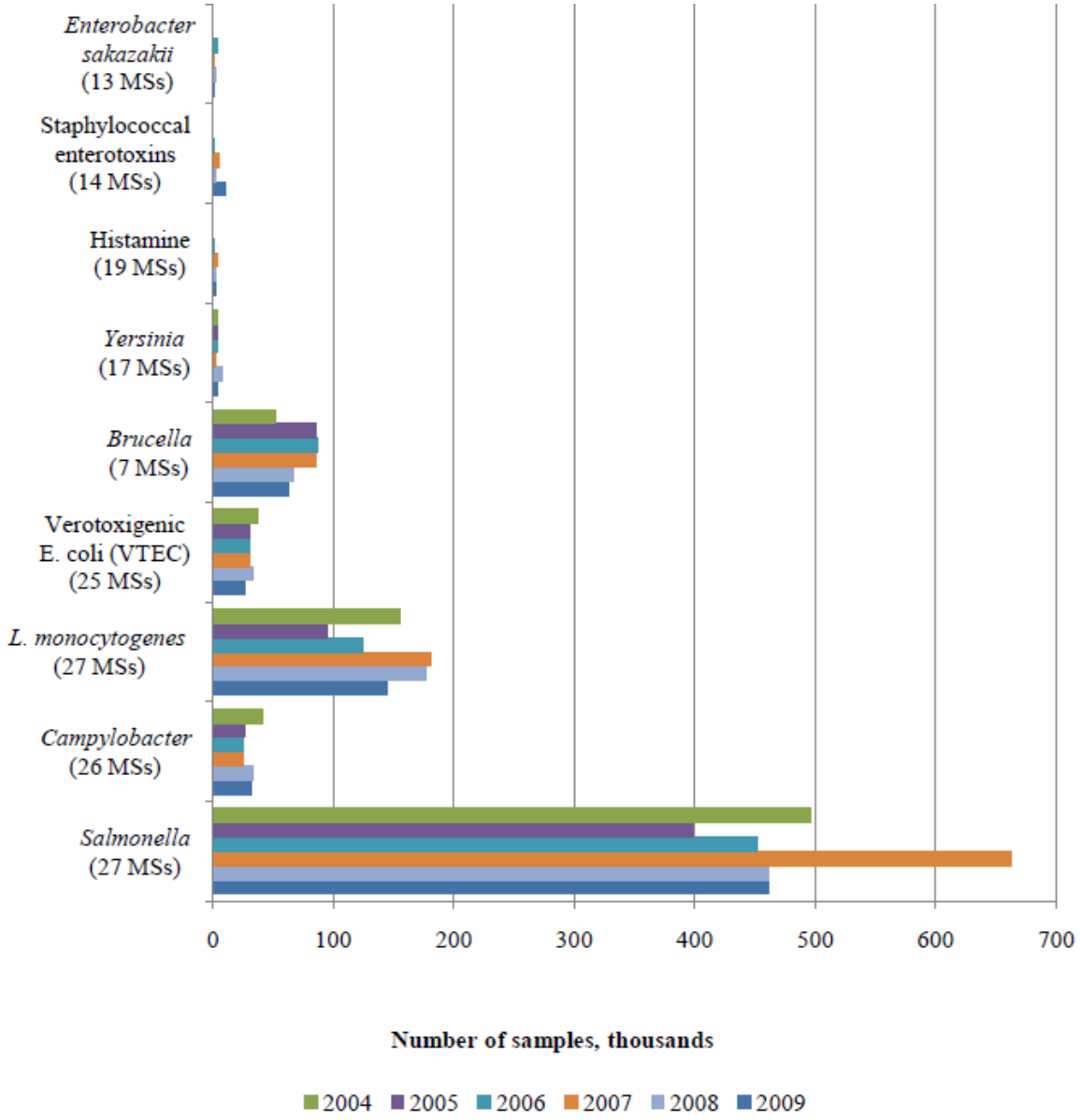

Figure DA3. Number of samples[(a)] included in the analysis per microbiological contaminant, reported by MSs, 2004-2009

Note: Total number of reporting MSs during 2004 to 2009 is indicated in parenthesis.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

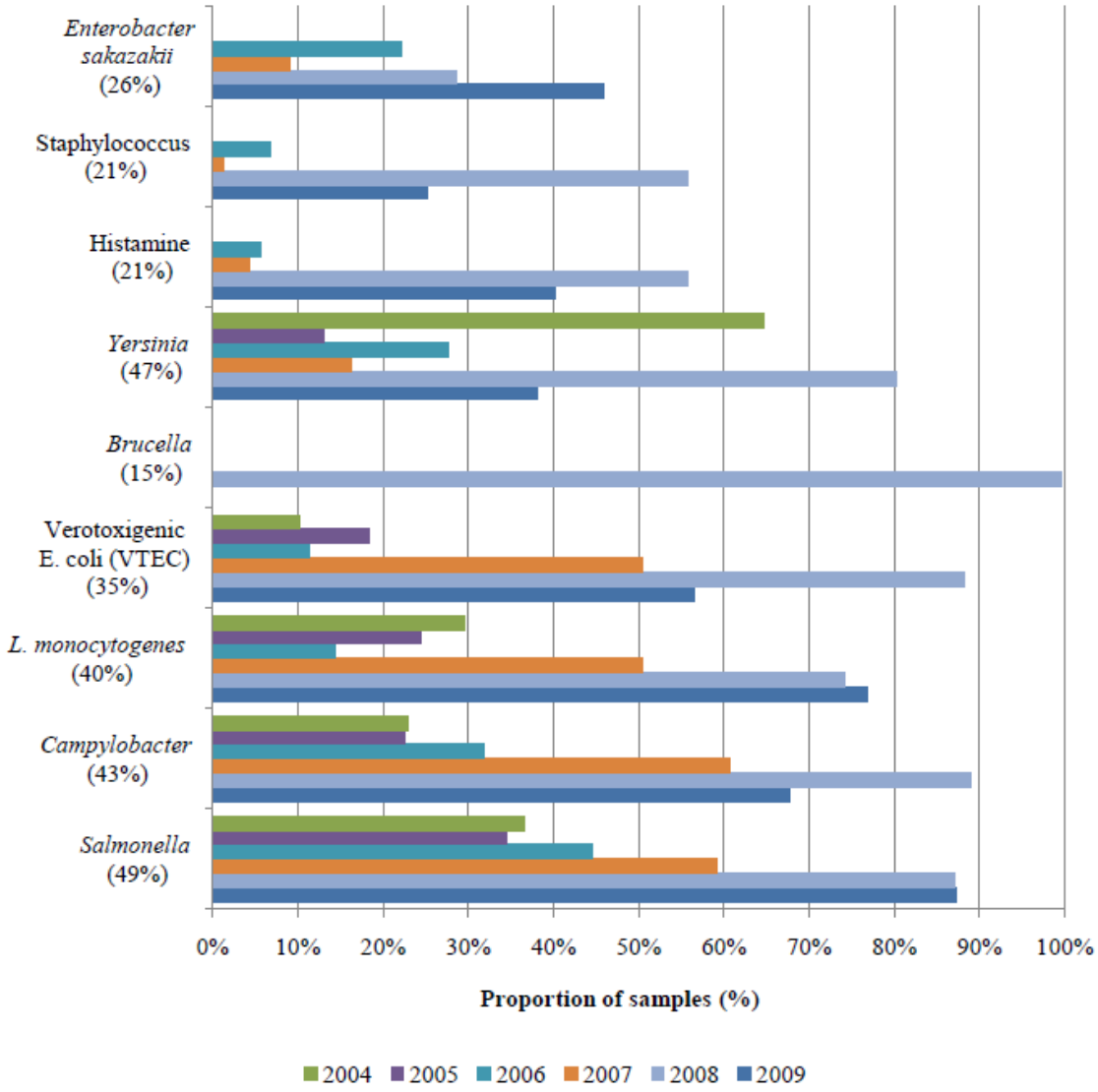

Figure DA4. Proportion of samples[(a)] with specific information on sampling stage and unit per microbiological contaminant, reported by MSs, 2004-2009

Note: Total proportion of all samples reported with specific sampling unit and sampling stage per contaminant (pooled 2004 to 2009) is indicated in parenthesis. For overview of MSs included in the figure see Tables DA5, DA15, DA23, DA33, DA39, DA48, DA51 and DA54 in the Appendix.

(a): Sample units include single samples, batches and unspecified sampling unit reported by MSs. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

2.2. Sampling of microbiological contaminants

2.2.1. *Salmonella*

Most MSs and the non-MS Norway have reported data on *Salmonella* in meat and meat products during the period 2004 to 2009; between 22 and 26 MSs have reported data annually (Figure DA5). Slightly fewer MSs have reported data on *Salmonella* in other food categories such as; milk, cheese and dairy (17 to 21 MSs), eggs and egg products (16 to 19 MSs) and fish and fishery products (17 to 20 MSs). The number of MSs reporting on *Salmonella* in fruit and vegetables has increased over the years, probably as a result of the increasing number of human outbreaks related to fruit and vegetables. In addition, microbiological criteria were defined for several types of fruits and vegetables in 2007. The number of MSs reporting data on special foods increased in 2007, coinciding with the implementation of microbiological criteria for dried infant formulae and other dried foods for medical purposes (Figure DA5).

Figure DA6 presents the number of samples tested for *Salmonella* reported by MSs during the period 2004 to 2009. More than half of the tested samples originated from meat and meat products. The total number of tested samples varied between years for each of the categories and no overall trends could be observed except for meat and meat products. From 2005 to 2009, an increase in number of reported samples for broiler meat (45%), turkey meat (100%) and pig meat (55%) occurred (Figure DA7). Especially, an increase in the volume of data from retail samplings have occurred since 2005, probably as a consequence of the implementation of microbiological criteria for minced meat and meat preparations during shelf life (at retail) (Figure DA8).

The microbiological criteria for *Salmonella* also concern other ready-to-eat foodstuffs. Even though, the annual numbers of RTE-samples from each category varied considerable, overall there has been an increase in sampling and reporting since 2004, except for milk, cheese and dairy where the number of reported RTE-samples has decreased by 42% since 2004 (Figure DA9). Almost no RTE-samples from egg and egg products have been reported (12 samples in 2008) however products containing eggs were often reported in the category of other foods.

The proportion of samples with information on sampling stage from the different food categories has increased since 2004, however in 2009 more than 10% of all samples were still reported without sampling stage information (Figure DA10). Information on sampling unit increased to almost 100% already in 2005 and has remained at this level (Figure DA11).

From 2004 to 2009, the number of samples tested for *Salmonella* with both specific sampling stage and sampling unit more than doubled, and in 2009, 87% of the samples were reported to both types of information (Figure DA11). From 2004 to 2008, the proportion of samples with specific information on sampling context, e.g. surveillance or monitoring programmes or from a national survey, increased (Figure DA11). However, this proportion decreased in 2009. Overall, 41% of the samples reported as tested for *Salmonella* during 2004 to 2009 were excluded from the detailed analyses of *Salmonella* in Chapter 3 report due to missing information on sampling unit and sampling stage.

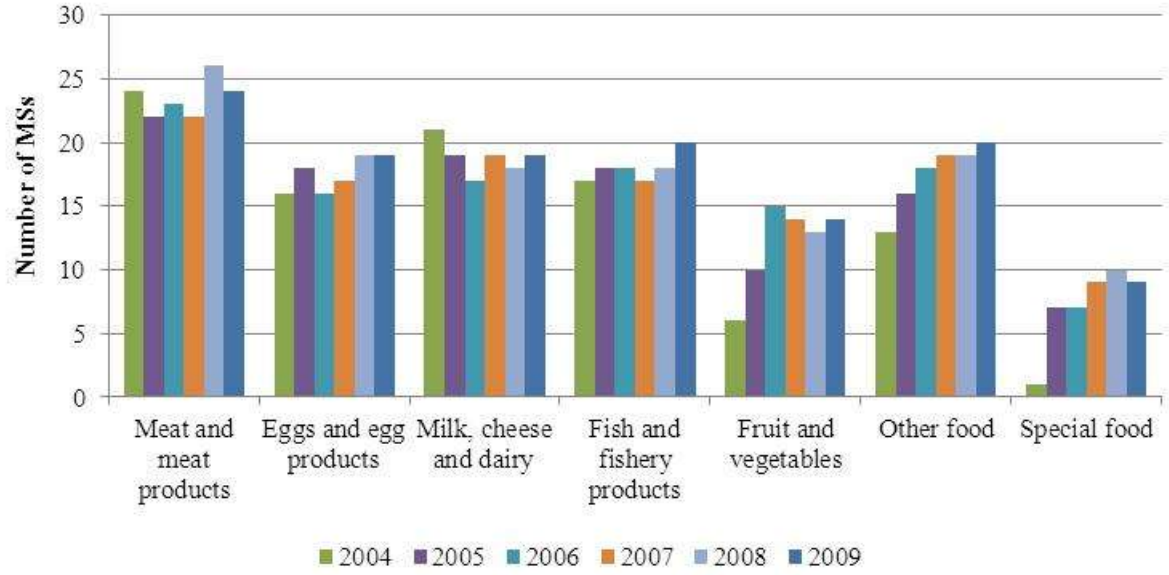

Figure DA5. Number of MSs reporting data for different food categories tested for *Salmonella*, reported by MSs, 2004-2009

Note: For overview of MSs included in the figure see Table DA5 and DA6 in the Appendix.

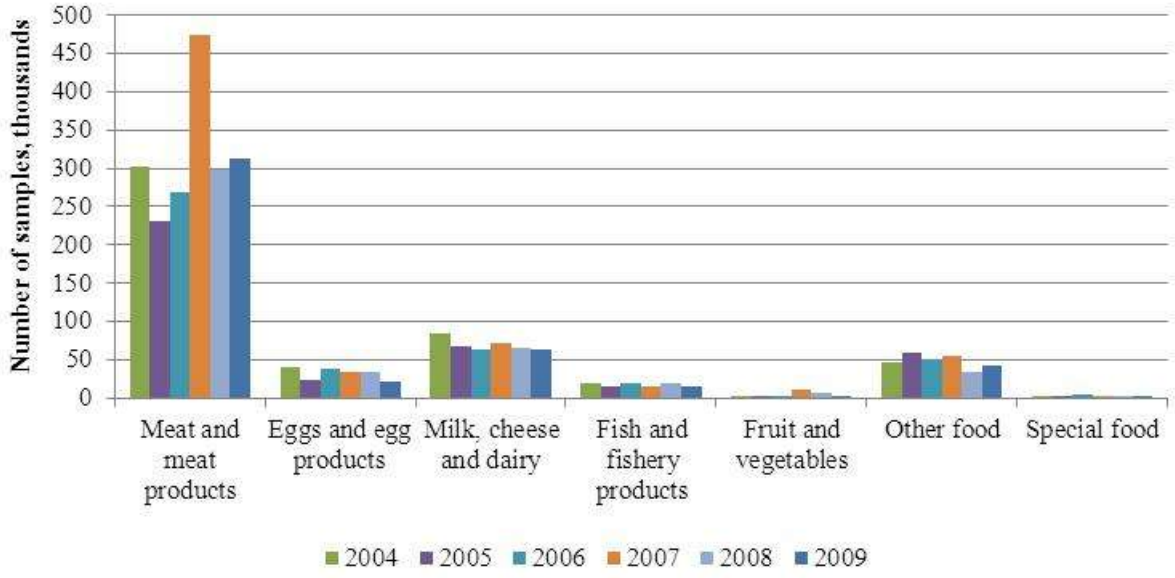

Figure DA6. Number of samples[(a)] from different food categories tested for *Salmonella*, reported by MSs, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA5, DA6, DA7 and DA8 in the Appendix.

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

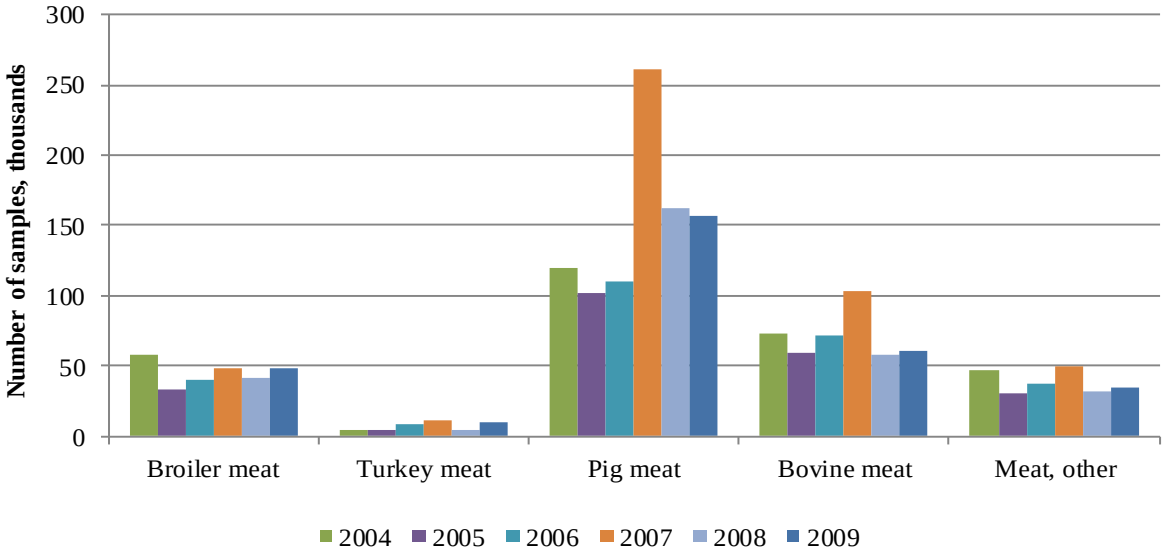

Figure DA7. Number of meat samples[(a)] from different animal species tested for *Salmonella*, reported by MSs, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA5, DA10, DA11 and DA12 in the Appendix.
(a): Samples include: Data reported as single samples, batches and unspecified sampling units from all sampling stages. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

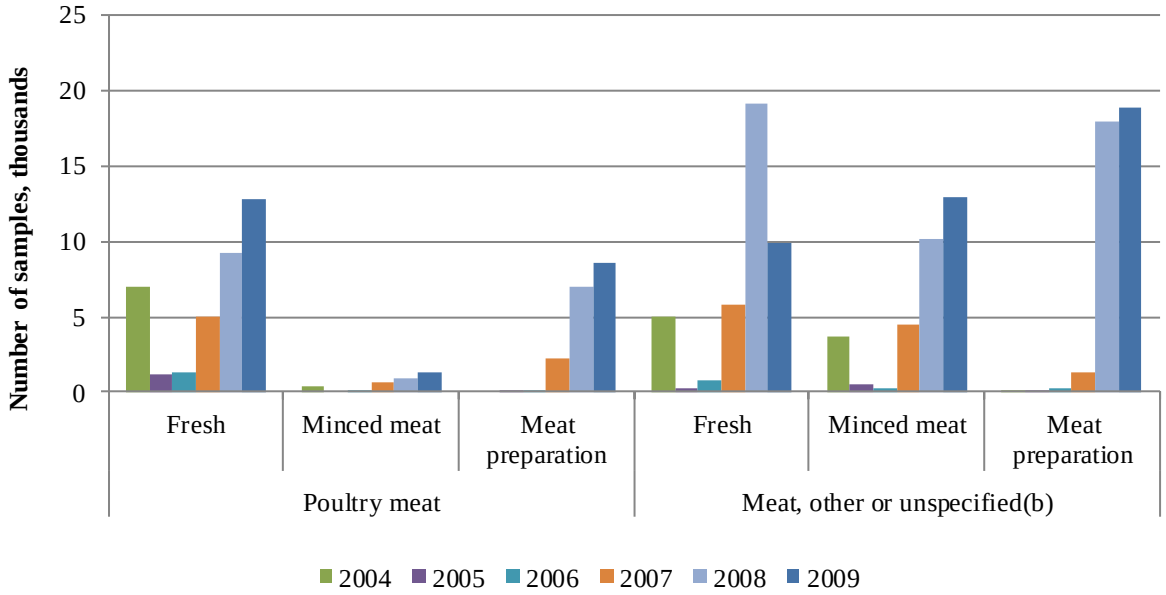

Figure DA8. Number of samples[(a)] of fresh meat, minced meat and meat preparations tested for *Salmonella* at retail, reported by MSs, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA5 and DA13 in the Appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

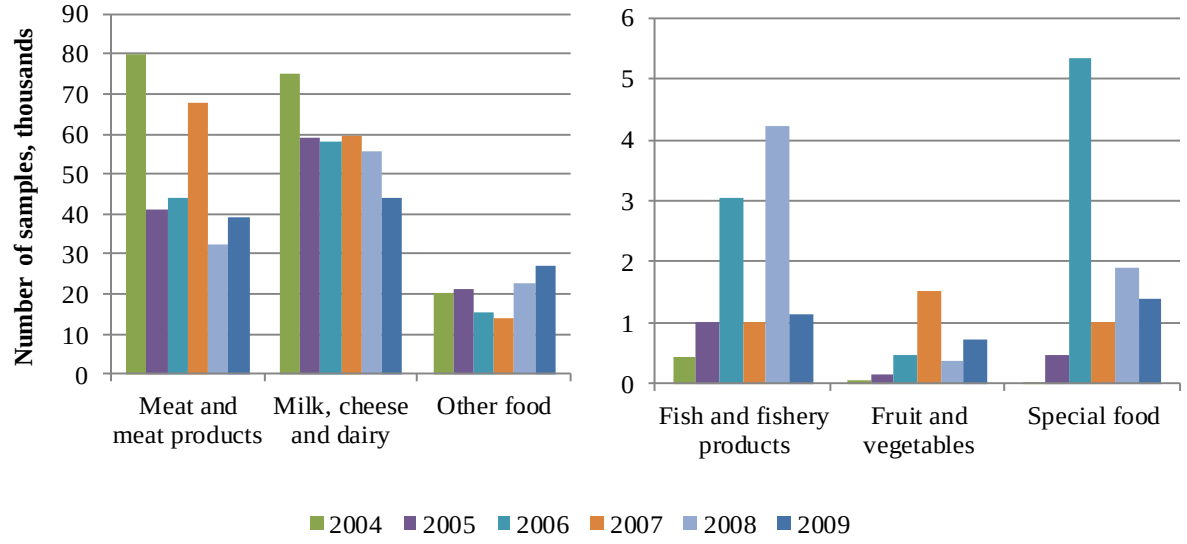

Figure DA9. Number of RTE-samples[(a)] from different food categories tested for *Salmonella*, reported by MSs, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA5, DA6 and DA14 in the Appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

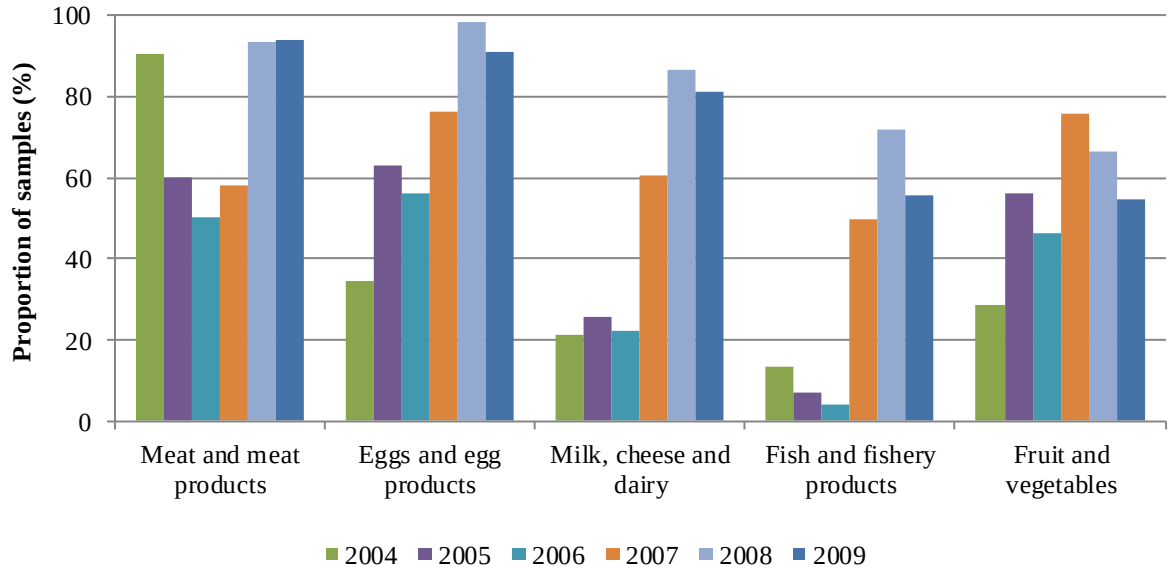

Figure DA10. Proportion of samples[(a)] from different food categories tested for *Salmonella* with specific information on sampling stage, reported by MSs, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA5, DA6, DA10, DA11 and DA12 in the Appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

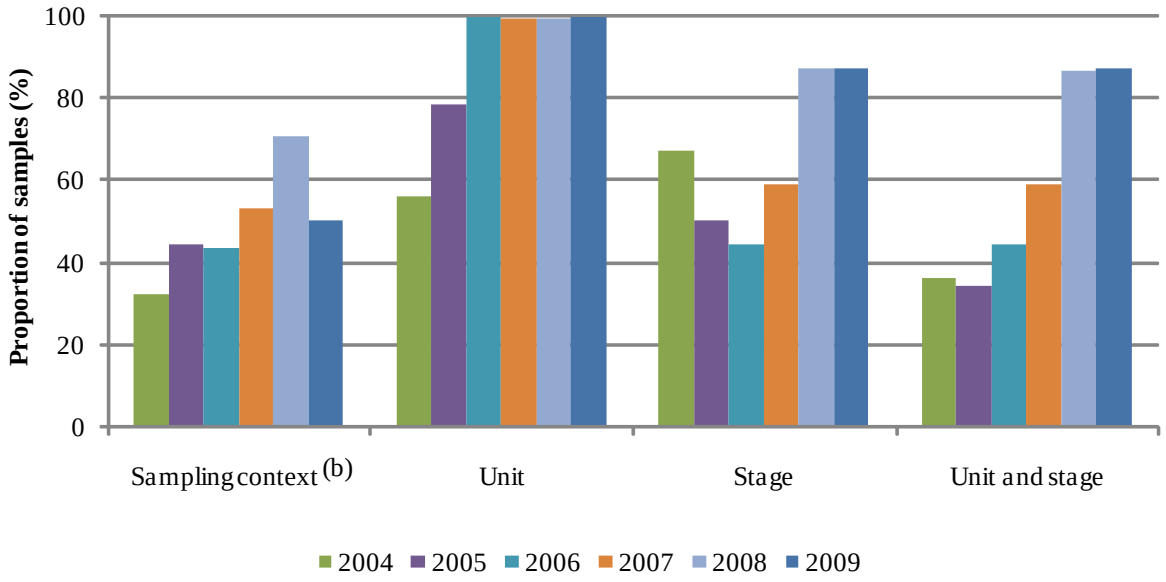

Figure DA11. Proportion of samples[(a)] tested for *Salmonella* with information on sampling context, unit and stage, reported by MSs, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA5, DA6, DA10, DA11 and DA12 in the Appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) excluded.
(b): Sampling context indicates if data were reported as results from surveillance/monitoring programmes or results from a survey.

2.2.2. *Campylobacter*

The majority of MSs and the non-MSs Norway have reported data on *Campylobacter* in meat and meat products during the period from 2004 to 2009, and between 18 and 21 MSs reported yearly (Figure DA12). Fewer MSs reported data on *Campylobacter* in milk, cheese and dairy during the period; 16 MSs in 2004 to seven MSs in 2009. For the other food categories less than 10 MSs have reported data.

Figure DA13 presents the number of samples tested for *Campylobacter* reported by MSs during the period 2004 to 2009. Most of tested samples originated from meat and meat products (74%). The total number of tested samples varied between years for each of the categories and no overall trends could be observed at this general level.

The total number of reported samples from broiler meat tested for *Campylobacter* varied slightly during 2004 to 2009. However, quality of data has improved, as the number of broiler meat samples with unspecified sampling stage have decreased since 2005. The number of samples from retail increased during the period (Figure DA14).

Samples from milk, cheese and dairy tested for *Campylobacter* represented 19% of all the reported samples tested for *Campylobacter*, however sampling stage was not specified for most of these investigations (Figure DA15).

The proportion of samples tested for *Campylobacter* with specific sample stage information has increased almost three-fold since 2004, due to the improved reporting for broiler meat (Figure DA14 and DA16). After 2006, relatively few meat samples were reported without information about sampling unit (Figure DA16).

From 2004 to 2009, the overall number of samples tested for *Campylobacter* with both specific sampling stage and sampling unit increased more than three-fold. In 2008 and 2009, 89% and 68% of the samples were reported included both types of information, respectively (Figure DA16). From 2008, the proportion of samples with specific information on sampling context, e.g. indications of whether the samples originate from surveillance or monitoring programmes or from a national survey, increased. (Figure DA16). Nonetheless, 51% of the samples tested for *Campylobacter* during 2004 to 2009 were excluded in the detailed analyses of the *Campylobacter* in Chapter 3 due to missing information on sampling unit and sampling stage.

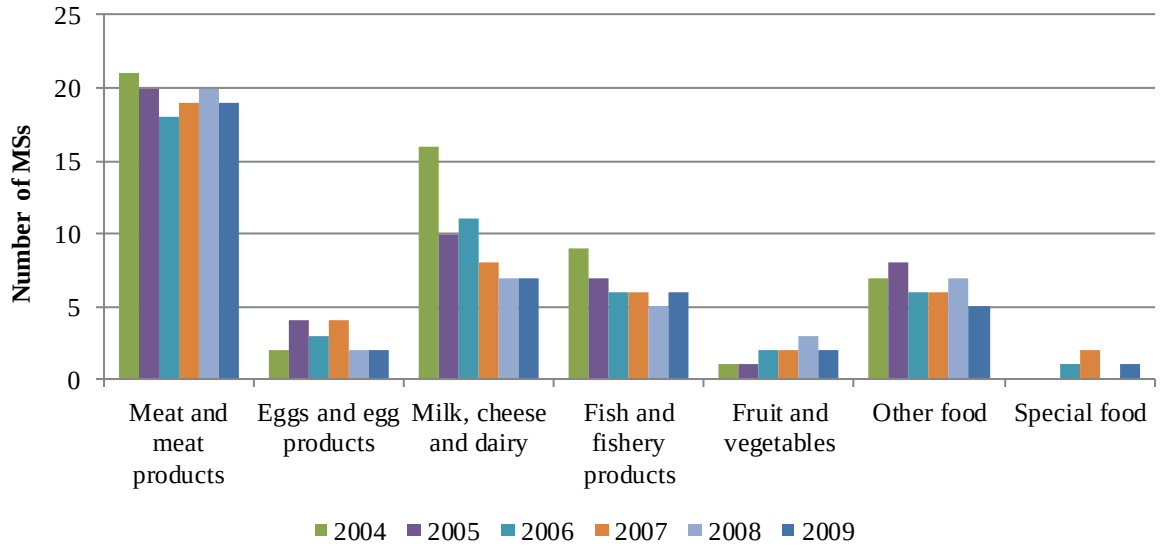

Figure DA12. Number of MSs reporting data for different food categories tested for *Campylobacter*, 2004-2009

Note: For overview of MSs included in the figure see Table DA15 and DA16 in the Appendix.

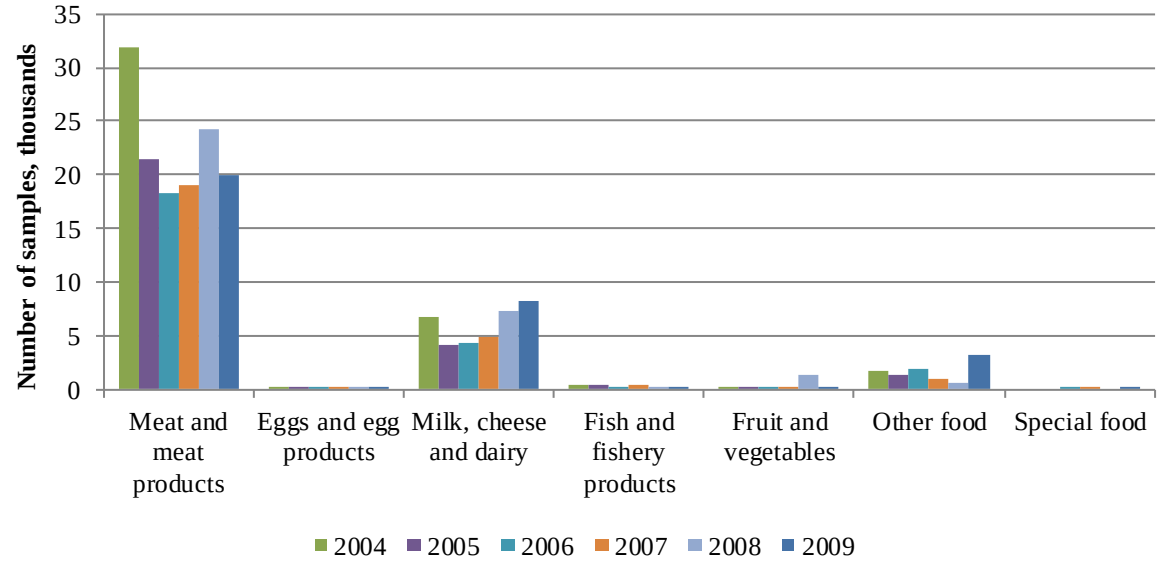

Figure DA13. Number of samples[(a)] from different food categories tested for *Campylobacter*, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA15, DA16, DA17, DA18 and DA19 in the Appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline,

import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) excluded.

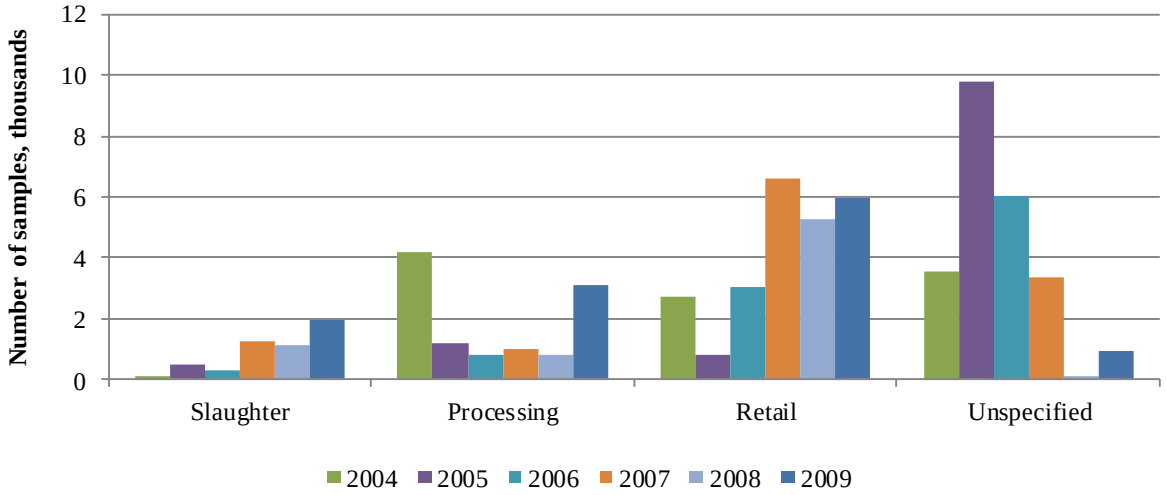

Figure DA14. Number of samples[(a)] of broiler meat tested for *Campylobacter*, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA15, DA17, DA18 and DA19 in Appendix A.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) excluded.

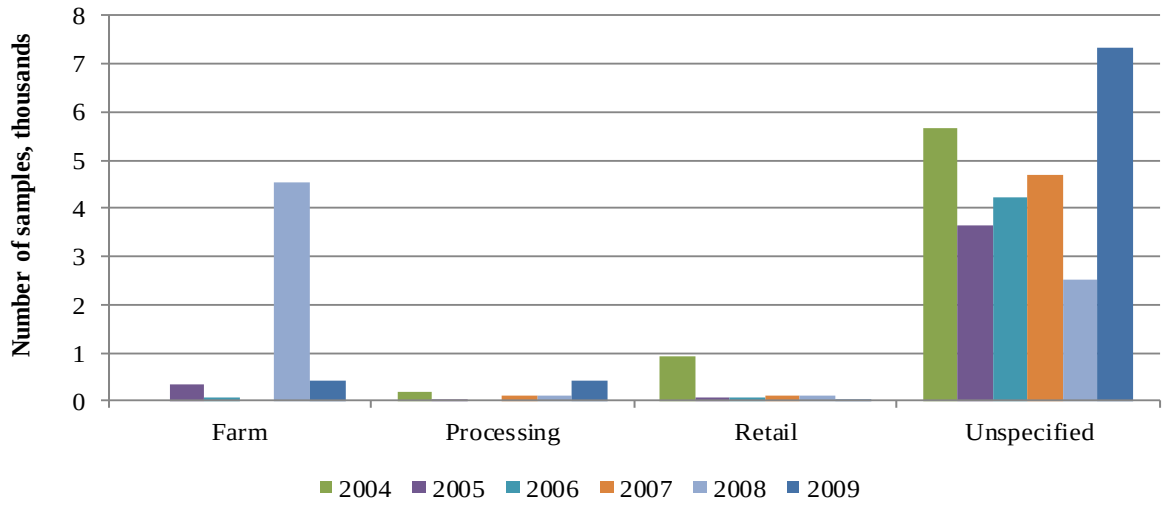

Figure DA15. Number of samples[(a)] of milk, cheese and dairy tested for *Campylobacter*, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA16, DA20, DA21 and DA22 in the Appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) excluded.

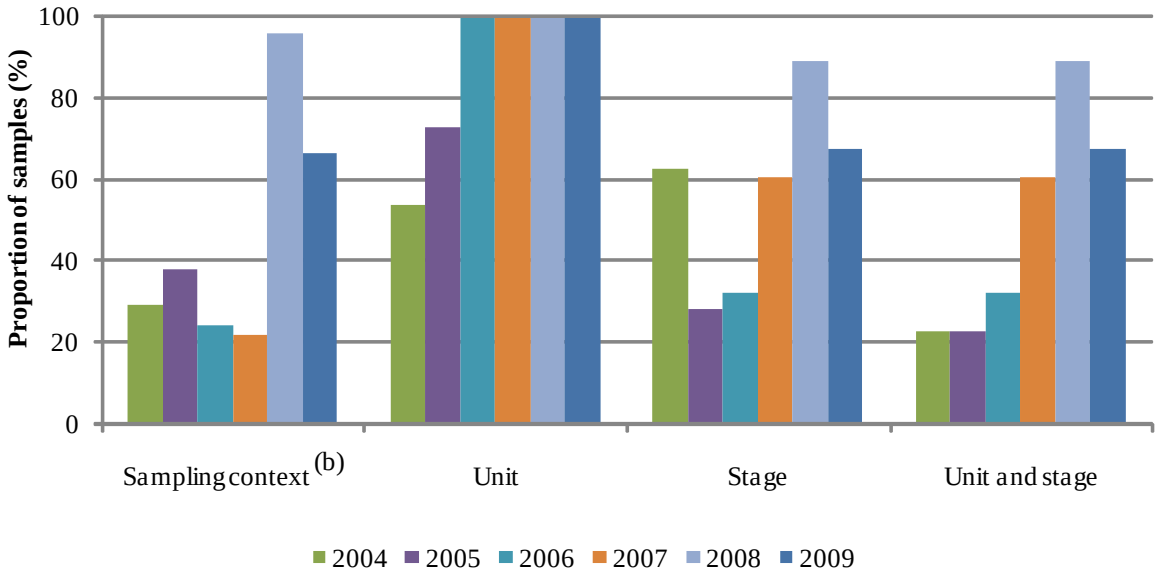

Figure DA16. Proportion of samples[(a)] tested for *Campylobacter* with information on sampling context, unit and stage, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA15, DA16, DA17, DA18, DA19, DA20, DA21 and DA22 in the Appendix.

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) excluded.

(b): Sampling context indicates if data were reported as results from surveillance/monitoring programmes or results from a survey.

2.2.3. *Listeria monocytogenes*

From 2004 to 2008/9, there has been an increase in number of MSs reporting data on *L. monocytogenes* in meat and meat products (19 to 32 MSs), fruits and vegetables (five to nine MS) as well as from special foods (zero to nine MSs) (Figure DA17). This increase was probably related to the implementation of microbiological criteria in 2007 for ready-to-eat products and for dried infant formulae. Slightly fewer MSs have reported on *L. monocytogenes* in other food categories such as milk, cheese and dairy (19 to 21 MSs), fish and fishery products (17 to 22 MSs) and other food (15 to 19 MSs). Microbiological criteria were also implemented for other ready-to-eat foodstuffs in 2007, but these requirements were not readily reflected in the overall number of reporting MSs (Figure DA17).

Figure DA18 presents the number of samples tested for *L. monocytogenes* reported by MSs the period 2004 to 2009. Forty percent of the tested samples originated from meat and meat products and 33% from milk, cheeses and dairy. The total number of tested samples varied between years, however since 2005, an increasing number of samples from meat and meat products (151%) and from milk, cheeses and dairy (16%) have been reported. The majority (70%) of samples tested for *L. monocytogenes* were from RTE products (Figure DA19).

Among samples from milk, cheese and dairy tested for *L. monocytogenes*, cheeses represent 55% of the samples. The number samples from hard cheeses has increased steadily since 2004. The number of samples from soft and semi-soft cheeses has been quite variable, whereas the number of samples from cheeses without type specification has decreased since 2004 (Figure DA20). Microbiological criteria for *L. monocytogenes* apply both at processing and at retail; however since 2007 sampling has decreased at processing and increased at retail. The number of samples from cheese without specific information of sampling stage has decreased during the period (Figure DA21).

The proportion of samples tested for *L. monocytogenes* with specific sample stage information from the different food categories has increased since the web-based reporting was introduced (Figure DA22), and after 2005, relatively few meat samples were reported without information about sampling unit (Figure DA23).

From 2004 to 2009, the number of samples tested for *L. monocytogenes* with both specific sampling stage and sampling unit information, increased more than five-fold, and in 2009, 77% of the samples were reported with both types of information (Figure DA23). Overall, 52% of the samples reported as tested for *Listeria* during 2004 to 2009 were excluded in the detailed analyses of *Listeria* in Chapter 3. From 2008, the proportion of samples with specific information on sampling context, e.g. indications of whether the samples originate from surveillance or monitoring programmes or from a national survey, increased (Figure DA23).

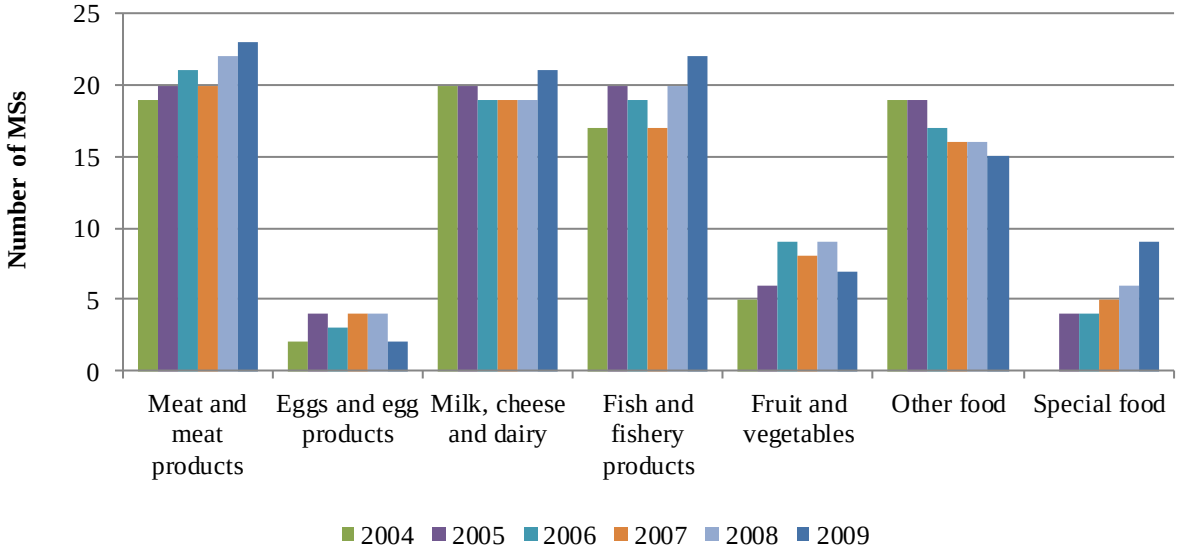

Figure DA17. Number of MSs reporting data for different food categories tested for *L. monocytogenes*, 2004-2009

Note: For overview of MSs included in the figure see Table DA23 and DA24 in the appendix.

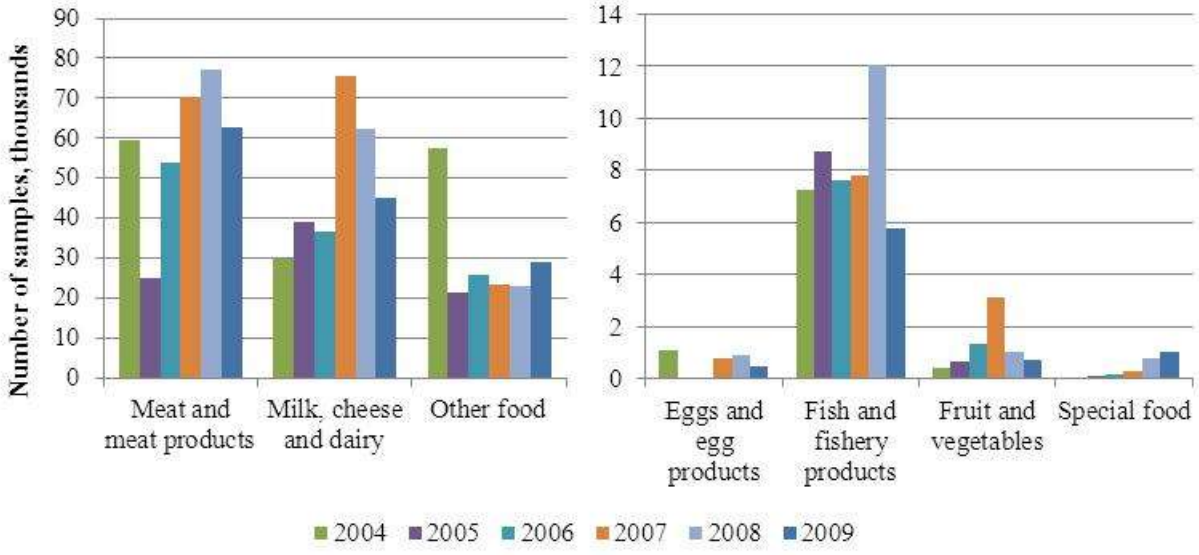

Figure DA18. Number of samples[(a)] from different food categories tested for *L. monocytogenes*, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA23, DA24, DA25, DA26 and DA27 in the appendix.

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

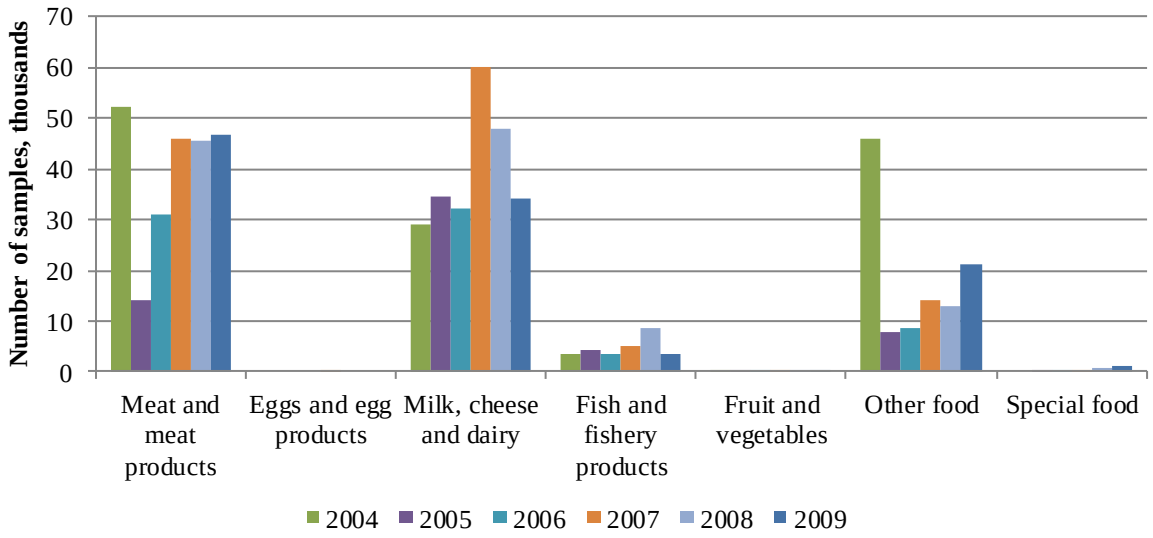

Figure DA19. Number of RTE-samples[(a)] from different food categories tested *L. monocytogenes*, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA24 and DA31 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

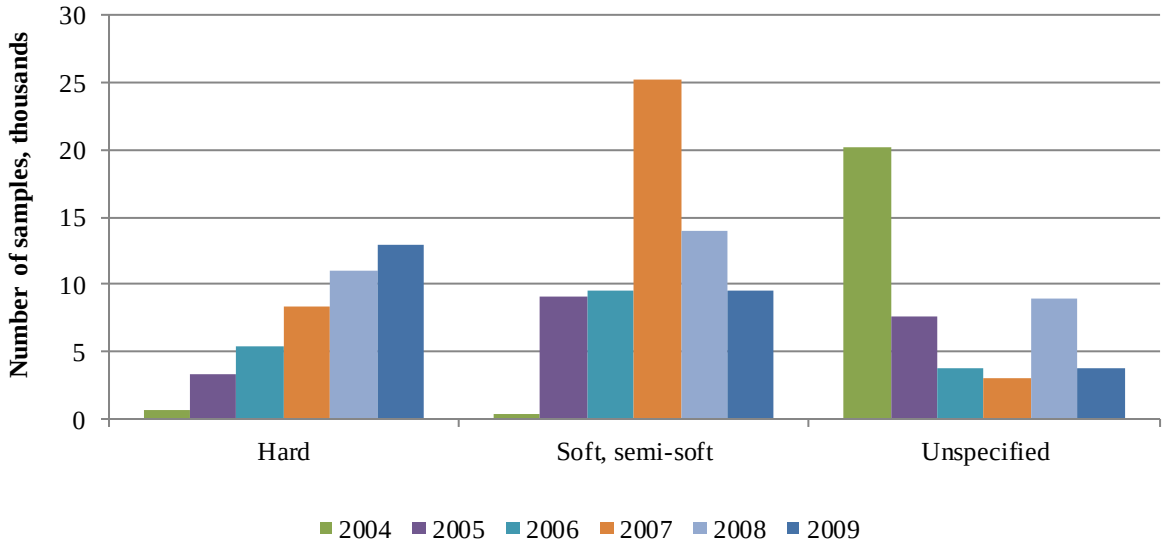

Figure DA20. Number of samples[(a)] of hard, soft/semi-soft and unspecified cheeses tested for *L. monocytogenes*, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA24 and DA32 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

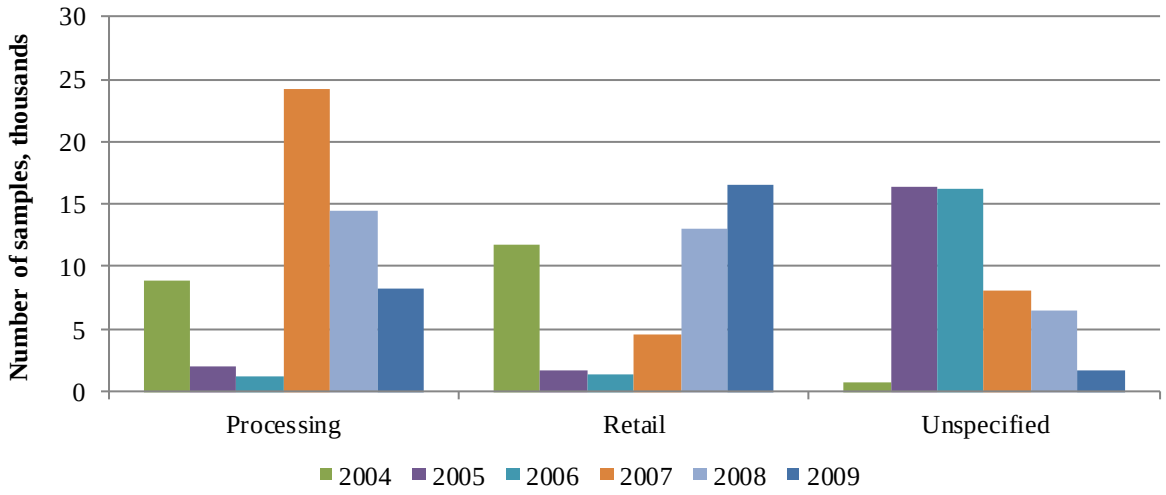

Figure DA21. Number of samples[(a)] of cheeses tested for *L. monocytogenes*, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA24 and DA32 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

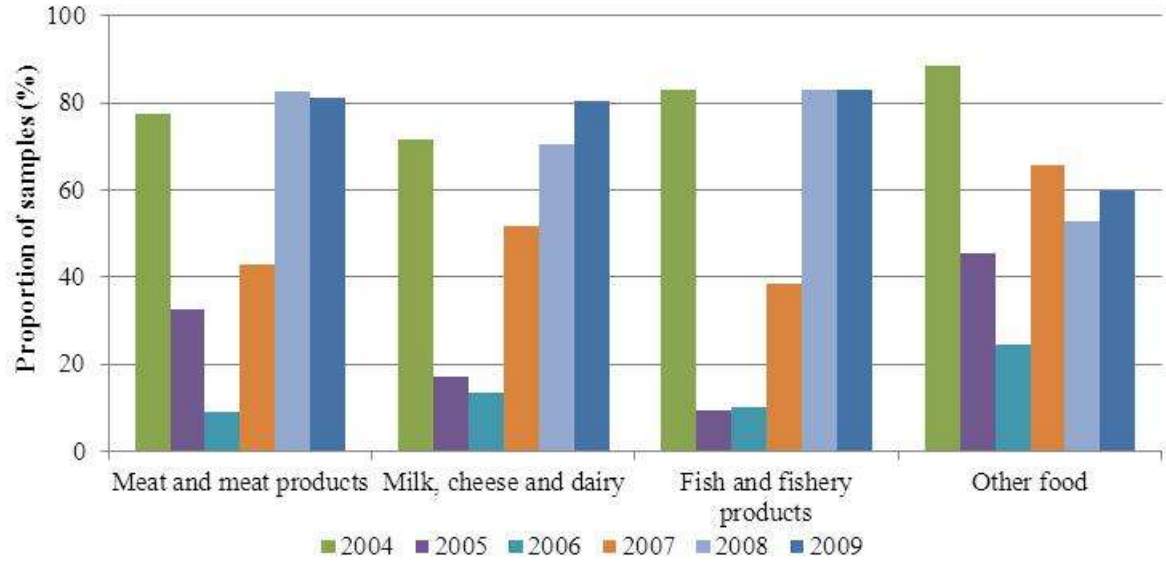

Figure DA22. Proportion of samples[(a)] from different food categories tested for *L. monocytogenes* with specific information on sampling stage, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA23, DA24, DA28, DA29 and DA30 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

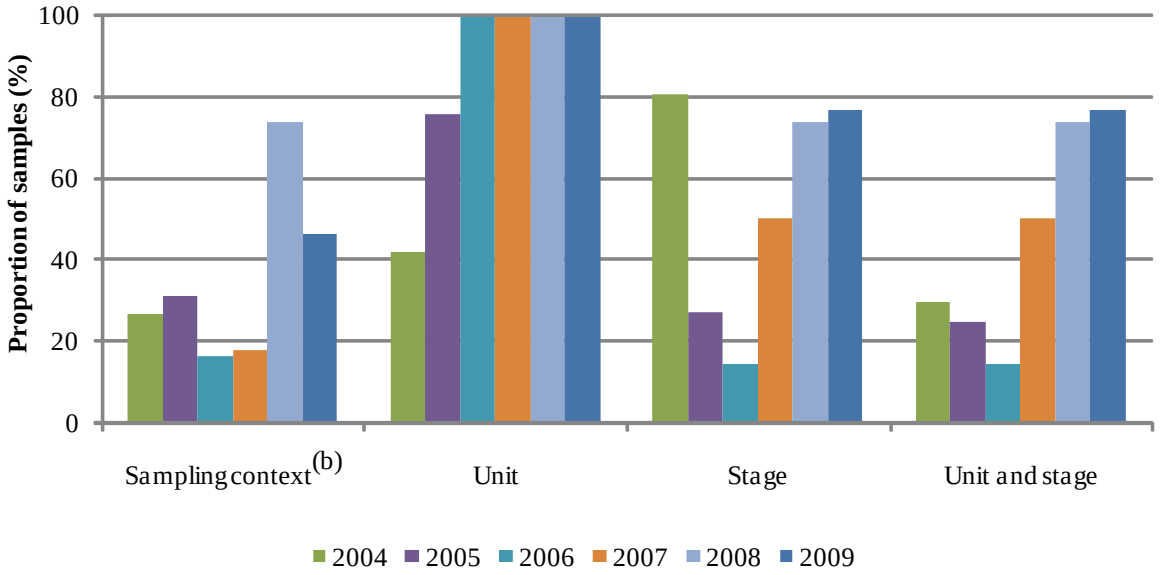

Figure DA23. Proportion of samples[(a)] tested for *L. monocytogenes* with information on sampling context[(b)], unit and stage, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA23, DA24, DA24, DA26, DA27, DA28, DA29 and DA30 in the appendix.

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) excluded.

(b): Sampling context indicates if data were reported as results from surveillance/monitoring programmes or results from a survey.

2.2.4. *Yersinia*

Less than 10 MSs have reported *Yersinia* data for each food category per year (Figure DA24).

Figure DA25 presents the number of samples reported by MSs during the period 2004 to 2009. Most of the samples tested for *Yersinia* originated from meat and meat products (82%) and samples from milk, cheese and dairy (11%). For most years, the annual number of tested meat samples was around three thousand; however in 2008 the number of reported meat samples more than doubled. This increase was due to two large investigations in Romania (pig meat tested at slaughter) and the United Kingdom (meat from pigs, sheep and bovine animals tested at slaughter). Of all samples tested for *Yersinia*, most of the samples originated from pig meat (53%) and bovine meat (13%).

In contrast to the data reported for most of the other reported zoonotic bacteria, reporting of sampling stages of samples from pig meat has not improved over the years (Figure DA26). This is also the case when including all samples tested for *Yersinia* (Figure DA27), where the proportion of samples with both specific sampling stage and sampling unit varied between 13 and 80% during the six year period. Overall, 52% of the samples reported as tested for *Yersinia* during 2004 to 2009 were excluded in the detailed analyses of *Yersinia* in Chapter 3.

Except for 2004 and 2008, less than half the samples were reported with a specified sampling stage (Figure DA27). Also relatively few samples included information regarding the sampling context, e.g. indications of whether the samples originate from surveillance or monitoring programmes or from a national survey, varied considerably (Figure DA27). In 2008, the proportion of samples with information regarding sampling context and sampling stage was relatively high (80%) compared to 2009 (38%). However, this high proportion relates to the large investigations reported by Romania and

the United Kingdom, where the sampling stage and context were included. These investigations represent 68% of all samples reported in 2008 and 21% of all sample tested for *Yersinia*.

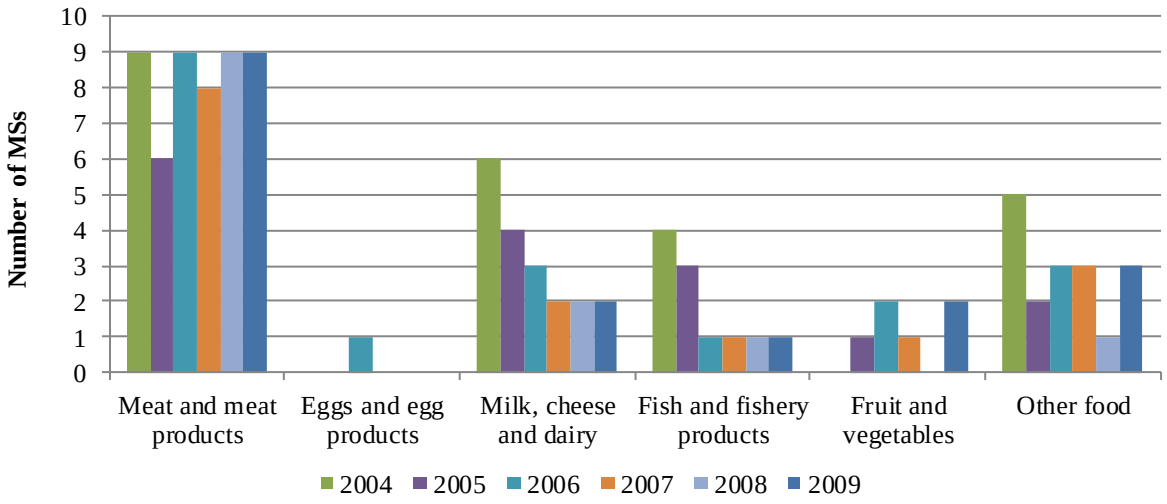

Figure DA24. Number of MSs reporting data for different food categories tested for *Yersinia*, 2004-2009

Note: For overview of MSs included in the figure see Table DA33 and DA34 in the appendix.

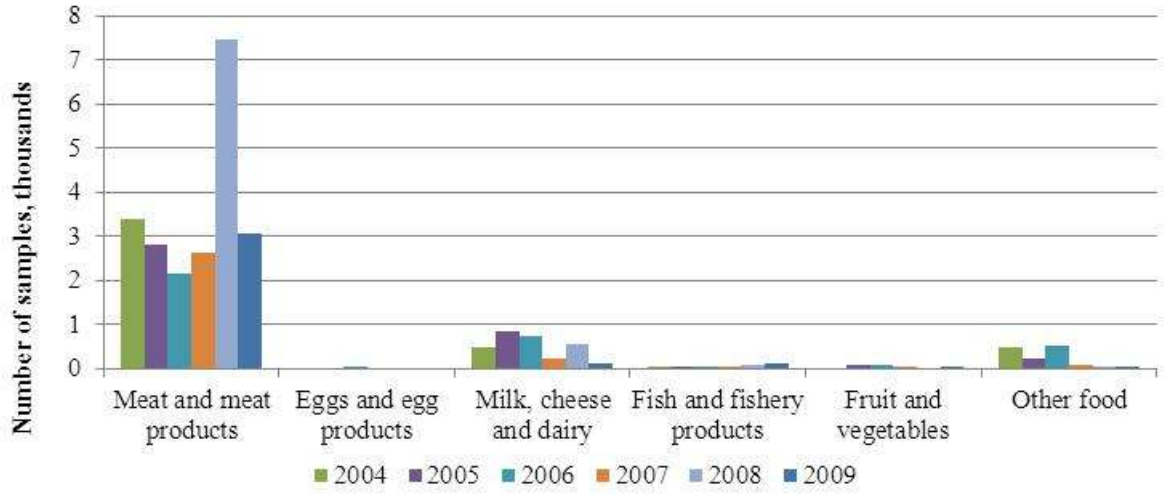

Figure DA25. Number of samples[(a)] from different food categories tested for *Yersinia*, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA33, DA34, DA35, DA36, DA37 and DA38 in the appendix.

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, Import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) excluded.

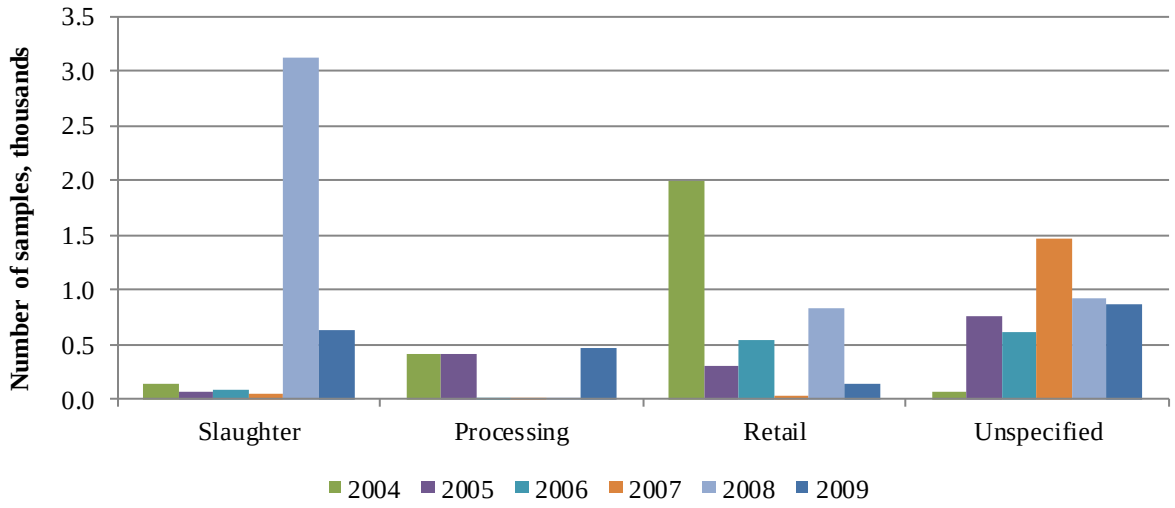

Figure DA26. Number of samples[(a)] from pig meat tested for *Yersinia*, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA33, DA35 and DA36 in the appendix.

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

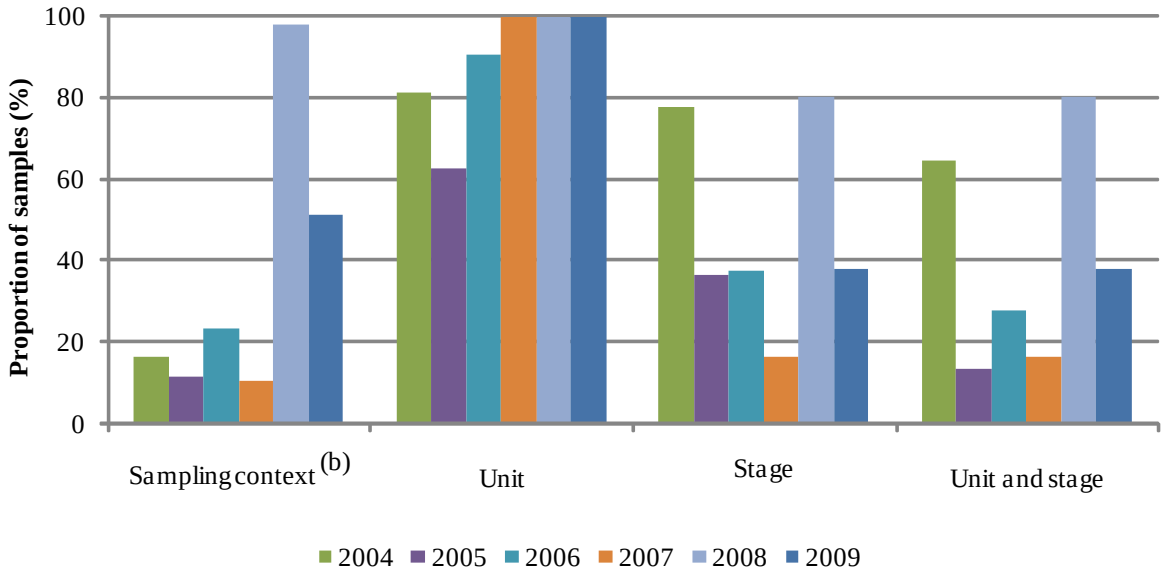

Figure DA27. Proportion of samples[(a)] tested for *Yersinia* with information on sampling context[(b)], unit and stage, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA33, DA34, DA35, DA36, DA37 and DA38 in the appendix.

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

(b): Sampling context indicates if data were reported as results from surveillance/monitoring programmes or results from a survey.

2.2.5. VTEC

The number of MSs reporting data on VTEC in meat and meat products has increased from 14 MSs in 2004 to 19 MSs 2009 (Figure DA28), of which most MSs reported data from bovine meat. Fewer MSs have reported data on VTEC in milk, cheese and dairy; 14 MSs in 2004 to 11 MSs in 2009, respectively. For the other food categories less than 10 MSs have reported data per year. The non-MSs Switzerland reported data on VTEC in cheese in 2006 to 2008 (data not included in the figures).

Figure DA29 presents the number of samples reported by MSs during the period 2004 to 2009. More than half of the samples tested for VTEC originated from meat and meat products (65%) and milk, cheese and dairy (23%). The total number of tested samples varied between years for each of the categories and no overall trends could be observed at this general level.

Overall 37% of all samples tested for VTEC were from bovine meat, however, the number of samples varied considerable over years and sampling stage. Since 2007, the number of bovine meat samples collected at processing and retail have increased; even though the number of samples from processing were markedly reduced in 2009 (Figure DA30).

From 2004 to 2008, the number of samples tested for VTEC with both specific sampling stage and sampling unit increased more than eight-fold. In 2008 and 2009, 88% and 57% of the samples were reported included both types of information, respectively (Figure DA31). From 2008, the proportion of samples with specific information on sampling context, e.g. indications of whether the samples originate from surveillance or monitoring programmes or from a national survey, decreased. (Figure DA31). Overall, 61% of the samples reported as tested for VTEC during 2004 to 2009 were excluded in the detailed analyses of VTEC in Chapter 3 due to missing information on sampling unit and sampling stage.

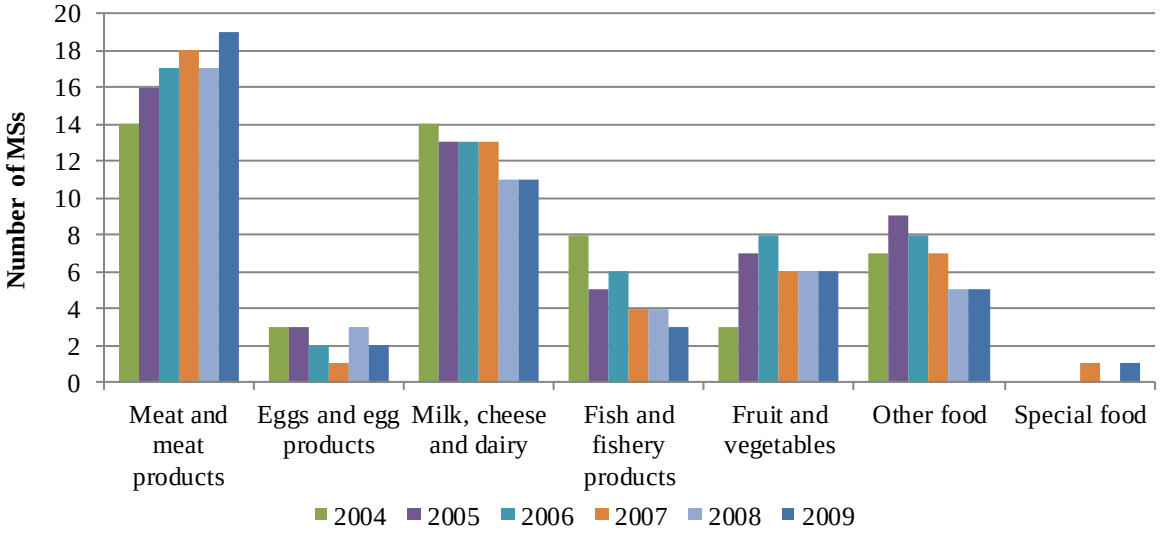

Figure DA28. Number of MSs reporting data for different food categories tested for VTEC, 2004-2009

Note: For overview of MSs included in the figure see Table DA39 and DA40 in the appendix.

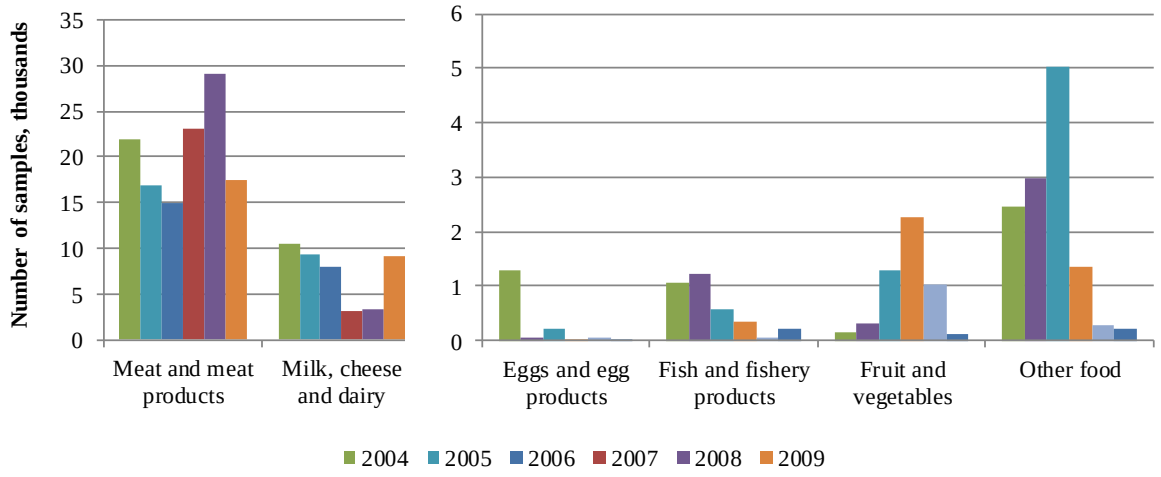

Figure DA29. Number of samples[(a)] from different food categories tested for VTEC, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA39, DA40, DA43 and DA44 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

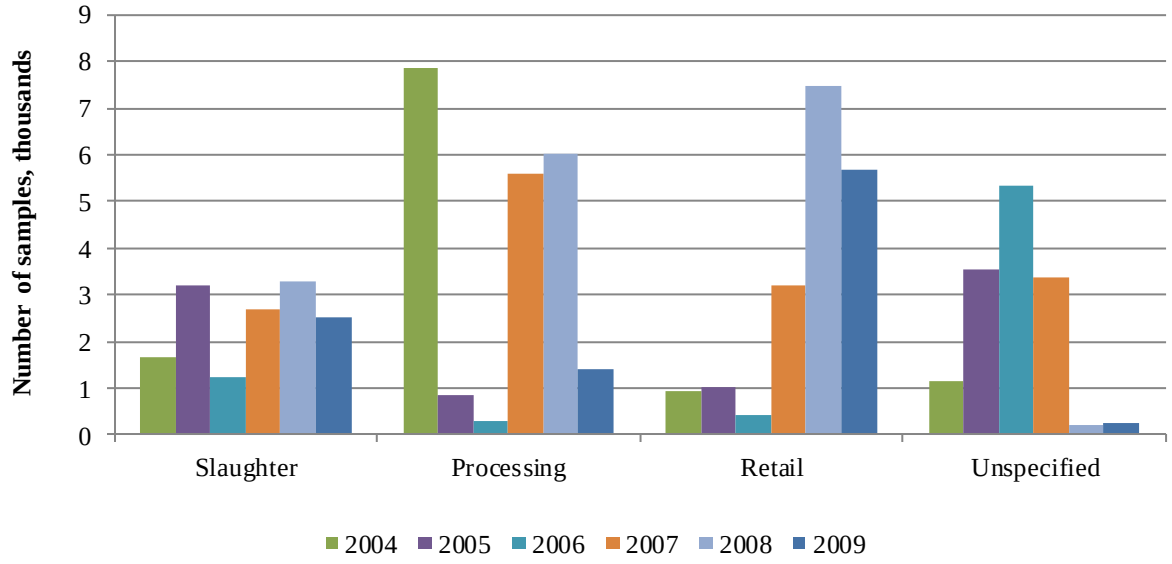

Figure DA30. Number of samples[(a)] of bovine meat tested for VTEC, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA39, DA41 and DA42 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

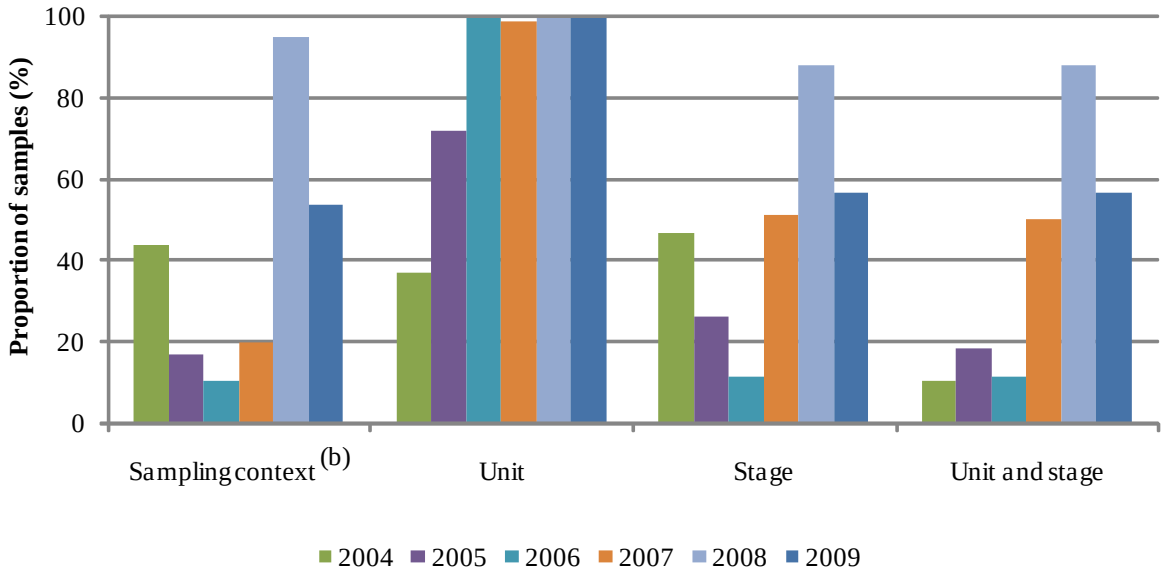

Figure DA31. Proportion of samples[(a)] tested for VTEC with information on sampling context[(b)], unit and stage, 2004-2009

Note: For overview of MSs and data included in the figure see Table DA39, DA40, DA43 and DA44 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.
(b): Sampling context indicates if data were reported as results from surveillance/monitoring program or as results from a survey.

2.2.6. *Brucella*

Very few MSs submit data on *Brucella* in food (six MSs). The submitted data are primarily data from milk, cheese and dairy (three to six MSs) (Table DA45 in Appendix A), and the number of tested samples was quite large (Table DA46 in Appendix A). More than 400.000 samples have been reported, of which 98% were from milk (Table DA47 in Appendix A). Most of the milk samples originate from Belgian investigations of raw milk for manufacture (84%). However, information on sampling stage has only been provided one of these investigations.

From 2004 to 2009, only 15% of the samples tested for *Brucella* included information regarding sampling stage and sampling unit, and 98% of the samples originate from the one Belgian investigation.

2.2.7. Histamine

Most of the MSs reporting data on histamine, has submitted data from fish and fishery products (10 to 14 MSs per year) (Figure DA32). Figure DA34 presents the number of samples from fish and fishery products reported by MSs from 2006 to 2009. Most of the tested samples originated from fish species associated with a high amount of histidine and from products that were not enzyme maturated (72%). Majority of samples were collected to test for compliance with the foods safety criteria. More than half of these samples originate from two larger investigations from Italy and the Netherlands, where sampling stage was not stated (Figure DA34).

Sampling unit was reported for most samples, and the proportion of samples with specific sample stage information increased from 6% in 2004 to 40% in 2009. Overall, 24% of the samples tested for histamine included information regarding sampling unit and sampling stage (Figure DA34).

Information regarding sampling context, e.g. indications of whether the samples originate from surveillance or monitoring programmes or from a national survey, also increased in 2008/2009 (Figure DA34).

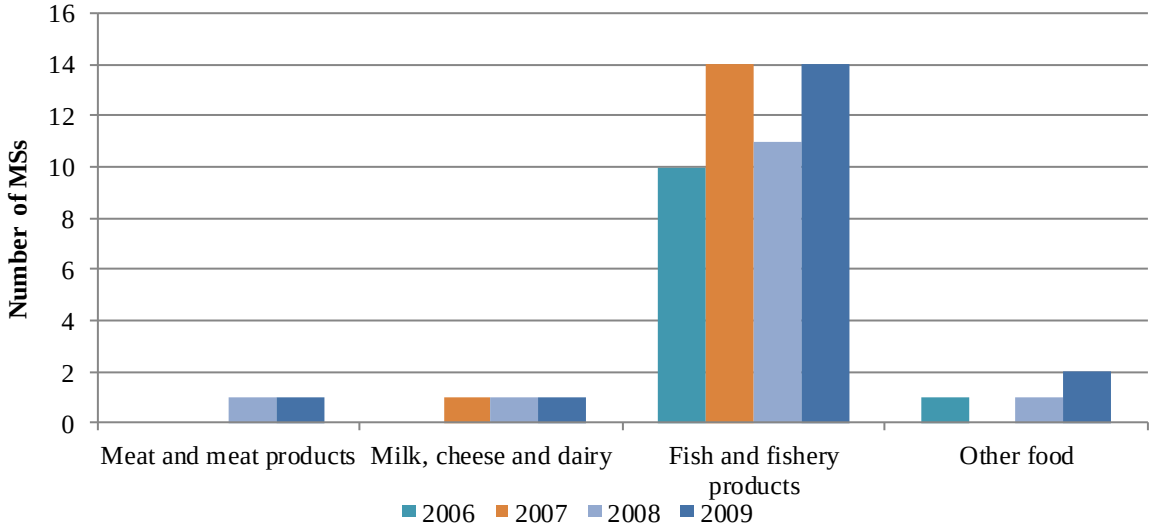

Figure DA32. Number of MSs reporting data for different food categories tested for histamine, 2006-2009

Note: For overview of MSs included in the figure see Table DA48 in the appendix.

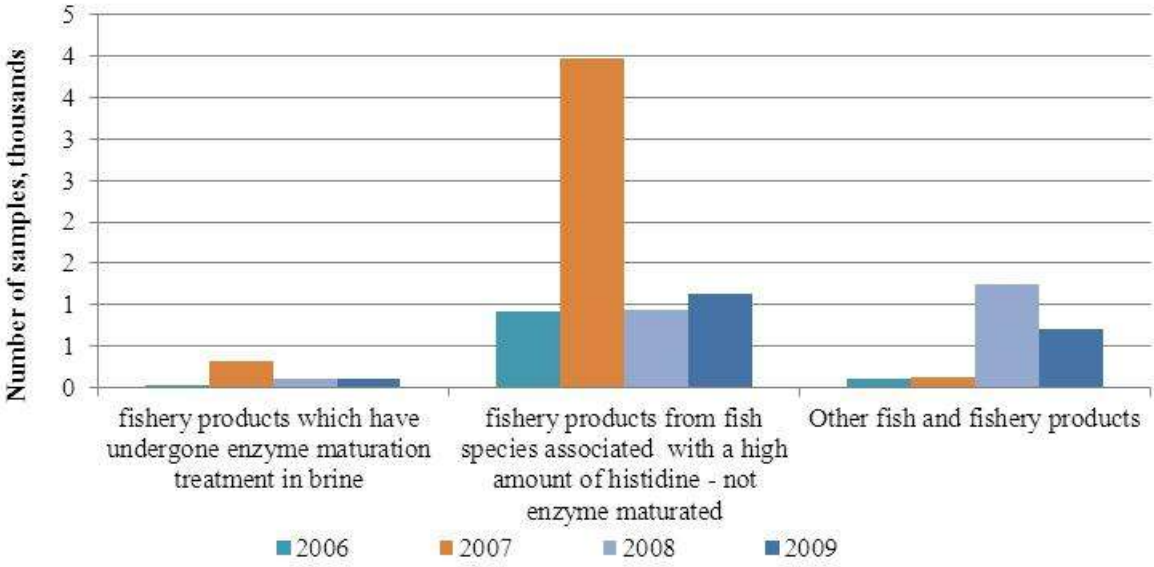

Figure DA33. Number of samples[(a)] from fish and fishery products tested for histamine, 2006-2009

Note: For overview of MSs and data included in the figure see Table DA48 and DA50 in the appendix.

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

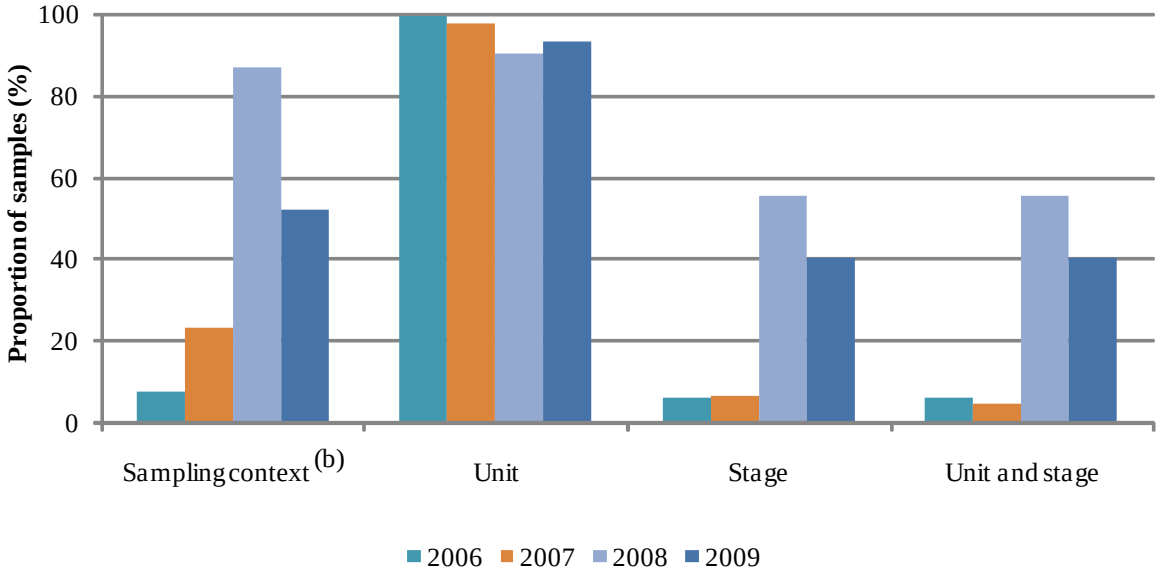

Figure DA34. Proportion of samples[(a)] tested for histamine with information on sampling context[(b)], unit and stage, 2006-2009

Note: For overview of MSs and data included in the figure see Table DA48, DA49 and DA50 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded. (b): Sampling context indicates if data were reported as results from surveillance/monitoring program or as results from a survey.

2.2.8. *Enterobacter sakazakii*

The number of MSs reporting data on *Enterobacter sakazakii* from special foods has increased from eight MSs in 2006 to 11 MSs in 2009. Less than five MSs reported data from the other food categories (Figure DA35). Most of the reported samples were from special food (Figure DA36) where infant formulae and foodstuffs intended for special nutritional uses represented 70% and 18%, respectively (Figure DA37) Even though, microbiological criteria were implemented for these two special foods in 2007, the number of reported samples has decreased, and most of the samples reported do not include information concerning the specific sampling stage. Most samples contained information regarding sampling unit, however the relatively low number of samples with sampling stage information, means that only 10% of the samples included information regarding sampling stage and sampling unit (Figure DA38). Information regarding sampling context, e.g. indications of whether the samples originate from surveillance or monitoring programmes or from a national survey, increase in 2008/2009.

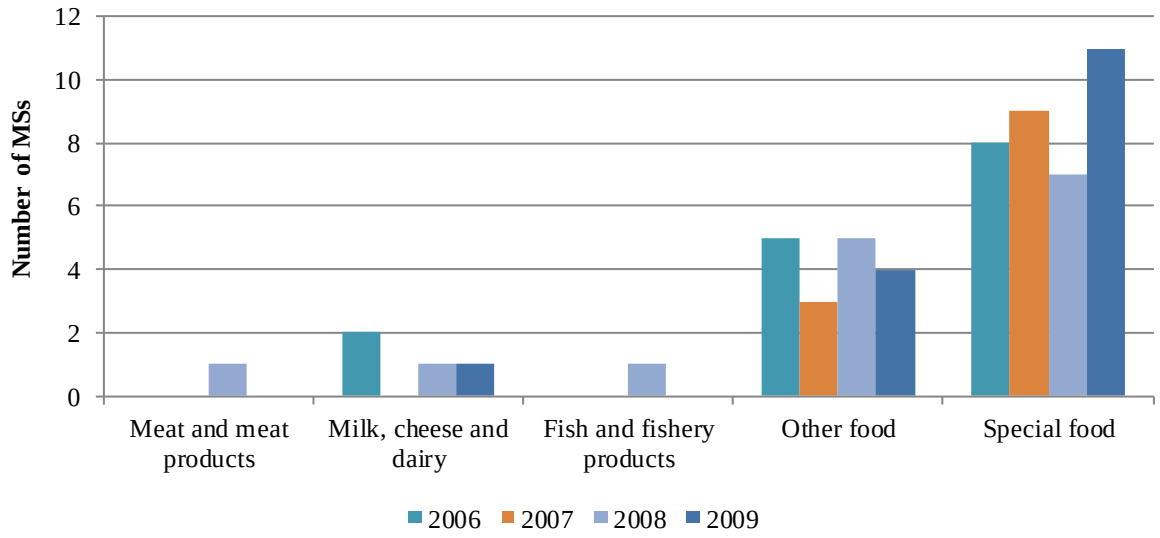

Figure DA35. Number of MSs reporting data for different food categories tested for *Enterobacter sakazakii*, 2006-2009

Note: For overview of MSs included in the figure see Table DA51 in the appendix.

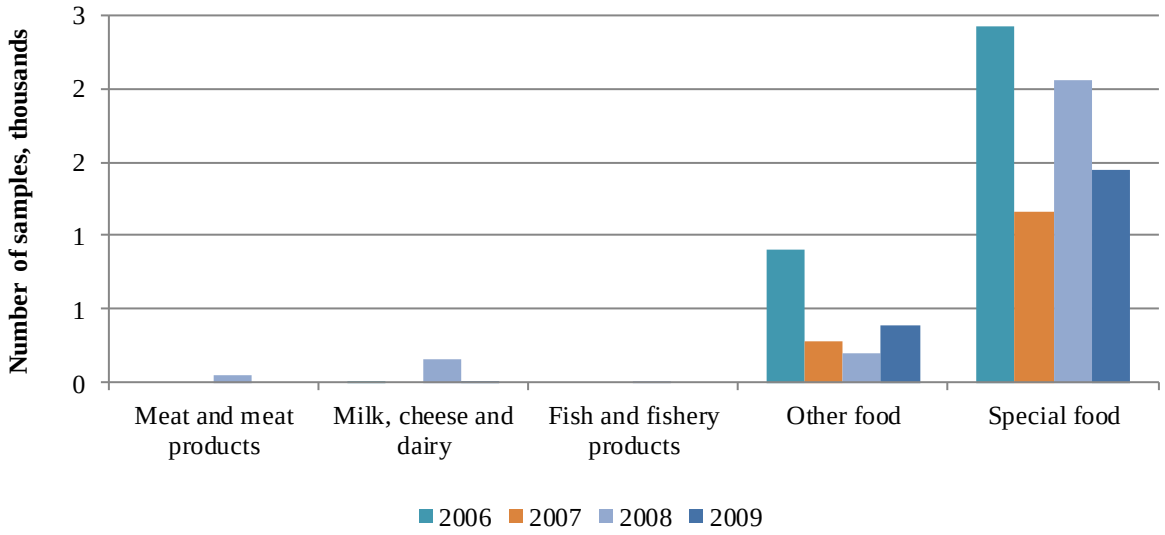

Figure DA36. Number of samples[(a)] from different food categories tested for *Enterobacter sakazakii*, 2006-2009

Note: For overview of MSs and data included in the figure see Table DA51 and DA52 in the appendix.

(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

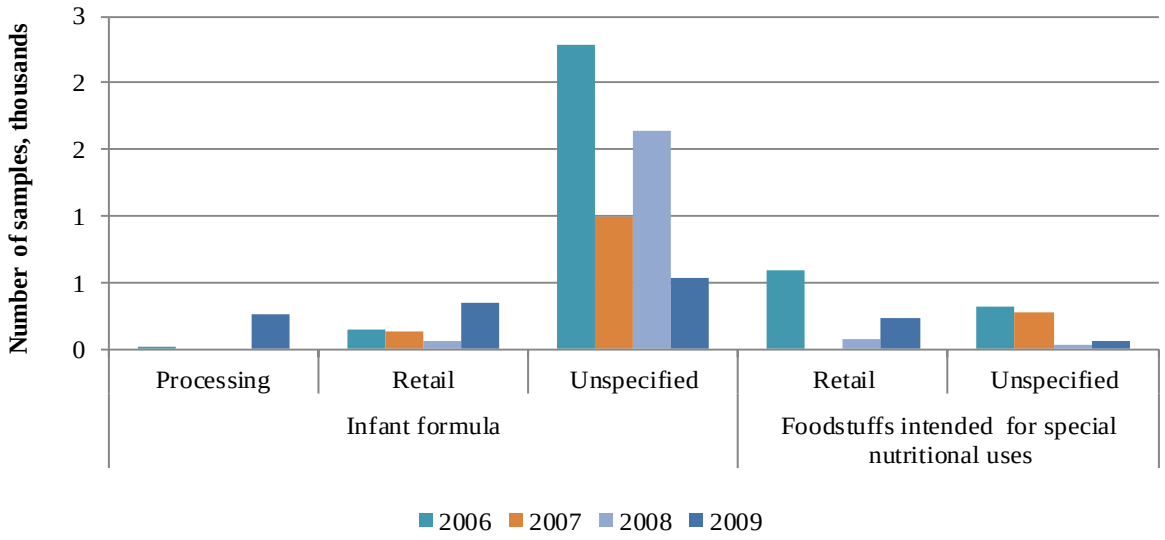

Figure DA37. Number of samples[(a)] from infant formulae and 'foodstuffs intended for special nutritional uses' tested for *Enterobacter sakazakii*, 2006-2009

Note: For overview of MSs and data included in the figure see Table DA51 and DA53 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

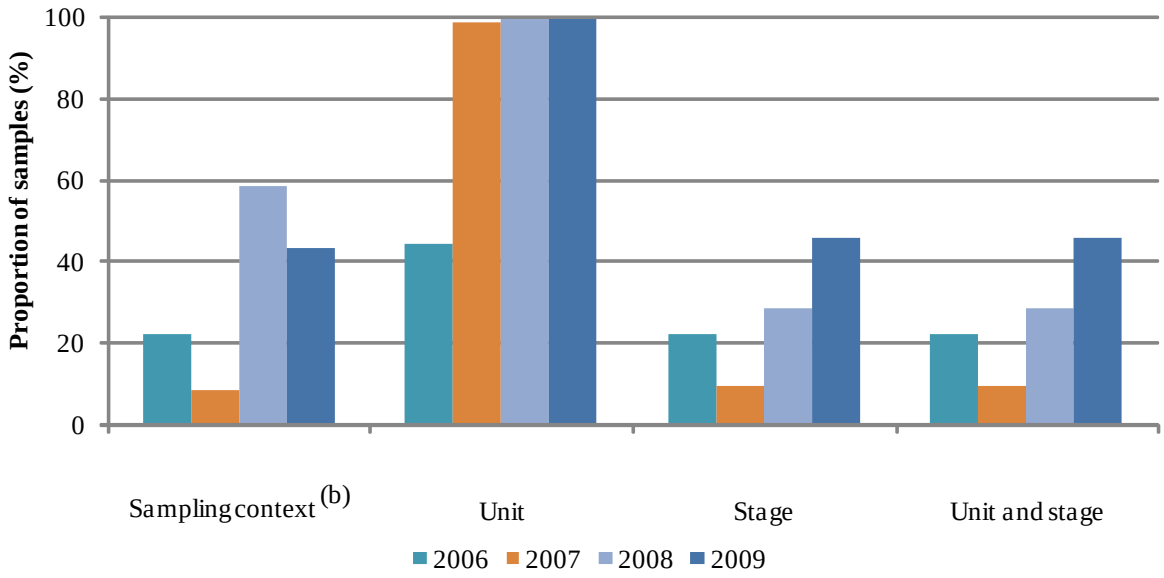

Figure DA38. Proportion of samples[(a)] tested for *Enterobacter sakazakii* with information on sampling context[(b)], unit and stage, 2006-2009

Note: For overview of MSs and data included in the figure see Table DA51 and DA52 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.
(b): Sampling context indicates if data were reported as results from surveillance/monitoring programmes or results from a survey.

2.2.9. Staphylococcal enterotoxins

The number of MSs reporting data on staphylococcal enterotoxins from milk, cheese and dairy has increased from eight MSs in 2006 to 12 MSs in 2009. Less than five MSs reported data from the other food categories (Figure DA39). Most of the samples were from milk, cheese and dairy (97%, primarily cheeses) (Figure DA40). In 2009, almost ten thousand samples from cheeses were reported, of which 80% originate from Bulgarian investigations of different types of cheeses. The sampling stage in these investigations was not reported and the proportion of samples including specific information regarding sampling stage varied considerably over the years (Figure DA41). Overall, only 8% of the samples tested for staphylococcal enterotoxins included information regarding sampling stage and sampling unit (Figure DA41).

Information regarding sampling context, e.g. indications of whether the samples originate from surveillance or monitoring programmes or from a national survey, increased in 2008/2009 (Figure DA41).

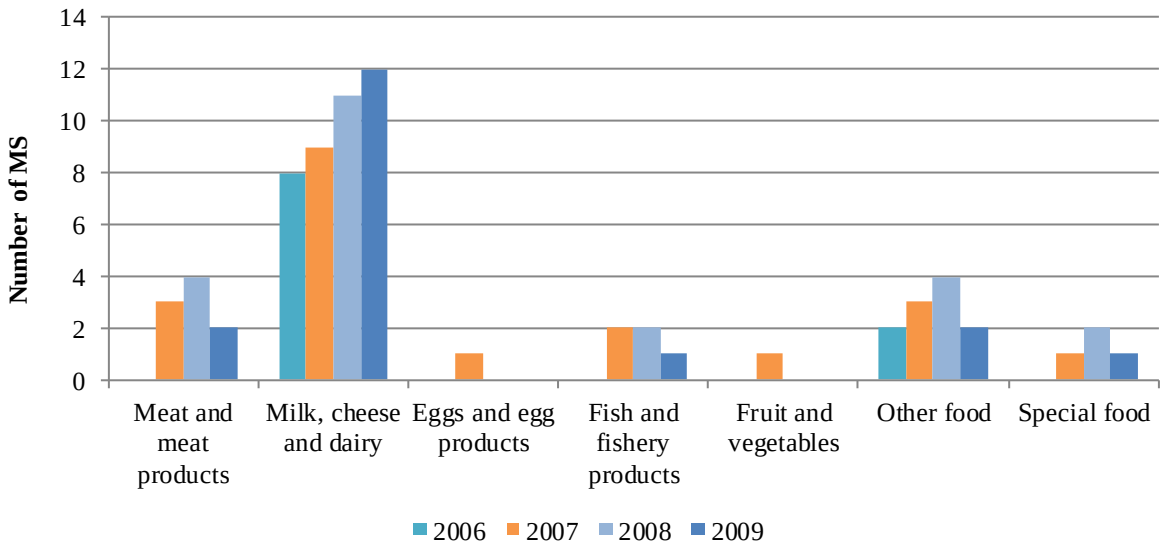

Figure DA39. Number of MSs reporting data for different food categories tested for staphylococcal enterotoxins, 2006-2009

Note: For overview of MSs included in the figure see Table DA54 in the appendix.

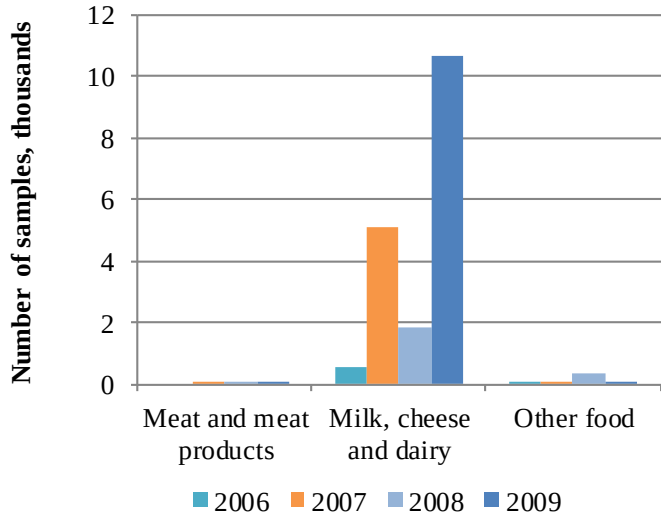

Figure DA40. Number of samples[(a)] from different food categories tested for staphylococcal enterotoxins, 2006-2009

Note: For overview of MSs and data included in the figure see Table DA54 and DA55 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

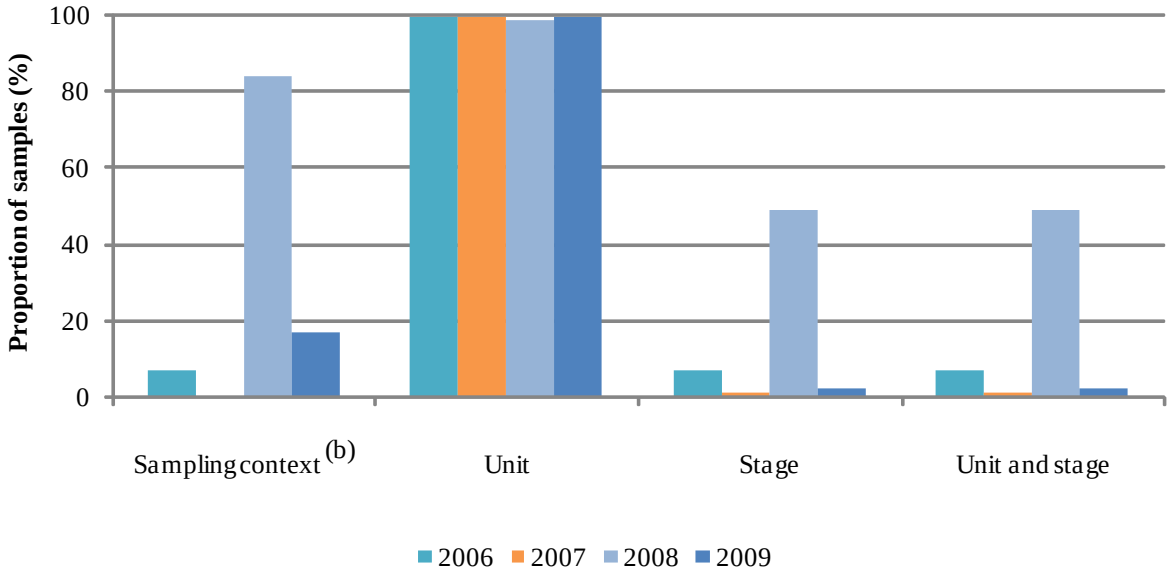

Figure DA41. Proportion of samples[(a)] tested for staphylococcal enterotoxins with information on sampling context[(b)], unit and stage, 2006-2009

Note: For overview of MSs and data included in the figure see Table DA54 and DA55 in the appendix.
(a): Samples include: single samples, batches and unspecified sampling units. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded. (b): Sampling context indicates if data were reported as results from surveillance/monitoring programmes or results from a survey.

2.3. Discussion

From 2004-2009, MSs have reported tests results from more than 5.5 million samples and non-MSs from more than 200,000 sample of fresh and processed meat, and other foodstuffs. Most of these investigations can be assumed to represent the occurrence of contaminants in domestically produced foods, however 12% of investigations were reported as HACCP, own controls and outbreak/clinical investigations or described as import, selective or suspect sampling. These types of data are difficult to interpret with regard to the occurrence of microbiological contaminants in domestically produced foods, however, the data have been valuable in relation to outbreak investigations as well as they can serve as valuable input data for risk assessments. Reporting of these data (HACCP, own control etc.) is not obligatory and relatively few MSs submit data each year. Even so, there has been an increase in number of samples described as HACCP, import control or described as being collected in a biased way, over the years. This probably reflects that more MSs are collecting samples and reporting to EFSA, but also better description of sampling context.

Among the investigations assumed to be representative of occurrence of contaminants in domestically produced foodstuffs, most samples were from meat and meat products and from milk, cheese and dairy tested for presence of *Salmonella* or *L. monocytogenes*. The number of samples tested for *Campylobacter* from broiler meat has also increased, especially at retail.

In 2007, microbiological criteria were implemented for *Salmonella* or *L. monocytogenes* in specific types of food. The microbiological criteria for *Salmonella* apply for specified foodstuffs at retail, and criteria for *L. monocytogenes* apply for specified foodstuffs at processing and retail. These requirements have, to some extent, been reflected in the number of samples reported. Especially, the number of samples from retail has increased for *Salmonella* in different types of processed meat and *L. monocytogenes* in different types of processed meat, cheese, and fishery products.

Microbiological criteria at retail level were also implemented for histamine (fish species associated with a high amounts of histidine and fish products enzyme maturated in brine), *E. Sakazakii* (dried infant formulae and special dietary foods) and staphylococcal enterotoxins (cheese, milk powder and whey powder), however this is not reflected in increasing numbers of samples tested at retail. The data on these microbiological contaminants were dominated by a few large investigations.

Specific information on sampling stage and sampling unit is essential if MS data are to be compared, and data without this information were excluded from the detailed analyses of the microbiological contaminants in Chapter 3. Overall, 86% of the samples complied with the criteria to be assumed representative of the occurrence of microbiological contaminants in domestically produced foodstuffs. However, when samples without specific information regarding sampling unit or sampling stage were excluded, only 44% of all data reported for 2004 to 2009 could be considered for analyses in this report. The overall proportion of representative data with specific information regarding sample unit and sample stage ranged from 49% for *Salmonella*, 43% for *Campylobacter* and 40% for *L. monocytogenes* to only 15% of the *Brucella*.

Since 2007, the data quality has clearly improved. Since then sampling unit has been reported for almost all reported samples, and the proportion of samples with sampling stage also increased except for samples tested for *Yersinia*, *Brucella* and staphylococcal enterotoxins. These data were dominated by a few large investigations. The improved data quality from 2007 and forward, probably reflect that the national reporting officers have more experience in reporting into EFSA's web based reporting system, e.g. choosing all the appropriate descriptive variables in the database pick-lists. However, some of the missing information might still be available in the MSs, and continued update of the historical data would further improve the data quality for future analyses. The increased use of submitting data as XML-files will hopefully also improve data quality.

Overall, the quality of information submitted by MSs on specific zoonoses in food has improved over the years and the database is and will continue to be an important source of information regarding the European situation concerning microbiological contaminants in food.

3. Results

3.1. *Salmonella*

Salmonella is a genus of mainly zoonotic bacteria associated with the gut of humans and animals. Although often present in animals in subclinical levels, the bacteria may cause gastroenteritis in humans. The enteric disease can range from mild and self-limiting to life threatening, and the bacteria may also reach the bloodstream, leading to more systemic disease. Salmonellosis has also been associated with long-term and sometimes chronic sequelae such as e.g. reactive arthritis.

Transmission occurs from none or lightly heat treated food of animal origin or from food contaminated with animal faeces, e.g. eggs or fresh meat, giving rise to contamination of ready-to-eat food during handling. Also, fruit and vegetables can act as vehicles of *Salmonella* infection if contaminated with faeces during growth, harvest or handling. The bacteria may also be transmitted through direct or indirect contact with infected animals or humans.

All MSs and two non-MSs reported data on *Salmonella* in food during the period 2004 to 2009 (Table SA1). The number of samples or batches tested within food categories ranged from less than 25 (not included in the report) to several thousand. The majority of samples or batches were collected from meat and meat products, especially pig meat and products derived hereof. Information from surveys was difficult to interpretate and was not included in the tables and figures, however they were be addressed in the text when relevant.

Table SA1. Overview of countries reporting data included in the analysis for *Salmonella*, 2004-2009

Food categories	No of reporting MSs		Non-MSs
Meat and meat products			
2004	17	MSs: AT, BE, CY, CZ, DE, DK, EE, FI, GR, IT, LT, LV, PL, PT, SE, SI, UK	Non-MS: NO
2005	12	MSs: BE, CZ, DK, EE, FI, GR, IE, LV, PL, SE, SI, UK	Non-MS: NO
2006	12	MSs: AT, BE, DK, EE, ES, FI, GR, IE, LT, SE, SI, UK	Non-MS: NO
2007	20	All MSs except BG, CY, FR, IT, MT, SK, UK	Non-MSs: CH, NO
2008	24	All MSs except CY, HU, MT	Non-MSs: CH, NO
2009	23	All MSs except CY, IT, MT, UK	Non-MSs: CH, NO
Eggs and egg products			
2004	7	MSs: AT, CY, DE, EE, GR, IT, SI	-
2005	12	MSs: AT, CY, CZ, DE, EE, GR, IE, IT, PL, SE, SI, SK	-
2006	15	MSs: AT, BE, DE, EE, ES, GR, HU, IE, IT, LT, NL, PL, SE, SI, SK	Non-MS: RO
2007	16	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, LU, NL, PL, PT, RO, SK	-
2008	16	MSs: AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, PL, RO, SK	-
2009	14	MSs: AT, BE, BG, CZ, DE, ES, GR, HU, IE, LT, PL, PT, RO, SK	-

Table SA1 (contd.). Overview of countries reporting data included in the analysis for *Salmonella,* 2004-2009

Food categories	No of reporting MSs		Non-MSs
Milk, cheese and dairy			
2004	4	MSs: CZ, EE, FI, SI	-
2005	4	MSs: BE, DE, EE, IE	-
2006	3	MSs: BE, EE, IE	-
2007	13	MSs: AT, BE, CZ, DE, EE, GR, HU, IE, NL, PL, PT, RO, SI	Non-MS: CH
2008	16	MSs: AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LV, PL, PT, RO, SI	Non-MS: CH
2009	15	MSs: AT, BE, BG, CZ, DE, EE, GR, HU, IE, NL, PL, PT, RO, SI, SK	Non-MS: CH
Fish and fishery products			
2004	3	MSs: CZ, EE, SI	-
2005	4	MSs: BE, CZ, EE, IE	-
2006	3	MSs: BE, EE, IE	-
2007	13	MSs: AT, BE, CZ, DE, EE, GR, HU, IE, LV, NL, PL, PT, SE	Non-MS: NO
2008	17	MSs: AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, PT, RO, SE, UK	Non-MS: NO
2009	14	MSs: BE, BG, CZ, DE, EE, GR, HU, IE, LV, NL, PL, PT, RO, SK	-
Fruit and vegetables			
2004	2	MSs: CZ, EE	-
2005	4	MSs: BE, EE, GR, IE	-
2006	4	MSs: BE, EE, IE, SI	-
2007	4	MSs: AT, EE, IE, UK	-
2008	9	MSs: AT, BE, CZ, EE, HU, IE, NL, PT, RO	-
2009	8	MSs: AT, CZ, EE, HU, IE, NL, RO, SK	-
Special food			
2004	1	MS: EE	-
2005	1	MS: EE	-
2006	3	MSs: BE, EE, IE	-
2007	3	MSs: AT, CZ, IE	-
2008	2	MSs: CZ, IE	-
2009	3	MSs: AT, IE, SK	-
Other food			
2004	3	MSs: CZ, EE, SI	-
2005	4	MSs: BE, CZ, EE, IE	-
2006	5	MSs: AT, BE, EE, IE, LT	-
2007	9	MSs: AT, BE, CZ, EE, GR, IE, PT, SI, UK	-
2008	15	MSs: AT, BE, CZ, EE, GR, HU, IE, IT, LT, PL, PT, RO, SE, SI, UK	-
2009	13	MSs: AT, CZ, EE, GR, HU, IE, LU, NL, PT, RO, SI, SK, UK	-

Note: MSs reporting >24 samples per food category per sampling unit were included.

3.1.1. Compliance with *Salmonella* food safety criteria

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 and was modified by Regulation (EC) No 1441/2007, entering into force in December 2007. The Regulation states that:

Salmonella must be absent in the food categories mentioned in Table SA2 and SA3 placed on the market during their shelf life. Absence is defined by testing of five or thirty samples of 25 g per batch depending of the food category.

In official controls, often only single samples were taken to verify compliance with the criteria.

Every year, the lowest levels of single and batch based samples in compliance with the *Salmonella* food safety criteria have been observed in processed meat (Figure SA1 and SA2). For single samples, minced meat and meat preparations made from poultry meat intended to be eaten cooked was by far the food category with lowest levels of compliance (11.2% to 16.7%) except for 2007. However the figures cover large variations between MSs and years. No MSs reported consistently throughout the period. For batch based data on minced meat and meat preparations made from poultry meat intended to be eaten cooked, the proportion of samples in non-compliance decreased dramatically from 14.0% in 2007 to 1.1% in 2009. A decrease of batches in non-compliance was also observed from 2007 to 2009 in meat products from poultry meat intended to be eaten cooked although only from 3.0% to 0.1%.

For minced meat and meat preparations made from species other than poultry, intended to be eaten cooked, the proportion on samples in non-compliance with the criteria were similar between years (1.3-2.4% in single samples and 0.3-1.6% in batches). The total number of reported samples increased from 2006-2009 and for batch based data this was mainly due to reporting from Bulgaria.

In all food categories other than meat products, most data were in compliance with the *Salmonella* food safety criteria (Table SA2 and SA3). In single samples, non-compliance was reported in 2007 and 2009 in egg products, in 2006 and 2007 in cooked crustaceans and molluscan shellfish and in 2007 and 2008 in live bivalve molluscs and live echinoderms, tunicates and gastropods. In batches, non-compliance was reported in 2008 in ice-cream and in 2009 in cheese, butter and cream made from raw or low heat-treated milk. For all remaining food categories, data were in compliance with the Regulation.

When investigating the criteria of absence of *Salmonella* in a product, the Regulation states that 25g should be analysed and most reported data were based on the analysis on 25g samples. The remaining data were mainly based on samples of 10g.

Table SA2. Compliance with the *Salmonella* food safety criteria laid down by Regulation (EC) No 2073/2005 and 1441/2007, single samples, 2006-2009

	2006		2007		2008		2009	
Food categories[(a)]	**N**	**% in non-compliance**	**N**	**% in non-compliance**	**N**	**% in non-compliance**	**N**	**% in non-compliance**
1.4 Minced meat and meat preparations intended to be eaten raw	35	0	2,502	1.3	1,452	3.2	1,163	1.9
1.5 Minced meat and meat preparations made from poultry meat intended to be eaten cooked	12	16.7	292	1.4	129	11.6	116	11.2
1.6 Minced meat and meat preparations made from other species than poultry intended to be eaten cooked	250	2.4	1,212	1.9	1,186	1.3	2,383	2.1
1.7 Mechanically separated meat (MSM)	1	0	-	-	82	0	6	0
1.8 Meat products intended to be eaten raw	125	2.4	31	0	122	0.8	56	0
1.9 Meat products from poultry meat intended to be eaten cooked	170	0.6	1,443	0.7	1,215	1.2	1,280	0.9
1.11 Cheeses, butter and cream made from raw or low heat-treated milk	134	0	639	0	339	0	1,261	0
1.12 Milk and whey powder	-	-	40	0	74	0	129	0
1.13 Ice-cream	524	0	7,491	0	8,593	0	6,784	<0.1
1.14 Egg products	-	-	1,002	0.4	631	0	605	0.3
1.16 Cooked crustaceans and molluscan shellfish	138	0.7	397	0.3	281	0	173	0
1.17 Live bivalve molluscs and live echinoderms, tunicates and gastropods	92	0	60	1.7	173	0.6	-	-
1.18 Sprouted seeds (RTE)	6	0	6	0	51	0	1	0
1.19 Pre-cut fruit and vegetables (RTE)	87	0	43	0	49	0	7	0
1.20 Unpasteurised fruits, vegetables and juices (RTE)	-	-	272	0	20	0	18	0
1.22 Dried infant formulae and dried dietary foods for special medical purpose intended for infants below 6 months of age	143	0	2	0	120	0	30	0

(a): Numbers before food categories refer to Annex 1, chapter 1 of Regulation (EC) No 2073/2005 as amended.

Table SA3. Compliance with the *Salmonella* food safety criteria laid down by Regulation (EC) No 2073/2005 and 1441/2007, batch based samples, 2006-2009

	2006		2007		2008		2009	
Food categories [(a)]	**N**	**% in non-compliance**	**N**	**% in non-compliance**	**N**	**% in non-compliance**	**N**	**% in non-compliance**
1.4 Minced meat and meat preparations intended to be eaten raw	-	-	2	0	10	0	636	1.4
1.5 Minced meat and meat preparations made from poultry meat intended to be eaten cooked	-	-	343	14.0	761	0.9	1,258	1.1
1.6 Minced meat and meat preparations made from other species than poultry intended to be eaten cooked	-	-	729	1.6	7,564	1.0	8,766	0.3
1.7 Mechanically separated meat (MSM)	-	-	-	-	10	0	5	0
1.8 Meat products intended to be eaten raw	-	-	-	-	12	0	-	-
1.9 Meat products from poultry meat intended to be eaten cooked	-	-	231	3.0	1,333	1.5	2,902	0.1
1.10 Gelatine and collagen	-	-	-	-	-	-	4	0
1.11 Cheeses, butter and cream made from raw or low heat-treated milk	-	-	11	0	1,472	0	3,223	<0.1
1.12 Milk and whey powder	-	-	90	0	157	0	136	0
1.13 Ice-cream	-	-	352	0	1,211	<0.1	3,103	0
1.14 Egg products	-	-	25	0	1,592	0	1,196	0
1.16 Cooked crustaceans and molluscan shellfish	-	-	186	0	56	0	496	0
1.18 Sprouted seeds (RTE)	-	-	-	-	30	0	3	0
1.20 Unpasteurised fruits, vegetables and juices (RTE)	-	-	-	-	150	0	210	0
1.22 Dried infant formulae and dried dietary foods for special medical purpose intended for infants below 6 months of age	-	-	19	0	-	-	-	-

(a): Numbers before food categories refer to Annex 1, chapter 1 of Regulation (EC) No 2073/2005 as amended.

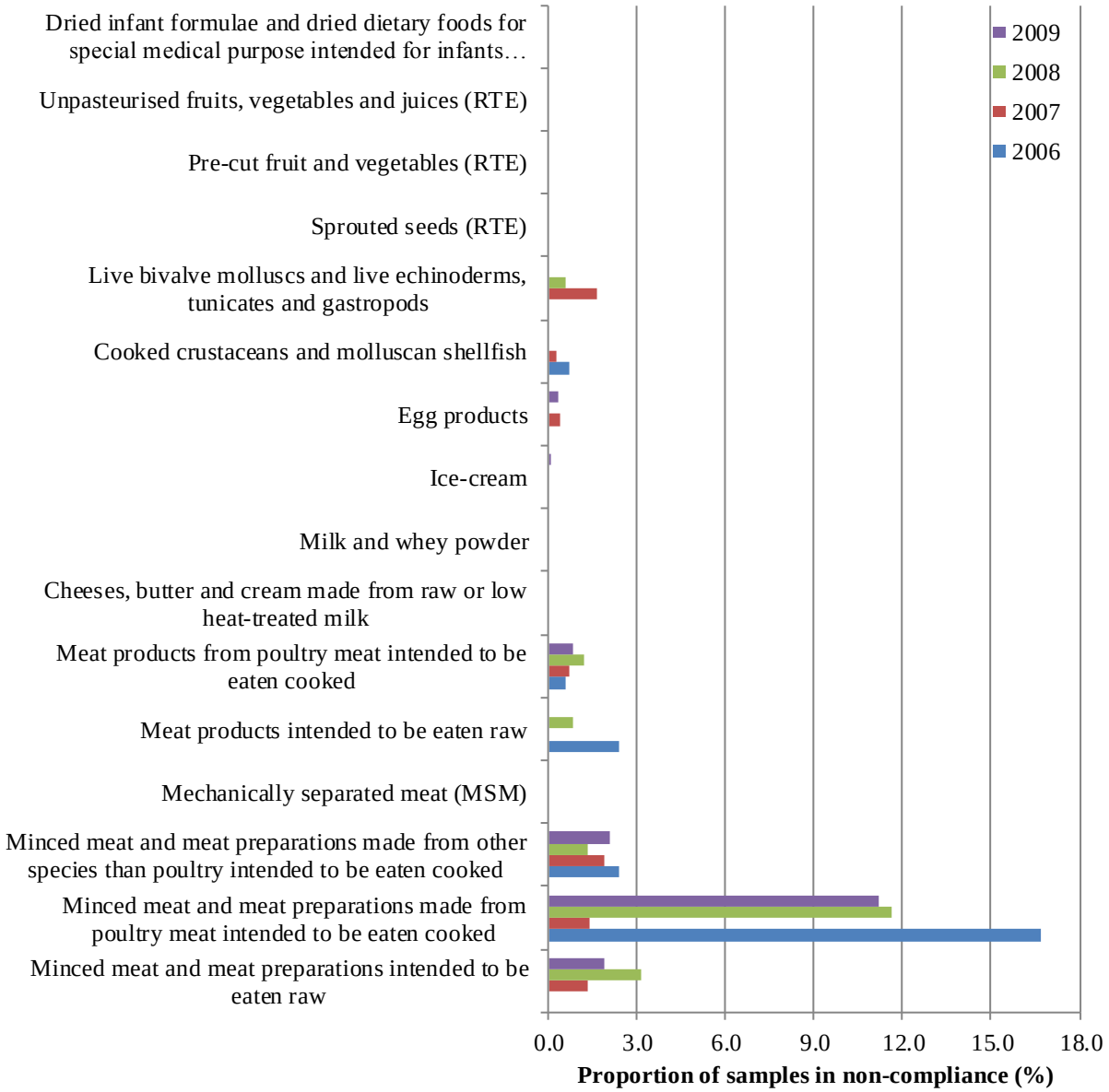

Figure SA1. Proportion of single samples in non-compliance with the EU *Salmonella* criteria, 2006-2009

Note: For overview of MSs included in the figure and total number of samples see Table SA36.

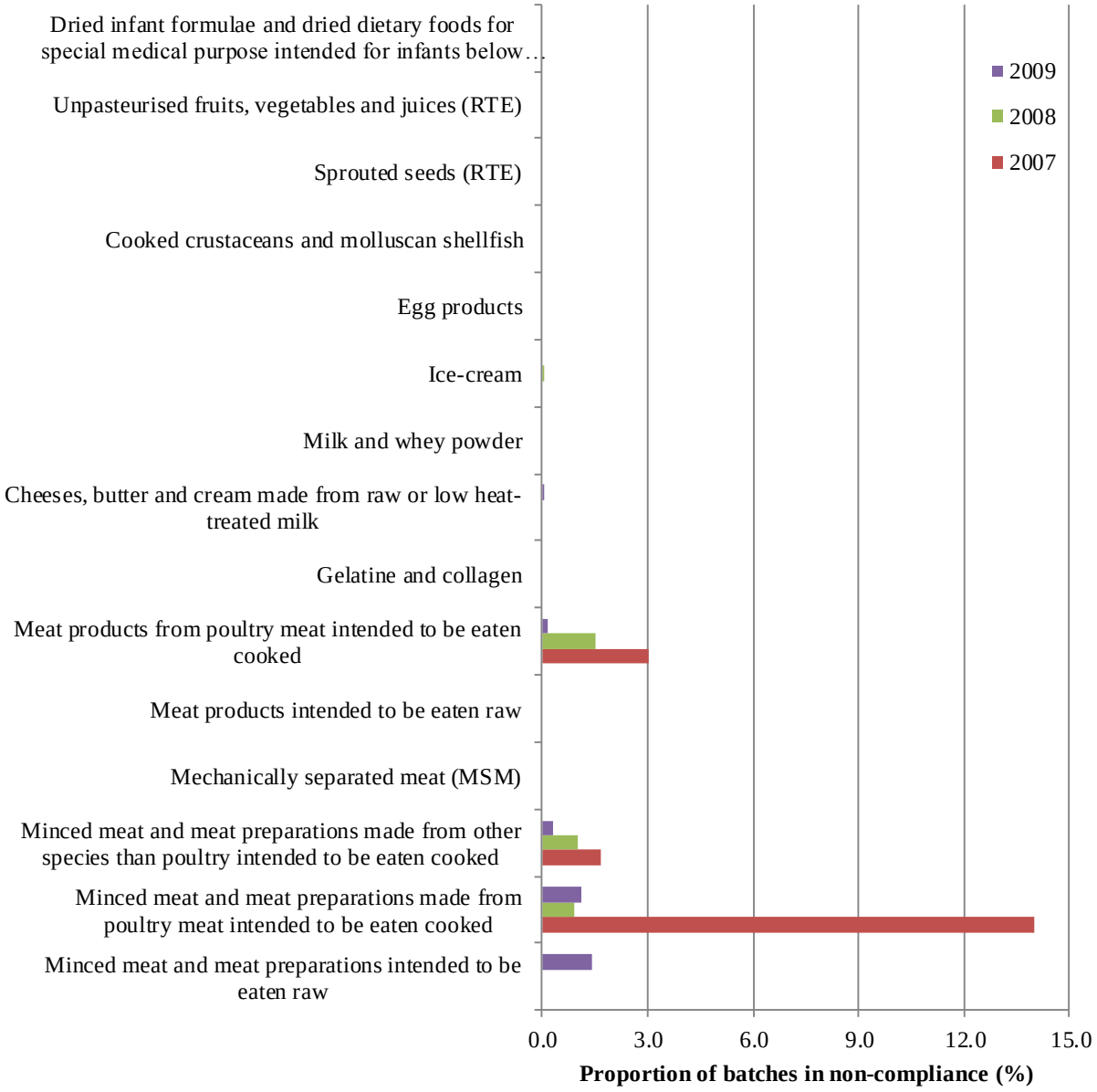

Figure SA2. Proportion of batches in non-compliance with the EU *Salmonella* criteria, 2007-2009[(a)]

Note: For overview of MSs included in the figure and total number of samples see Table SA36.
(a): Batch based data from 2006 are not included as the data quality did not meet the requirements set out for this report.

3.1.2. *Salmonella* in food

3.1.2.1. Broiler meat and products thereof

Data on *Salmonella* in fresh broiler meat have been reported by all MSs except Malta and Portugal at some part of the period 2004 to 2009 and data were reported from all sampling stages (Table SA4 and SA5). A few MSs have reported consistently throughout the period. Majority of data, especially on single samples, were reported from 2007to 2009.

At MSs level, the occurrence of *Salmonella* in single samples varied from 0% to 60.8% (Table SA4). Over time, the proportion of positive samples within the entire group of reporting MSs varied between 5.4% and 21.6% at slaughter, between 0.6% and 7.3% at processing and between 6.4% and 8.9% at retail. There was no clear temporal trend regarding fraction of positive samples (Figure SA3). Hungary reported the highest levels of positive samples at all sampling stages. Finland was the only country to report data from the same stage (processing) every year and found only one positive sample (in 2004) out of a total of 4,628 samples.

Few data were available from batches (Table SA5). Values as high as 36.6% were reported by Cyprus in 2004, but most investigations had less than 10% positive samples.

Only four surveys with more than 25 observations have been reported. Belgium reported 16 positive single samples out of 183 (8.7%) at processing and 17 positive out of 126 (13.5%) at retail, both in 2004. The same year, the United Kingdom reported 40 positive samples in a survey at retail level comprising 1,033 single samples (3.9%), and in 2008, Spain found 58 positive single samples out of 389 (14.9%) at slaughter. These data were not included in the tables and figures.

For samples of processed broiler meat, there were more observations in the years 2007 to 2009 compared to the years 2004 to 2006. Occurrence of *Salmonella* in non ready-to-eat (non-RTE) processed meat ranged from 0% to 32.7% in single samples and from 0% to 20.2% in batches (Table SA6 and SA7). Processed meat includes meat preparations, meat products and minced meat. At slaughter and processing, the processed meat also includes mechanically separated meat. Very little consistency was seen concerning reporting from individual MSs during the period as well as numbers of samples and proportions of positives in MSs. One exception was Greece reporting investigations of single samples every year from both processing and retail. Likewise, Ireland consistently reported investigations from 2005 to 2009.

MSs reporting data on RTE broiler meat only reported on RTE meat products (Table SA8 and SA9). Occurrence of *Salmonella* ranged from 0% to 6.7% in single samples at processing and from 0% to 5.6% at retail. The highest level of positive single samples was reported by Germany in 2007. In batches, the occurrence of *Salmonella* was lower, ranging from 0% to 0.9%.

Pooled data covering the whole period are presented in Figure SA4 and SA5. There was no consistent reduction of *Salmonella* along the production chain (slaughter to retail), but differences were observed for different products along the production line, i.e. RTE products were clearly less frequently contaminated with *Salmonella* than fresh meat and non-RTE processed meat. Increased occurrence of *Salmonella* in fresh meat at retail (single samples) compared to processing was found in each of the years 2004, 2007 and 2008 (Table SA4 and Figure SA3 and SA4). Only few data were reported from retail in 2005 and 2006 and thus no conclusions concerning this category can be drawn for these years. The relatively high occurrence of *Salmonella* in RTE meat at retail (single samples, Figure SA4) was mainly caused by high numbers reported by Austria and Germany in 2004 and by Austria and Spain in 2008.

Very few data have been reported from surveys of processed broiler meat. In 2004, Belgium reported on single samples of non-RTE processed meat at retail and 62 samples out of 335 contained *Salmonella* (18.5%). This result was not included in the tables and figures.

Table SA4. *Salmonella* in fresh broiler meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	
Slaughter												
Belgium	-	-	228	5.7	69	1.4	58	10.3	285	14.4	422	5.9
Czech Republic	240	0	-	-	-	-	-	-	-	-	-	-
Estonia	62	3.2	-	-	-	-	NS	NS	NS	NS	-	-
Germany	-	-	-	-	-	-	-	-	55	12.7	-	-
Greece	897	5.5	-	-	-	-	-	-	76	6.6	NS	NS
Hungary	-	-	-	-	-	-	232	43.5	-	-	653	60.8
Ireland	-	-	-	-	-	-	-	-	-	-	250	14.0
Italy	43	0	-	-	-	-	-	-	NS	NS	-	-
Latvia	-	-	-	-	-	-	100	15.0	50	22.0	-	-
Poland	753	7.8	-	-	-	-	-	-	-	-	-	-
Slovenia	79	1.3	-	-	-	-	187	0.5	-	-	-	-
Spain	-	-	-	-	-	-	184	22.3	76	15.8	90	26.7
Sweden	-	-	3,506	0	3,369	0.1	-	-	-	-	-	-
Processing												
Austria	-	-	-	-	-	-	67	7.5	64	0	39	2.6
Belgium	-	-	260	14.2	293	13.3	-	-	568	7.0	415	8.2
Estonia	42	4.8	-	-	-	-	NS	NS	NS	NS	-	-
Finland	777	0.1	772	0	752	0	757	0	768	0	802	0
Germany	46	6.5	-	-	-	-	36	11.1	79	5.1	60	6.7
Greece	-	-	785	2.8	805	2.6	27	55.6	77	15.6	NS	NS
Hungary	-	-	-	-	-	-	-	-	-	-	302	31.1
Ireland	-	-	1,966	3.5	6,132	2.1	5,050	5.5	NS	NS	120	2.5
Italy	202	3.5	-	-	-	-	-	-	NS	NS	-	-
Slovenia	-	-	70	0	172	0	-	-	-	-	96	0
Spain	-	-	-	-	-	-	144	2.8	91	15.4	105	5.7
Sweden	1,025	0	1,014	0	1,047	0	-	-	1,441	0	-	-

(continue next page)

Table SA4 (contd.). *Salmonella* in fresh broiler meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Retail												
Austria	1,042	8.5	-	-	-	-	86	5.8	295	7.8	51	0
Belgium	-	-	90	2.2	80	5.0	416	6.7	88	11.4	119	5.9
Czech Republic	-	-	-	-	-	-	-	-	-	-	240	1.7
Estonia	-	-	51	11.8	68	10.3	30	3.3	NS	NS	-	-
France	-	-	-	-	-	-	-	-	-	-	361	3.6
Germany	838	12.9	-	-	-	-	714	8.5	993	10.8	599	6.2
Greece	25	0	33	18.2	NS	NS	69	11.6	64	15.6	NS	NS
Hungary	-	-	-	-	-	-	-	-	-	-	97	36.1
Italy	269	4.1	-	-	-	-	-	-	NS	NS	-	-
Latvia	-	-	-	-	-	-	-	-	85	8.2	NS	NS
Lithuania	NS	NS	-	-	-	-	-	-	136	16.2	71	1.4
Luxembourg	-	-	-	-	-	-	254	6.7	101	5.9	81	3.7
Netherlands	-	-	-	-	-	-	1,418	8.1	-	-	615	7.6
Romania	-	-	-	-	-	-	-	-	-	-	149	0
Slovakia	-	-	-	-	-	-	-	-	-	-	35	2.9
Slovenia	95	7.4	-	-	-	-	343	2.3	315	0.6	106	1.9
Spain	-	-	-	-	-	-	206	10.2	195	3.6	167	13.8
Sweden	197	2.0	-	-	-	-	NS	NS	38	0	-	-
United Kingdom	-	-	877	4.0	860	3.6	-	-	-	-	-	-
Switzerland	-	-	-	-	-	-	415	6.5	-	-	-	-
MS total												
Slaughter	2,074	5.4	NS	NS	NS	NS	761	21.6	542	14.0	NS	NS
Processing	2,092	0.6	4,867	2.6	9,201	2.0	6,081	5.0	3,088	2.3	1,939	7.3
Retail	2,466	8.9	NS	NS	NS	NS	3,536	7.5	2,310	8.4	2,691	6.4

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.

Table SA5. *Salmonella* in fresh broiler meat, batch based data, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter												
Czech Republic	-	-	-	-	-	-	1,697	1.8	1,367	4.2	708	3.0
Denmark	1,472	1.6	1,174	2.3	775	1.9	828	1.2	518	0.6	375	0.8
Estonia	-	-	56	8.9	102	2.0	-	-	-	-	-	-
Latvia	70	7.1	39	5.1	-	-	-	-	-	-	-	-
Lithuania	-	-	-	-	1,081	6.9	-	-	-	-	-	-
Poland	-	-	-	-	-	-	1,340	7.5	-	-	8,664	5.5
Romania	-	-	-	-	-	-	-	-	2,027	0.6	1,167	0.9
Sweden	-	-	-	-	-	-	-	-	4,686	0	-	-
Switzerland	-	-	-	-	-	-	-	-	-	-	288	1.7
Processing												
Belgium	-	-	-	-	-	-	170	6.5	-	-	-	-
Cyprus	134	36.6	-	-	-	-	-	-	-	-	-	-
Estonia	-	-	93	21.5	40	7.5	94	1.1	48	0	-	-
Ireland	-	-	-	-	-	-	261	11.5	219	15.1	-	-
Poland	-	-	-	-	-	-	-	-	-	-	50	0
Romania	-	-	-	-	-	-	-	-	294	0.7	153	0
Switzerland	-	-	-	-	-	-	-	-	-	-	697	1.1
Retail												
Bulgaria	-	-	-	-	-	-	-	-	4,046	0.3	8,414	0.1
Latvia	345	7.2	96	11.5	-	-	40	15.0	-	-	-	-
Romania	-	-	-	-	-	-	-	-	295	2.4	-	-

Table SA6. *Salmonella* in non ready-to-eat processed broiler meat[(a)], single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Belgium	-	-	-	-	-	-	32	0	-	-	-	-
Estonia	-	-	-	-	-	-	43	2.3	NS	NS	NS	NS
Germany	29	6.9	-	-	-	-	34	11.8	136	6.6	NS	NS
Greece	518	0.8	112	7.1	794	1.0	55	32.7	196	10.2	98	4.1
Hungary	-	-	-	-	-	-	-	-	-	-	201	10.0
Ireland	-	-	61	1.6	2,237	1.4	1,182	2.0	109	3.7	150	1.3
Italy	38	0	-	-	-	-	-	-	-	-	-	-
Latvia	-	-	-	-	-	-	-	-	50	0	-	-
Portugal	-	-	-	-	-	-	-	-	NS	NS	44	4.5
Spain	-	-	-	-	-	-	36	5.6	-	-	-	-
Retail												
Austria	84	10.7	-	-	-	-	50	12.0	-	-	-	-
Belgium	-	-	-	-	-	-	86	5.8	-	-	-	-
Estonia	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	26	0
France	-	-	-	-	-	-	-	-	100	3.0	-	-
Germany	221	5.0	-	-	-	-	128	14.1	149	6.7	228	6.1
Greece	518	1.0	474	0	53	0	NS	NS	46	13.0	37	16.2
Hungary	-	-	-	-	-	-	-	-	-	-	171	17.0
Ireland	-	-	NS	NS	NS	NS	136	0	849	0.5	858	0
Italy	153	0.7	-	-	-	-	-	-	NS	NS	-	-
Latvia	-	-	-	-	-	-	-	-	80	0	NS	NS
Lithuania	NS	NS	-	-	-	-	-	-	73	17.8	NS	NS
Netherlands	-	-	-	-	-	-	126	4.0	-	-	343	7.9
Romania	-	-	-	-	-	-	2,091	0	-	-	45	0
Slovenia	-	-	-	-	-	-	-	-	50	0	44	6.8
Spain	-	-	-	-	-	-	90	1.1	-	-	-	-
Sweden	89	0	-	-	-	-	NS	NS	-	-	-	-
Switzerland	-	-	-	-	-	-	-	-	179	2.8	-	-
MS Total												
Processing	NS	NS	NS	NS	NS	NS	1,382	3.5	NS	NS	NS	NS
Retail	1,065	2.5	NS	NS	NS	NS	2,707	1.3	1,347	2.7	1,752	4.5

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

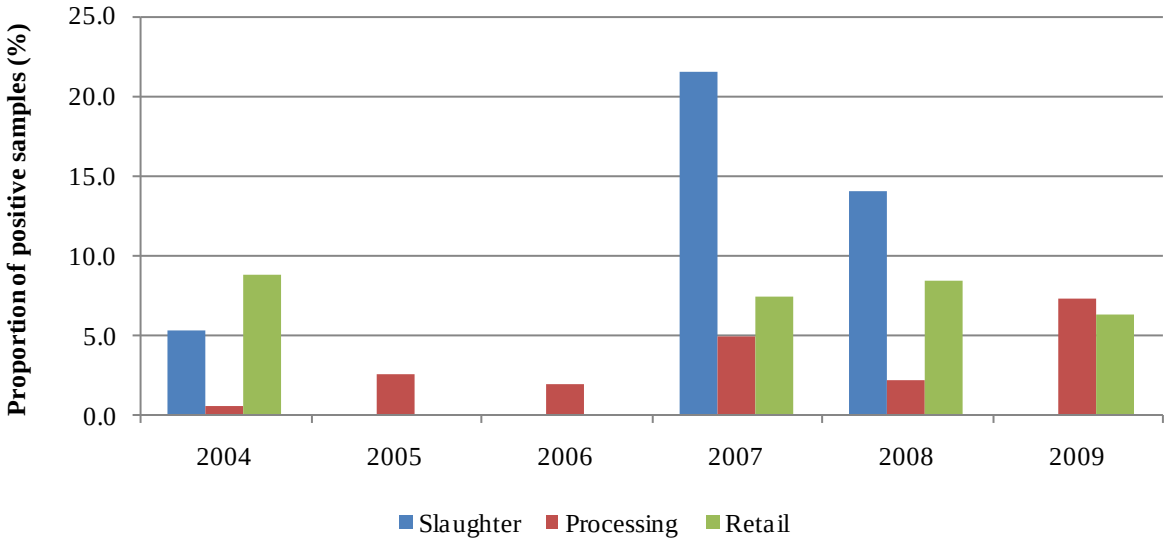

Figure SA3. *Salmonella* in fresh broiler meat at different stages of production, single samples reported by MSs, 2004-2009

Note: Minimum five MSs must report sufficient data for a sampling stage/year data point to be presented in the figure. For overview of MSs included in the figure and total number of samples see Table SA4.

Table SA7. *Salmonella* in non ready-to-eat processed broiler meat[(a)], batch based data, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Belgium	-	-	-	-	-	-	81	18.5	-	-	108	10.2
Cyprus	48	6.3	-	-	-	-	-	-	-	-	-	-
Czech Republic	-	-	-	-	-	-	1,307	1.5	2,161	0.6	2,083	0.4
Poland	-	-	-	-	-	-	3,389	10.3	1,962	5.6	1,635	1.2
Romania	-	-	-	-	-	-	-	-	343	0	166	0.6
Slovakia	-	-	-	-	-	-	-	-	86	2.3	32	12.5
Retail												
Belgium	-	-	-	-	-	-	516	13.0	-	-	181	17.1
Bulgaria	-	-	-	-	-	-	-	-	7,779	0.8	9,916	0.3
Czech Republic	-	-	50	2.0	-	-	NS	NS	-	-	-	-
Hungary	-	-	-	-	-	-	797	20.2	-	-	-	-
Latvia	NS	NS	NS	NS	-	-	28	0	-	-	-	-
Portugal	-	-	-	-	-	-	NS	NS	-	-	592	0
Romania	-	-	-	-	-	-	-	-	486	0	NS	NS
Slovakia	-	-	-	-	-	-	-	-	-	-	115	1.7
MS total												
Processing	NS	NS	-	-	-	-	NS	NS	NS	NS	4,024	1.1
Retail	-	-	NS	NS	-	-	NS	NS	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): At processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat

Table SA8. *Salmonella* in ready-to-eat processed broiler meat[(a)], single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Germany	96	3.1	-	-	-	-	30	6.7	NS	NS	NS	NS
Greece	325	0	295	0	-	-	-	-	NS	NS	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	293	0
Ireland	-	-	142	0	3,536	0.1	3,476	<0.1	311	0.3	114	0
Poland	18,816	<0.1	-	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	-	-	-	-	459	2.8	NS	NS
Retail												
Austria	451	2.7	-	-	-	-	44	0	180	5.6	-	-
Estonia	89	0	66	0	56	3.6	31	0	NS	NS	25	0
Germany	436	1.8	-	-	-	-	198	0.5	137	0.7	181	0.6
Greece	NS	NS	NS	NS	-	-	-	-	25	0	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	170	0.6
Ireland	-	-	1,281	0	1,185	0	980	0.1	463	0	433	0
Lithuania	NS	NS	-	-	-	-	-	-	-	-	26	0
Romania	-	-	-	-	-	-	816	0	-	-	NS	NS
Slovenia	-	-	-	-	-	-	-	-	49	0	-	-
Spain	-	-	-	-	-	-	-	-	327	3.7	57	3.5
MS total												
Processing	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
Retail	NS	NS	NS	NS	NS	NS	2,069	<0.1	1,181	1.9	892	0.4

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): At processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

Table SA9. *Salmonella* in ready-to-eat processed broiler meat[(a)], batch based data, 2004—2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Czech Republic	-	-	-	-	-	-	230	0	250	0	249	0
Poland	-	-	-	-	-	-	573	0.9	-	-	874	0.1
Romania	-	-	-	-	-	-	-	-	240	0	130	0
Slovakia	-	-	-	-	-	-	-	-	177	0	33	0
Retail												
Bulgaria	-	-	-	-	-	-	-	-	211	0	403	0
Czech Republic	-	-	-	-	-	-	44	0	NS	NS	NS	NS
Latvia	80	0	NS	NS	-	-	-	-	-	-	-	-
Portugal	-	-	-	-	-	-	NS	NS	-	-	32	0
Romania	-	-	-	-	-	-	-	-	208	0	NS	NS
Slovakia	-	-	-	-	-	-	-	-	-	-	40	0

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): At processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

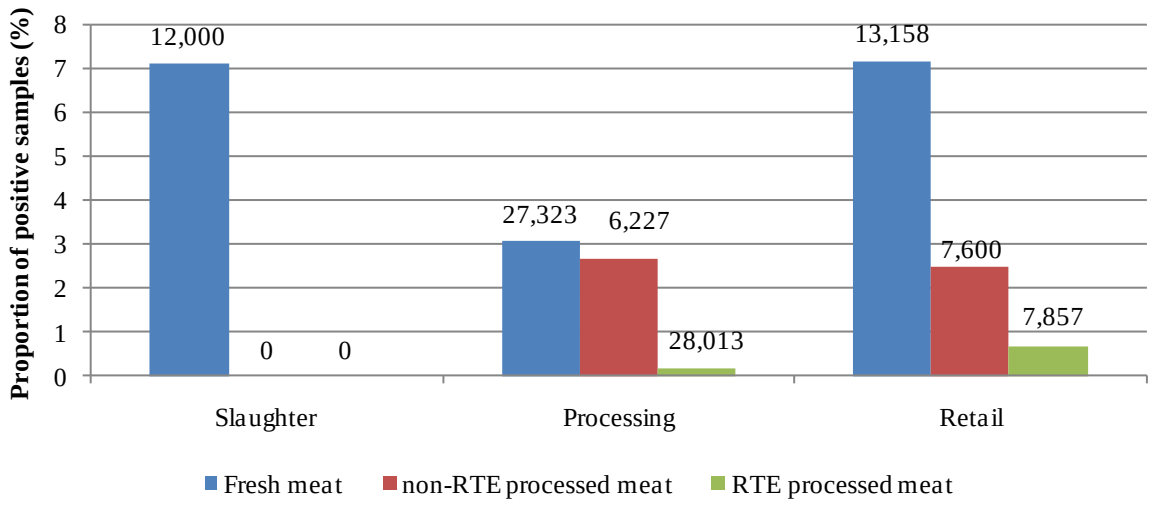

Figure SA4. *Salmonella* in broiler meat[(a)], single samples, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data at a data point to be presented in the figure. For overview of MSs included in the figure see Tables SA2, SA4 and SA6. Number of samples tested shown above the columns.
(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

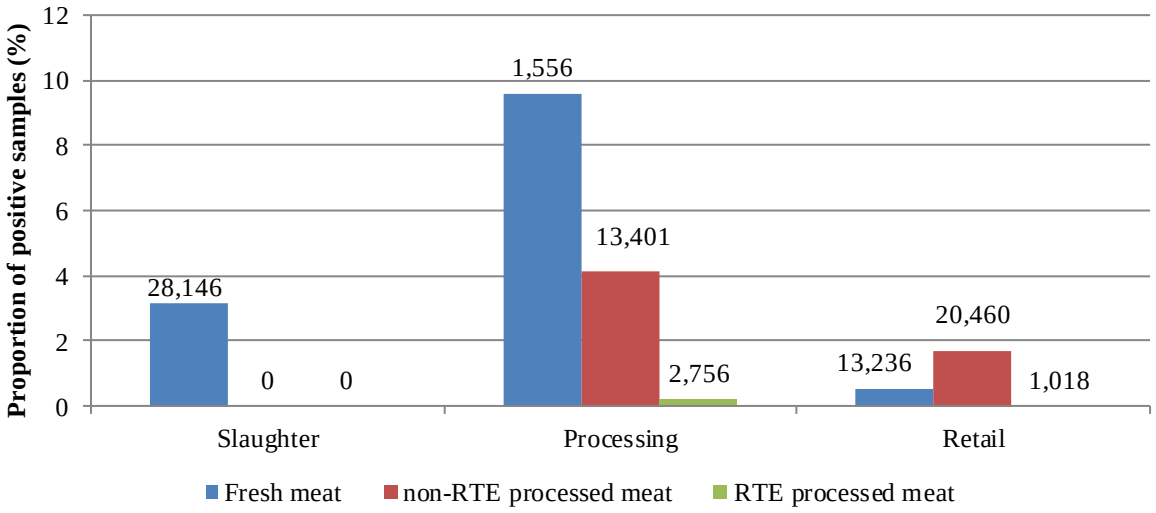

Figure SA5. *Salmonella* in broiler meat[(a)], batch samples, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data for a meat category/sampling stage data point to be presented in the figure. For overview of MSs included in the figure see Tables SA5, SA7 and SA9. The numbers of samples tested are shown above the columns.

(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

3.1.2.2. Pig meat and products thereof

The occurrence of *Salmonella* in fresh pig meat was reported by 24 MSs (Table SA10 and SA11).

Denmark, Estonia, Finland Germany and Ireland sampled almost consistently during the entire period, but in general most data were reported from 2007 and onwards. This was especially true for single sample investigations as shown by Table SA10. In general, investigations revealed less than 5% positive samples and several investigations reported no *Salmonella* at all. On the other hand no further reduction of the prevalence of *Salmonella* was evident during the period.

The highest proportion of positive single samples of fresh pig meat (23.8%) was found by Portugal in 2008 at the slaughterhouse level (Table SA10). At slaughter, the proportions of positive samples found by the reporting MSs were between 0.6% and 0.9%, which were lower than the proportions of positive samples at processing (0.9% to 1.6%) and retail (1.6% to 3.3%) during the period (Figure SA6). The overall picture concerning single samples was dominated by Finland and Denmark reporting substantial numbers of samples and no *Salmonella* findings at all or very low proportions of positive samples, respectively.

For batch samples of fresh pig meat, Poland dominated with 33,225 and 20,146 samples in 2008 and 2009, respectively. Only 0.1% of these were positive (Table SA11).

Data from three surveys on single samples were reported by Belgium (slaughter 2004, processing 2004 and slaughter 2007). Positive samples corresponding to 12.3%, 10.4% and 19.4% were found in 374, 241 and 386 samples, respectively. These findings were not included in Table SA10.

Corresponding to the picture from fresh meat, non-RTE processed pig meat also showed low proportions of positive single samples and batches (Table SA12 and SA13). In many cases only relatively few (<100) samples were tested and therefore, a few MSs reporting large numbers of single samples dominated the mean proportion of positive samples (Table SA12). In 2007, e.g., Ireland reported 4,832 samples out of a total of 6,421 from processing, while Germany reported 1,125 samples out of a total of 2,283 at retail. High proportions of positive samples in investigations with low number

of samples tested, e.g. 18.9% positive samples reported by Portugal from processing in 2009 (N=53), did not affect the overall picture very much.

Most data reported on RTE meat were meat products from processing and retail (Table SA14 and SA15). Generally, very low occurrence of *Salmonella* was observed, if any at all. The highest proportions of positive samples were reported by Spain, Portugal and Italy. Spain reported 4.1% single samples of meat products at retail positive for *Salmonella* in 2008, and Portugal and Italy found 3.7% and 3.0% of the same kind of samples positive in 2004, respectively.

Information on RTE minced meat at retail was reported by Germany in 2007 to 2009 with 2.3% to 7.8% of single samples containing *Salmonella*, and by Bulgaria in 2009, where one out of 353 batches was positive (Table SA14 and SA15).

Few investigations on RTE meat preparations at retail were reported and only Hungary reported a positive finding of eight positive out of 240 batch samples (Table SA15).

Belgium reported one and the Czech Republic reported two surveys of RTE meat products at retail (not included in the tables). No *Salmonella* was found in any of these investigations comprising a total of 234 single samples. These data were not included in the tables and figures.

An overview of data from pig meat is given in figure SA7 and SA8, illustrating the general observation of a low or very low prevalence of *Salmonella*. Especially for single samples of fresh meat from slaughter, this conclusion was based upon a very large number of samples, but it should still be noted that the majority of the samples originate from only a few of MSs.

There was no clear change in the level of *Salmonella* along the production chain (slaughter to retail). The peak value of 2.3% found for single samples of non-RTE processed meat at retail (figure SA7) was mainly caused by one investigation from Italy in 2004 and three investigations reported by Germany in 2007, 2008 and 2009 (see Table SA12).

Table SA10. *Salmonella* in fresh pig meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter												
Austria	299	0.3	-	-	-	-	-	-	-	-	-	-
Belgium	-	-	703	7.0	-	-	293	16.0	281	14.6	840	13.7
Czech Republic	741	0	-	-	-	-	-	-	-	-	-	-
Denmark	34,213	0.8	30,730	0.6	27,892	0.6	27,290	0.7	27,045	0.7	24,385	0.6
Estonia	NS	NS	819	0.6	687	0.1	638	0	520	0.2	713	1.5
Finland	6,576	<0.1	6,609	0	6,454	0	6,363	0	6,447	<0.1	6,479	0
Germany	7,934	0.9	13,084	1.0	11,859	0.9	5,233	3.8	5,726	1.3	4,761	0.6
Hungary	-	-	-	-	-	-	178	3.4	-	-	860	0.2
Italy	256	4.3	-	-	-	-	-	-	NS	NS	-	-
Latvia	-	-	-	-	-	-	3,500	0.2	2,150	0.7	-	-
Poland	895	0.2	-	-	-	-	-	-	-	-	-	-
Portugal	256	15.2	-	-	-	-	-	-	105	23.8	-	-
Slovenia	188	0	-	-	35	0	168	0	-	-	-	-
Spain	-	-	-	-	297	6.4	315	4.8	276	6.2	174	6.9
Sweden	-	-	-	-	-	-	6,239	<0.1	-	-	5,989	0
Norway	2,456	0	3,157	0	3,122	0	3,472	0.1	2,151	0	2,029	0
Processing												
Belgium	-	-	607	7.2	-	-	537	4.1	122	5.7	239	3.3
Estonia	225	0.4	309	0	347	0	520	0.4	424	0	373	0
Finland	3,092	0	3,226	0	2,311	0	2,329	<0.1	2,058	0	1,838	0
Germany	201	3.0	221	8.6	269	3.3	304	8.9	348	4.9	432	3.7
Greece	-	-	NS	NS	NS	NS	-	-	-	-	73	5.5
Hungary	-	-	-	-	-	-	-	-	-	-	363	1.7
Ireland	-	-	38	18.4	2,927	1.7	2,014	2.9	30	0	28	0
Italy	393	2.0	-	-	-	-	-	-	NS	NS	-	-
Lithuania	NS	NS	-	-	-	-	-	-	-	-	31	0
Portugal	-	-	-	-	-	-	-	-	NS	NS	61	3.3
Slovenia	-	-	113	0	159	0	-	-	281	0	322	0.3
Spain	-	-	-	-	88	0	63	7.9	149	4.0	27	3.7
Sweden	-	-	-	-	-	-	3,571	0	-	-	-	-

(Continue next page)

Table SA10 (contd.). *Salmonella* in fresh pig meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Retail												
Austria	42	4.8	-	-	96	0	427	0.9	30	0	46	0
Germany	1,217	3.9	1,430	2.5	1,654	2.2	1,664	2.8	1,902	2.2	2,105	1.8
Greece	35	0	28	3.6	NS	NS	30	0	-	-	61	0
Hungary	-	-	-	-	-	-	-	-	-	-	89	0
Italy	231	0.9	-	-	-	-	-	-	61	3.3	-	-
Lithuania	46	2.2	-	-	-	-	-	-	-	-	NS	NS
Luxembourg	-	-	-	-	-	-	39	5.1	NS	NS	NS	NS
Netherlands	-	-	-	-	-	-	277	3.2	319	2.8	313	1.6
Romania	-	-	-	-	-	-	-	-	-	-	124	0.8
Slovenia	-	-	-	-	-	-	385	0.3	-	-	-	-
Spain	-	-	-	-	227	11.5	66	6.1	236	12.7	85	3.5
Sweden	-	-	-	-	-	-	1,238	0	-	-	-	-
United Kingdom	-	-	-	-	-	-	-	-	1,693	0.5	-	-
MS total												
Slaughter	51,358	0.8	51,945	0.7	47,224	0.6	50,217	0.9	42,550	0.9	44,201	0.7
Processing	NS	NS	4,514	1.6	6,101	1.0	9,338	1.2	3,412	0.9	3,787	1.0
Retail	1,571	3.3	NS	NS	NS	NS	4,126	1.6	4,241	2.2	2,823	1.6

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.

Table SA11. *Salmonella* in fresh pig meat, batch based data, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter												
Czech Republic	-	-	-	-	-	-	6,979	0.7	5,625	0.6	5,262	0.2
Latvia	185	1.1	35	0	-	-	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-	480	1.9	-	-	-	-
Poland	-	-	-	-	-	-	-	-	33,225	0.1	20,146	0.1
Portugal	-	-	-	-	-	-	-	-	-	-	125	2.4
Romania	-	-	-	-	-	-	-	-	2,929	0.5	1,457	0.8
Processing												
Cyprus	73	1.4	-	-	-	-	-	-	-	-	-	-
Latvia	35	0	NS	NS	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	1,698	0.8	424	1.7
Retail												
Bulgaria	-	-	-	-	-	-	-	-	4,027	0.2	3,986	<0.1
Latvia	30	0	47	0	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	660	3.6	-	-

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.

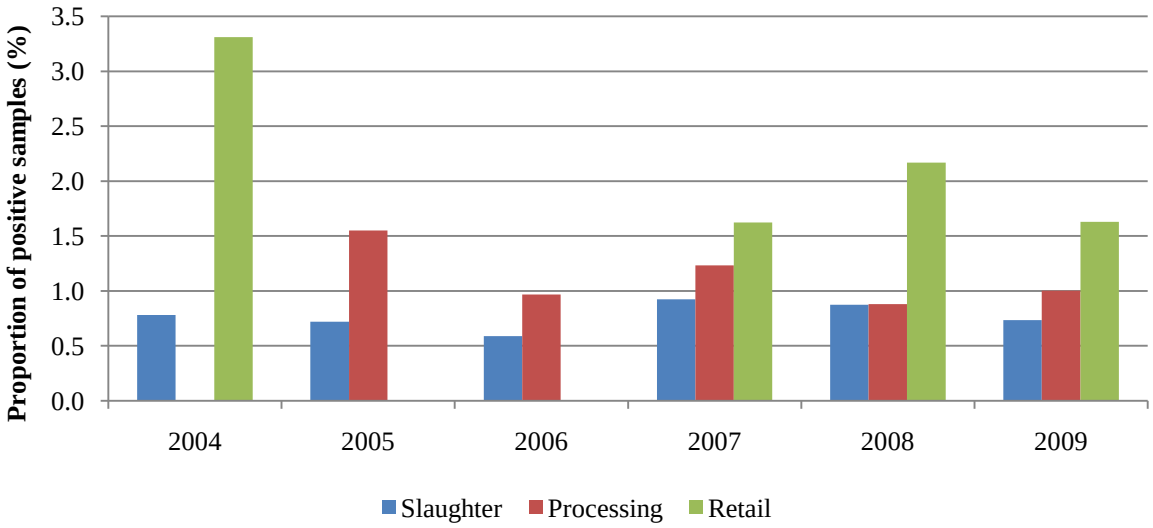

Figure SA6. *Salmonella* in fresh pig meat at different stages of production, single samples reported by MSs, 2004-2009

Note: Minimum five MSs must report sufficient data for a sampling stage/year data point to be presented in the figure. For overview of MSs included in the figure and total number of samples see Table SA10.

Table SA12. *Salmonella* in non ready-to-eat processed pig meat[(a)], single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter												
Italy	-	-	-	-	-	-	-	-	60	0	-	-
Processing												
Austria	-	-	-	-	-	-	NS	NS	NS	NS	25	0
Belgium	-	-	292	3.4	-	-	65	1.5	-	-	-	-
Estonia	-	-	-	-	-	-	209	1.0	103	1.9	107	3.7
Germany	-	-	-	-	-	-	406	4.4	489	1.8	338	1.8
Greece	NS	NS	40	12.5	-	-	NS	NS	31	3.2	95	2.1
Hungary	-	-	-	-	-	-	-	-	-	-	421	3.8
Ireland	-	-	125	0.8	3,656	1.3	4,832	1.0	132	0.8	134	0
Italy	1,212	1.1	-	-	-	-	-	-	NS	NS	-	-
Poland	9,172	0.4	-	-	-	-	-	-	-	-	-	-
Portugal	-	-	-	-	-	-	-	-	NS	NS	53	18.9
Spain	-	-	-	-	713	2.2	909	1.9	-	-	1,025	2.7
Retail												
Austria	310	1.0	-	-	-	-	317	1.6	121	0	781	0.3
Belgium	-	-	155	6.5	-	-	-	-	31	0	-	-
Estonia	26	0	71	2.8	29	0	54	0	75	1.3	83	1.2
France	-	-	-	-	-	-	-	-	100	4.0	-	-
Germany	-	-	-	-	-	-	1,125	1.8	1,547	2.7	2,233	2.1
Greece	NS	NS	NS	NS	-	-	NS	NS	46	10.9	239	1.3
Hungary	-	-	-	-	-	-	147	15.0	-	-	254	1.6
Ireland	-	-	NS	NS	NS	NS	73	0	1,821	1.0	692	0
Italy	1,140	7.9	-	-	-	-	-	-	154	5.8	-	-
Latvia	-	-	-	-	-	-	-	-	315	0.6	NS	NS
Lithuania	28	0	-	-	-	-	-	-	-	-	-	-
Luxembourg	-	-	-	-	-	-	92	1.1	204	0	NS	NS
Netherlands	-	-	-	-	-	-	71	7.0	612	0.2	155	0.6
Romania	-	-	-	-	-	-	-	-	-	-	334	0.3
Slovenia	-	-	-	-	-	-	-	-	40	0	-	-
Spain	-	-	-	-	367	3.3	404	1.2	-	-	588	2.7
MS total												
Slaughter	-	-	-	-	-	-	-	-	NS	NS	-	-
Processing	10,384	0.5	457	3.5	4,369	1.4	6,421	1.4	755	1.7	2,198	3.0
Retail	1,504	6.2	226	5.3	396	3.0	2,283	2.5	5,066	1.6	5,359	1.4

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

Table SA13. *Salmonella* in non ready-to-eat processed pig meat[(a)], batch based data, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Cyprus	340	0	-	-	-	-	-	-	-	-	-	-
Czech Republic	-	-	-	-	-	-	6,841	0.2	7,804	0.3	2,396	0.4
Italy	-	-	-	-	-	-	-	-	112	5.4	-	-
Latvia	40	0	NS	NS	-	-	NS	NS	-	-	-	-
Poland	-	-	-	-	-	-	18,813	0.4	-	-	14,012	0.4
Romania	-	-	-	-	-	-	-	-	2,402	<0.1	725	1.0
Slovakia	-	-	-	-	-	-	-	-	-	-	295	0.3
Retail												
Bulgaria	-	-	-	-	-	-	-	-	20,281	0.4	20,482	0.3
Hungary	-	-	-	-	-	-	387	1.3	-	-	-	-
Italy	-	-	-	-	-	-	-	-	102	5.9	-	-
Latvia	NS	NS	NS	NS	-	-	25	24.0	-	-	-	-
Poland	-	-	-	-	-	-	-	-	-	-	141	0
Portugal	-	-	-	-	-	-	200	1.0	310	5.8	-	-
Romania	-	-	-	-	-	-	-	-	577	0.5	NS	NS
Slovakia	-	-	-	-	-	-	-	-	-	-	94	0

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

Table SA14. *Salmonella* in ready-to-eat processed pig meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Meat preparation												
Processing												
Greece	-	-	-	-	-	-	-	-	-	-	128	3.9
Retail												
Greece	-	-	-	-	-	-	-	-	-	-	60	0
Meat products												
Processing												
Austria	-	-	-	-	-	-	NS	NS	35	0	NS	NS
Estonia	-	-	-	-	-	-	-	-	113	0	104	0
Germany	-	-	-	-	-	-	105	0	136	0	78	0
Greece	NS	NS	26	0	64	0	89	0	236	0	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	781	1.8
Ireland	-	-	165	0	5,544	0	4,276	0.2	263	1.9	139	0
Italy	257	1.2	-	-	-	-	-	-	-	-	-	-
Portugal	47	0	-	-	-	-	-	-	NS	NS	57	12.3
Spain	-	-	-	-	-	-	-	-	66	28.8	-	-
Retail												
Austria	193	0	-	-	-	-	163	0	90	1.1	455	0.2
Belgium	-	-	119	0	NS	NS	63	0	-	-	-	-
Estonia	54	0	75	0	-	-	-	-	NS	NS	NS	NS
Germany	-	-	-	-	-	-	847	0.1	719	0	644	0.2
Greece	-	-	102	0	-	-	-	-	NS	NS	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	433	1.6
Ireland	-	-	1,848	0	927	0.1	882	0	351	0.6	343	0
Italy	330	3.0	-	-	-	-	-	-	-	-	-	-
Latvia	-	-	-	-	-	-	-	-	115	0	-	-
Luxembourg	-	-	-	-	-	-	26	0	NS	NS	150	0
Netherlands	-	-	-	-	-	-	-	-	NS	NS	334	0.6
Portugal	54	3.7	-	-	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	-	-	157	0
Slovenia	-	-	-	-	-	-	-	-	57	0	-	-
Spain	-	-	-	-	-	-	-	-	269	4.1	-	-
United Kingdom	-	-	-	-	-	-	-	-	1,096	0	-	-
Minced meat												
Processing												
Germany	-	-	-	-	-	-	249	3.2	300	5.7	212	2.4
Retail												
Germany	-	-	-	-	-	-	525	2.3	410	7.8	416	4.3
MS total												
Meat products												
Processing	NS	NS	NS	NS	NS	NS	NS	NS	849	2.8	1,159	1.8
Retail	NS	NS	NS	NS	NS	NS	1,981	<0.1	2,697	0.5	2,516	0.4

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.

Table SA15. *Salmonella* in ready-to-eat processed pig meat, batch based data, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Meat preparation												
Processing												
Poland	-	-	-	-	-	-	710	0.8	-	-	3,177	0.2
Romania	-	-	-	-	-	-	-	-	38	0	NS	NS
Retail												
Bulgaria	-	-	-	-	-	-	-	-	NS	NS	215	0
Hungary	-	-	-	-	-	-	240	3.3	-	-	-	-
Meat products												
Processing												
Czech Republic	-	-	-	-	-	-	1,898	<0.1	1,954	0.2	1,546	<0.1
Latvia	30	0	NS	NS	-	-	-	-	-	-	-	-
Poland	-	-	-	-	-	-	-	-	-	-	8,480	<0.1
Romania	-	-	-	-	-	-	-	-	1,335	0	696	0
Slovakia	-	-	-	-	-	-	-	-	-	-	338	0
Retail												
Bulgaria	-	-	-	-	-	-	-	-	3,587	0.3	3,513	0.1
Czech Republic	-	-	NS	NS	-	-	50	0	-	-	90	0
Hungary	-	-	-	-	-	-	415	0.2	-	-	-	-
Latvia	198	0	NS	NS	-	-	-	-	-	-	-	-
Portugal	-	-	-	-	-	-	465	1.3	1,065	1.1	-	-
Romania	-	-	-	-	-	-	-	-	1,159	0	NS	NS
Slovakia	-	-	-	-	-	-	-	-	-	-	187	0
Slovenia	-	-	-	-	-	-	42	0	-	-	-	-
Minced meat												
Processing												
Poland	-	-	-	-	-	-	49	8.2	-	-	1,160	1.0
Retail												
Bulgaria	-	-	-	-	-	-	-	-	NS	NS	353	0.3

NS: Not sufficient data, <25 samples reported by the MS.

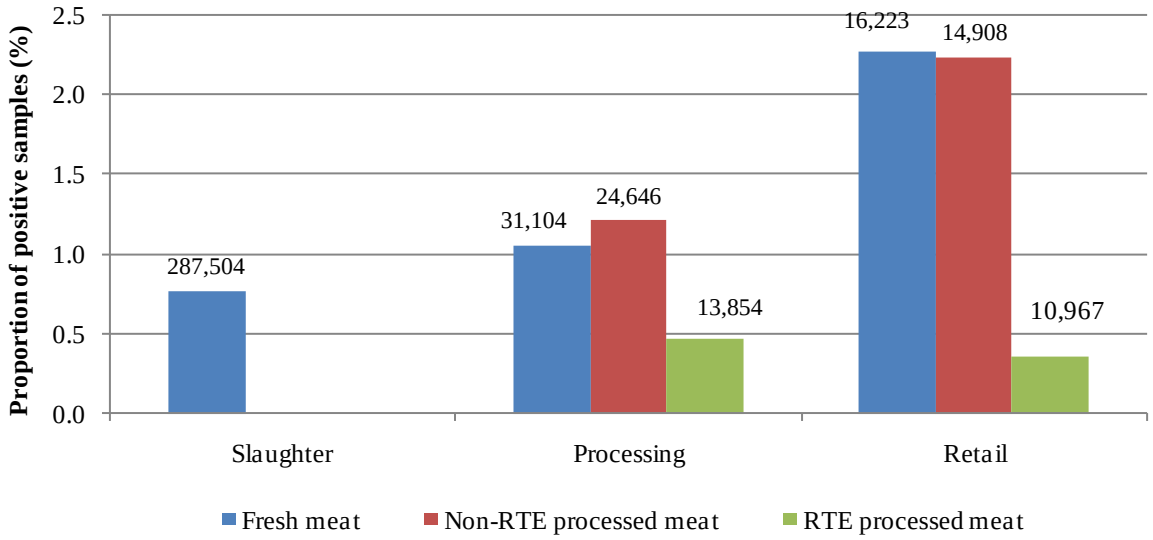

Figure SA7. *Salmonella* in pig meat[(a)], single samples reported by MSs, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data for a meat category/sampling stage data point to be presented in the figure. For overview of MSs included in the figure see Tables SA10, SA12 and SA14. The numbers of samples tested are shown above the columns.

(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

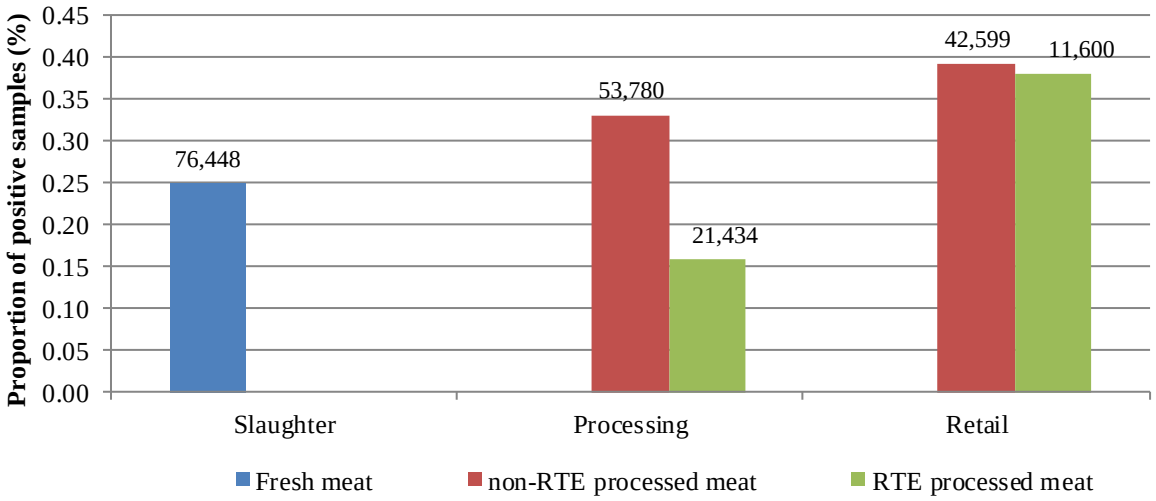

Figure SA8. *Salmonella* in pig meat[(a)], batch based samples reported by MSs, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data for a meat category/sampling stage data point to be presented in the figure. For overview of MSs included in the figure see Tables SA11, SA13 and SA15. Numbers of samples tested are shown above the columns.

(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

3.1.2.3. Bovine meat and products thereof

Data on *Salmonella* in fresh meat from bovine animals were reported by 22 MSs (Tables SA16 and SA17). Four MSs (Denmark, Estonia, Finland and Germany) sampled almost consistently. Furthermore, more MSs reported data from 2007 to 2009 at all three sampling stages compared to 2004 to 2006. This was also seen for broiler and pig meat. For both single and batch based samples, the occurrence of *Salmonella* in bovine meat and products thereof was generally very low, and only a few MSs reported findings above 1% positive. Spain, however, consistently reported relatively high proportions (from 0.7% to 7.5%) from all production stages (single samples, Table SA16) except for 2009, where no *Salmonella* was found in samples from processing and retail.

An overview of data from fresh bovine meat (single samples) is given in Figure SA9. The total proportion of positive samples at slaughter decreased from 0.4% in 2004 to 0.2% in 2009, while the proportion of positive samples at processing remained within the range from 0.1% to 0.2% in years with enough data for calculation of totals (more than 4 MSs reporting more than 24 samples each). In years with sufficient data from retail level (2007 to 2009), the total proportions found at retail were higher than at processing.

Similar to fresh meat, majority of data on non-RTE processed meat were reported from 2007 to 2009 (Tables SA18 and SA19). As for fresh meat, most values were in the very low range or zero, although some findings above 1% were also reported. The highest values reported were 7.1% for single samples at processing and 13.0% for batches at retail, both reported by Portugal in 2009.

Most investigations on RTE meat resulted in no *Salmonella* findings, although proportions up to 5.5% positive samples were reported (Tables SA20 and SA21). The highest level at retail (5.0%) was reported by Spain for meat products (single samples) in 2008. Data were too sparse for conclusions to be drawn concerning development over time.

An increase in the level of *Salmonella* along the production chain (slaughter to retail) was observed for non-RTE processed meat, single samples (Figure SA10), but this result mostly reflects a substantial number of negative single samples of non-RTE processed meat at processing reported by Ireland in 2006 and 2007. No clear increase or decrease was observed along the production chain for fresh meat and for RTE meat, or for any of the categories of batch based samples (Figure SA11).

Table SA16. *Salmonella* in fresh meat from bovine animals, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter												
Austria	3,940	<0.1	-	-	-	-	-	-	-	-	-	-
Belgium	-	-	-	-	69	0	-	-	-	-	-	-
Czech Republic	1,328	2.0	-	-	-	-	-	-	-	-	-	-
Denmark	11,579	0.3	10,160	0.4	8,155	0.2	7,350	0.3	7,915	0.1	7,080	0.2
Estonia	537	1.9	731	0.3	546	0.2	425	1.4	326	0.6	293	0
Finland	3,251	0	3,218	0	3,237	<0.1	3,133	0	3,125	0	3,163	0
Germany	12,002	0.6	9,583	0.5	10,572	1.0	8,119	0.7	8,479	0.4	9,736	0.3
Hungary	-	-	-	-	-	-	144	0.7	-	-	186	1.1
Italy	1,131	0.4	-	-	-	-	-	-	29	0	-	-
Latvia	-	-	-	-	-	-	3,000	0.1	2,350	<0.1	-	-
Poland	870	0	-	-	-	-	-	-	-	-	-	-
Slovenia	-	-	-	-	44	0	160	0	-	-	-	-
Spain	-	-	-	-	67	7.5	60	6.7	892	1.9	426	2.1
Sweden	-	-	-	-	-	-	3,782	<0.1	-	-	3,621	0
Norway	2,136	0	2,076	0	2,035	0	2,096	<0.1	1,588	0	2,097	0
Processing												
Estonia	60	0	85	0	78	0	177	0.6	125	0	143	0
Finland	2,485	<0.1	2,370	0	2,261	0	2,062	0	2,054	0	2,040	0
Germany	50	0	-	-	-	-	97	0	141	0	133	0.8
Hungary	-	-	-	-	-	-	-	-	-	-	280	1.8
Ireland	-	-	31	0	21,618	0.2	22,971	0.1	40	0	49	0
Italy	338	0.3	-	-	-	-	-	-	NS	NS	-	-
Slovenia	-	-	107	0	155	0	-	-	266	0	299	0
Spain	-	-	-	-	99	3.0	155	1.9	105	3.8	104	0
Retail												
Austria	NS	NS	-	-	-	-	-	-	NS	NS	30	0
Belgium	-	-	-	-	110	0	-	-	-	-	-	-
Germany	363	0.8	-	-	-	-	489	0	575	0.7	547	0.7
Greece	-	-	-	-	NS	NS	NS	NS	45	0	NS	NS
Hungary	-	-	-	-	-	-	-	-	-	-	71	0
Italy	422	0.7	-	-	-	-	-	-	51	0	-	-
Luxembourg	-	-	-	-	-	-	27	0	NS	NS	NS	NS
Netherlands	-	-	-	-	-	-	401	0.2	265	0	NS	NS
Portugal	61	0	-	-	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	-	-	38	2.6
Slovenia	-	-	-	-	-	-	385	0.5	-	-	135	0.7
Spain	-	-	-	-	153	0.7	90	2.2	172	1.7	161	0
Sweden	-	-	-	-	-	-	-	-	1,612	<0.1	-	-
United Kingdom	-	-	-	-	-	-	-	-	3,249	0.2	-	-
MS total												
Slaughter	34,638	0.4	NS	NS	22,690	0.6	26,173	0.4	23,116	0.3	24,505	0.2
Processing	NS	NS	NS	NS	24,211	0.2	25,462	0.1	2,731	0.1	3,048	0.2
Retail	NS	NS	-	-	NS	NS	1,392	0.4	5,969	0.2	982	0.6

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs

Table SA17. *Salmonella* in fresh meat from bovine animals, batch based samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter												
Czech Republic	-	-	-	-	-	-	4,856	0.3	4,505	0.2	4,410	<0.1
Poland	-	-	-	-	-	-	-	-	-	-	7,806	0.2
Portugal	-	-	-	-	-	-	-	-	-	-	180	6.1
Romania	-	-	-	-	-	-	-	-	2,043	0.1	781	0
Processing												
Poland	-	-	-	-	-	-	-	-	-	-	432	0
Romania	-	-	-	-	-	-	-	-	699	1.0	154	0
Retail												
Bulgaria	-	-	-	-	-	-	-	-	1,226	0	951	0.1
Romania	-	-	-	-	-	-	-	-	448	0	-	-

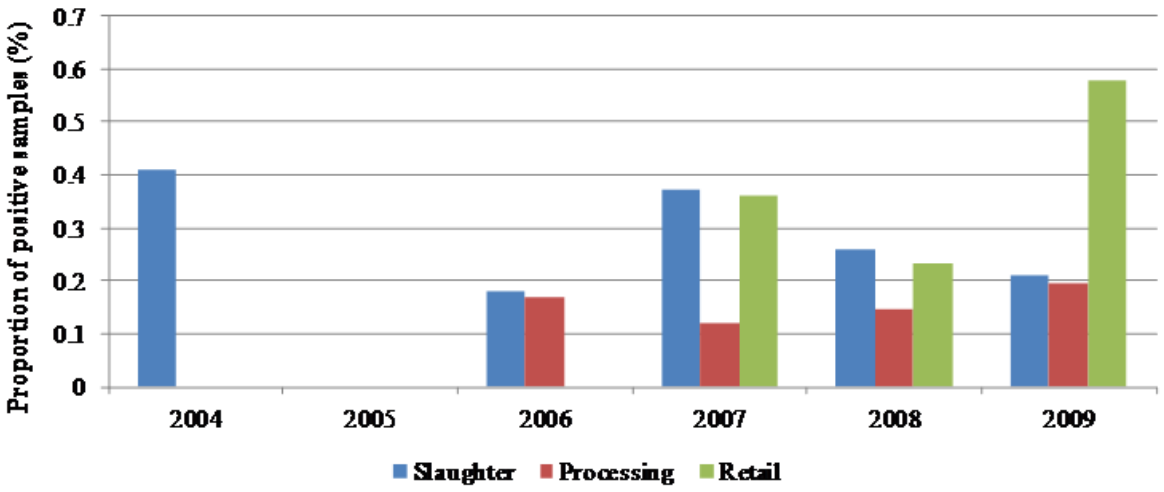

Figure SA9. *Salmonella* in fresh meat from bovine animals at different stages of production, single samples reported by MSs, 2004-2009

Note: Minimum five MSs must report sufficient data for sampling stage/year data point to be presented in the figure. For overview of MSs included in the figure and total number of samples see Table SA16.

Table SA18. *Salmonella* in non ready-to-eat processed meat[(a)] from bovine animals, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Austria	-	-	-	-	-	-	NS	NS	-	-	38	0
Belgium	-	-	280	1.4	-	-	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	31	3.2	NS	NS	NS	NS
Germany	88	6.8	-	-	-	-	29	0	39	0	84	0
Greece	-	-	-	-	NS	NS	NS	NS	176	3.4	NS	NS
Hungary	-	-	-	-	-	-	-	-	-	-	64	0
Ireland	-	-	117	0	11,858	0.2	12,278	<0.1	163	0	225	2.2
Italy	269	0.7	-	-	-	-	-	-	NS	NS	-	-
Latvia	-	-	-	-	-	-	-	-	85	0	-	-
Poland	-	-	-	-	-	-	-	-	-	-	61	0
Portugal	NS	NS	-	-	-	-	-	-	NS	NS	42	7.1
Spain	-	-	-	-	246	0.4	46	0	327	3.7	108	2.8
Retail												
Austria	NS	NS	-	-	112	0	114	1.8	109	0	48	0
Germany	2,015	2.5	-	-	-	-	118	0	178	0	252	1.2
Greece	NS	NS	-	-	NS	NS	30	0	70	0	NS	NS
Hungary	-	-	-	-	-	-	298	3.0	-	-	100	1.0
Ireland	-	-	NS	NS	NS	NS	98	0	301	0	295	0
Italy	683	0.6	-	-	-	-	-	-	29	3.4	-	-
Luxembourg	-	-	-	-	-	-	35	0	NS	NS	29	0
Netherlands	-	-	-	-	-	-	291	0.7	54	3.7	724	1.1
Romania	-	-	-	-	-	-	-	-	-	-	51	0
Slovenia	-	-	-	-	-	-	-	-	29	0	-	-
Spain	-	-	-	-	96	3.1	59	0	-	-	127	4.7
Sweden	1,124	0	-	-	-	-	-	-	-	-	-	-
MS total												
Processing	NS	NS	NS	NS	NS	NS	NS	NS	790	2.3	622	1.8
Retail	NS	NS	NS	NS	NS	NS	1,043	1.2	770	0.4	1,626	1.1

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): Processed meat includes meat preparations, meat products, mechanically separated meat and minced meat.

Table SA19. *Salmonella* in non ready-to-eat processed meat[(a)] from bovine animals, batch based samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Cyprus	66	0	-	-	-	-	-	-	-	-	-	-
Czech Republic	-	-	-	-	-	-	1,600	0.2	1,712	0.2	1,029	0.2
Poland	-	-	-	-	-	-	1,533	0.7	-	-	4,408	0.2
Romania	-	-	-	-	-	-	-	-	661	0	202	0
Retail												
Bulgaria	-	-	-	-	-	-	-	-	3,703	0.6	3,361	0.2
Czech Republic	-	-	52	1.9	-	-	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	97	1.0	-	-	-	-
Italy	-	-	-	-	-	-	-	-	86	0	-	-
Portugal	-	-	-	-	-	-	135	2.2	95	0	115	13.0
Romania	-	-	-	-	-	-	-	-	187	0	NS	NS

(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

Table SA20. *Salmonella* in ready-to-eat processed meat from bovine animals, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Meat preparation												
Retail												
Belgium	-	-	116	0.9	124	0	132	2.3	120	0.8	-	-
Netherlands	-	-	-	-	-	-	-	-	1,062	0.2	1,328	0.2
Slovenia	-	-	-	-	-	-	50	0	NS	NS	-	-
Meat products												
Processing												
Germany	-	-	-	-	-	-	NS	NS	NS	NS	NS	NS
Hungary	-	-	-	-	-	-	-	-	-	-	63	0
Ireland	-	-	145	0	1,951	0.1	1,513	0.2	309	0	131	0
Italy	25	0	-	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	-	-	-	-	803	5.5	-	-
Retail												
Germany	-	-	39	0	130	0.8	114	0.9	57	0	185	0
Greece	-	-	-	-	NS	NS	NS	NS	31	0	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	38	0
Ireland	-	-	395	0	481	0	329	0	249	2.4	207	0
Italy	51	2.0	-	-	-	-	-	-	-	-	-	-
Latvia	-	-	-	-	-	-	-	-	95	0	NS	NS
Netherlands	-	-	-	-	-	-	-	-	320	0.6	37	0
Romania	-	-	-	-	-	-	-	-	-	-	26	0
Spain	-	-	-	-	-	-	-	-	1,046	5.0	-	-
United Kingdom	-	-	-	-	-	-	-	-	134	0	-	-
Minced meat												
Processing												
Germany	-	-	-	-	-	-	63	1.6	156	0.6	90	0
Retail												
Belgium	-	-	171	0.6	35	0	128	1.6	111	0.9	-	-
Germany	-	-	-	-	-	-	539	0.7	552	1.6	596	0.7
Luxembourg	-	-	-	-	-	-	112	0	217	0	124	0
Netherlands	-	-	-	-	-	-	952	0.4	-	-	-	-

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.

Table SA21. *Salmonella* in ready-to-eat processed meat from bovine animals, batch based samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Meat preparation												
Processing												
Poland	-	-	-	-	-	-	117	0	-	-	411	0.5
Meat products												
Processing												
Czech Republic	-	-	-	-	-	-	641	0	641	0	467	0.2
Poland	-	-	-	-	-	-	365	0	-	-	63	0
Romania	-	-	-	-	-	-	-	-	109	0	29	0
Retail												
Bulgaria	-	-	-	-	-	-	-	-	94	0	68	0
Latvia	52	0	NS	NS	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	164	0	NS	NS
Minced meat												
Processing												
Poland	-	-	-	-	-	-	-	-	-	-	1,031	1.2
Retail												
Bulgaria	-	-	-	-	-	-	-	-	NS	NS	43	0

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.

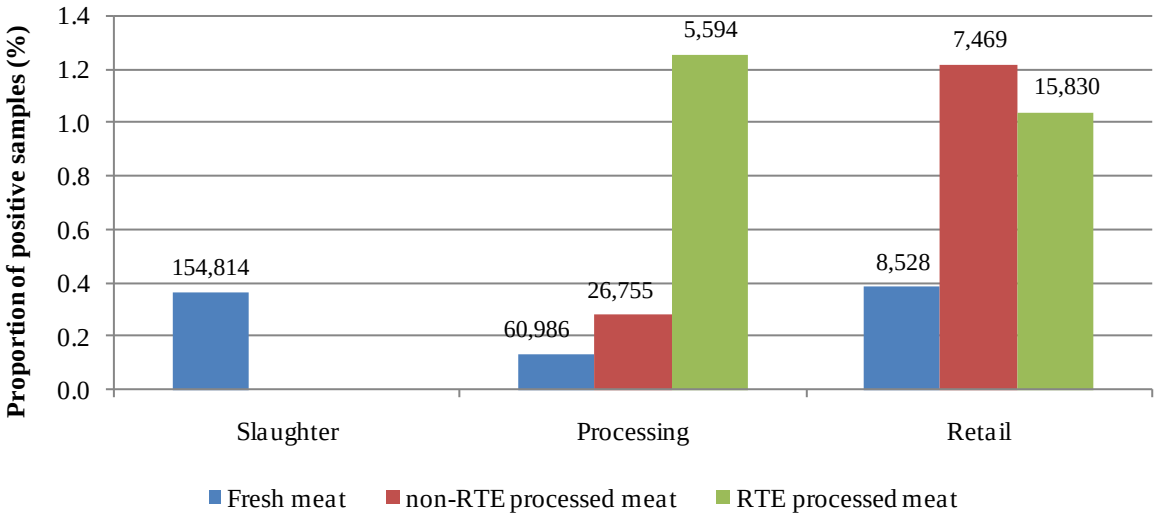

Figure SA10. *Salmonella* in meat[(a)] from bovine animals, single samples reported by MSs, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data for a meat category/sampling stage data point to be presented in the figure. For overview of MSs included in the figure see Tables SA16, SA18 and SA20. The numbers of samples tested are shown above the columns.

(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

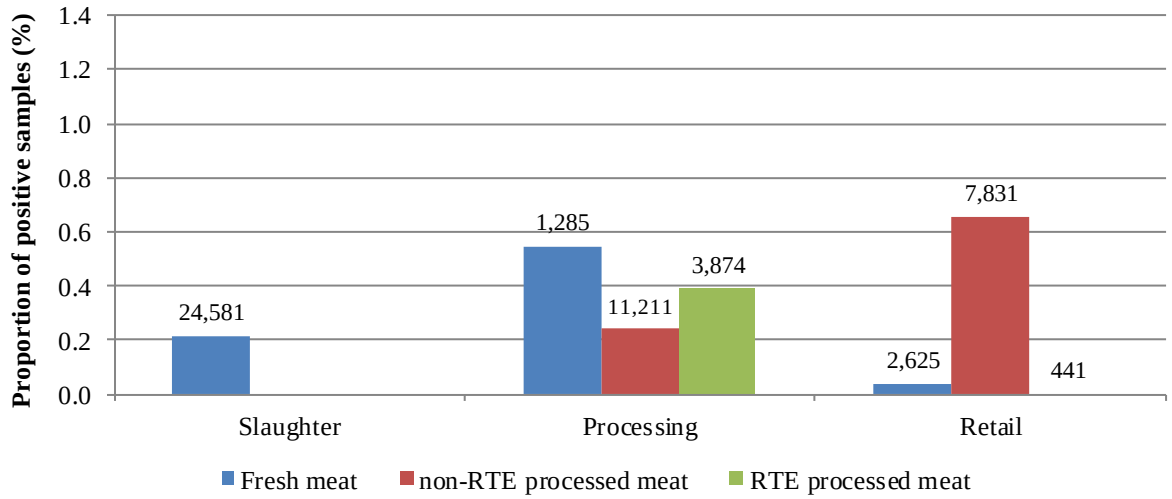

Figure SA11. *Salmonella* in meat[(a)] from bovine animals, batch based samples reported by MSs, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data for a meat category/sampling stage data point to be presented in the figure. For overview of MSs included in the figure see Tables SA17, SA19 and SA21. The numbers of samples tested are shown above the columns.

(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

3.1.2.4. Meat from turkey and products thereof

Data on *Salmonella* in turkey meat were reported by 16 MSs (Tables SA22 and SA23). Majority of data were single samples of non-RTE fresh meat reported throughout the production chain. Most of these investigations revealed *Salmonella* contamination of the meat, reaching proportions as high as 19.2% (Hungary, processing, pooled data from 2004 to 2009).

In total, single samples of non-RTE fresh meat contained *Salmonella* less frequently at processing (2.8%) than at slaughter (9.5%), but at retail, the proportion increased to 6.6%.

RTE meat generally contained *Salmonella* much less frequently than non-RTE fresh or processed meat. At retail, the level of production closest to the consumer and therefore of major concern to consumer safety, most investigations did not result in any *Salmonella* findings, except Germany reporting 1.3% positive single samples, and Portugal reporting 0.5% positive batch based samples.

Table SA22. *Salmonella* in fresh and processed meat[(a)] from turkey, single samples, 2004-2009

	Fresh		Non ready-to-eat Processed meat		Ready-to-eat Processed meat	
	N	% pos	N	% pos	N	% pos
Slaughter						
Germany	36	2.8	-	-	-	-
Hungary	629	18.3	-	-	-	-
Poland	441	0.7	-	-	-	-
Romania	84	0	-	-	-	-
Slovenia	110	4.5	-	-	-	-
Processing						
Austria	30	6.7	-	-	-	-
Finland	2,413	0	-	-	-	-
Germany	202	8.9	136	7.4	92	7.6
Hungary	255	19.2	133	5.3	239	0
Ireland	995	3.2	554	2.5	1,523	<0.1
Portugal	-	-	59	3.4	NS	NS
Slovenia	107	0	-	-	-	-
Spain	88	17.0	-	-	-	-
Retail						
Austria	259	8.1	27	11.1	NS	NS
Germany	2,575	7.0	558	7.3	299	1.3
Greece	NS	NS	NS	NS	55	0
Hungary	83	4.8	135	13.3	104	0
Ireland	-	-	291	0	730	0
Luxembourg	57	7.0	NS	NS	NS	NS
Netherlands	595	5.7	119	3.4	-	-
Romania	NS	NS	67	0	26	0
Slovenia	144	4.2	31	16.1	NS	NS
Spain	186	3.2	-	-	-	-
MS total						
Slaughter	1,300	9.5	-	-	-	-
Processing	4,090	2.8	NS	NS	NS	NS
Retail	3,899	6.6	1,228	5.9	1,214	0.3

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

Table SA23. *Salmonella* in fresh and processed meat[(a)] from turkey, batch based data, 2004-2009

	Fresh		Non ready-to-eat Processed meat		Ready-to-eat Processed meat	
	N	% pos	N	% pos	N	% pos
Slaughter						
Czech Republic	535	6.2	-	-	-	-
Poland	1,260	10.2	-	-	-	-
Processing						
Czech Republic	-	-	670	3.7	44	2.3
Poland	1,398	6.9	2,125	6.1	2,393	0.7
Slovenia	74	4.1	-	-	-	-
Retail						
Bulgaria	52	0	253	0.8	NS	NS
Portugal	-	-	185	7.6	192	0.5
Romania	38	2.6	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

3.1.2.5. Meat from sheep and products thereof

Seven MSs and one non-MS reported single sample data on sheep meat; primarily as non-RTE fresh meat (Table SA24). Almost no *Salmonella* was detected (from 0% to 1.1%).

Very few data were available from batches; a total of 614 samples of fresh sheep meat were tested from 2004 to 2009, and only one of these was found to contain *Salmonella*. These data were not included in the tables and figures.

Table SA24. *Salmonella* in fresh and processed meat[(a)] from sheep, single samples, 2004-2009

	Fresh		Non ready-to-eat Processed meat		Ready-to-eat Processed meat	
	N	% pos	N	% pos	N	% pos
Slaughter						
Estonia	63	0	-	-	-	-
Germany	88	1.1	-	-	-	-
Latvia	400	0	-	-	-	-
Poland	107	0	-	-	-	-
Norway	13,230	<0.1	-	-	-	-
Processing						
Germany	29	0	-	-	-	-
Ireland	3,095	0.2	1,435	0	188	0
Retail						
Germany	280	0	-	-	-	-
Ireland	NS	NS	70	0	186	0
Netherlands	248	0.4	29	0	NS	NS
United Kingdom	1,056	0	-	-	-	-

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): At slaughter and processing, processed meat includes meat preparations, meat products, mechanically separated meat and minced meat. At retail, processed meat includes meat preparations, meat products and minced meat.

3.1.2.6. Meat from other animal species

Findings of *Salmonella* in meat from other animal species are presented in Table SA25. The samples originate from fresh meat, meat preparations, meat products, minced meat or unspecified meat. No distinction has been made between productions stages or RTE/non-RTE products due to the limited dataset and the fact that no development over time was evident.

The high number of batches of duck meat was almost exclusively reported by Bulgaria reporting very low levels of *Salmonella* (Table SA25). A residual of 138 batches of duck meat from other MSs showed a proportion of *Salmonella* positive samples of 5.1%.

Results from investigations on meat from deer, farmed game, goat, rabbit, wild boar and wild birds have also been reported, but individual investigations had less than 25 samples and therefore insufficient for analysis in this report.

Table SA25. *Salmonella* in meat from other animals, 2004-2009

	N	% pos
Single		
Meat from duck	1,118	11.3
Meat from geese	333	6.6
Meat from horse	77	0
Meat from wild game - land mammals	216	0.5
Batch		
Meat from duck	5,314	0.4
Meat from geese	263	6.8
Meat from horse	453	0
Meat from wild game - land mammals	414	1.4

3.1.2.7. Meat from unspecified species

A relatively large number of meat samples has been reported without information on animal species or from mixed species by 22 MSs and one non-MS (Tables SA26 and SA27).

Occurrence of *Salmonella* ranged from 0% to 18.3% in single samples and from 0% to 8.7% in batches at MS level.

Table SA26. *Salmonella* in meat[(a)] from unspecified animal species, single samples, 2004-2009

	Non ready-to-eat		Ready-to-eat	
	N	**% pos**	**N**	**% pos**
Meat from bovine animals and pigs				
Austria	128	0	26	0
Belgium	292	4.5	284	4.2
Lithuania	118	0	-	-
Luxembourg	763	2.2	367	1.4
Netherlands	27	3.7	-	-
Romania	506	3.6	-	-
Slovenia	435	2.5	146	0
Sweden	13,743	0	-	-
Meat from poultry, unspecified				
Austria	374	6.1	158	1.9
Belgium	1,796	18.3	-	-
Estonia	47	2.1	NS	NS
Finland	378	0	-	-
Ireland	314	3.5	243	0
Lithuania	99	0	-	-
Spain	721	7.4	36	0
Sweden	6,692	0	-	-
United Kingdom	-	-	402	0
Meat, unspecified				
Austria	749	1.3	225	0.9
Belgium	480	3.1	135	8.1
Estonia	3,429	0.8	192	0
Greece	331	2.4	411	0
Ireland	10,318	0.4	8,189	<0.1
Italy	2,801	3.8	66	1.5
Latvia	30	6.7	-	-
Lithuania	55	0	104	1.0
Luxembourg	34	2.9	-	-
Netherlands	381	0.8	577	1.0
Slovenia	453	1.5	-	-
Spain	947	2.0	-	-
Sweden	26	0	-	-
United Kingdom	-	-	1,589	0

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.
(a): All categories, fresh, processed, unspecified etc., at all production stages.

Table SA27. *Salmonella* in meat[(a)] from unspecified animal species, batch based data, 2004-2009

	Non ready-to-eat		Ready-to-eat	
	N	% pos	N	% pos
Meat from bovine animals and pigs				
Belgium	591	1.9	966	1.6
Poland	5,395	0.1	-	-
Romania	7,935	0.9	-	-
Slovakia	1,187	0	-	-
Meat from poultry, unspecified				
Poland	2,908	8.7	363	0.8
Sweden	3,907	<0.1	-	-
Norway	18,885	<0.1	-	-
Meat, unspecified				
Cyprus	26	3.8	-	-
Czech Republic	5,232	0.2	5,178	<0.1
Denmark	430	0.5	-	-
Latvia	47	0	300	0
Poland	1,339	0	189	0
Romania	149	0	52	0
Norway	5,676	<0.1	-	-

(a): All categories, fresh, processed, unspecified etc. at all production stages.

3.1.2.8. Eggs and products thereof

Salmonella findings in table eggs were reported by 20 MSs (Tables SA28 and SA29). The majority of data were from single samples at retail. In general, low or very low findings were reported and MS totals of positive samples ranged from 0.2% to 1.1% for single samples and from 0.4% to 1.2% batch based samples. A peak value of 22.6% positive was reported by Slovakia in 2008.

In total, table eggs at retail were less frequently infected with *Salmonella* than eggs at packing centre (Figure SA12). The data from single samples at retail were, however, strongly dominated by Germany reporting 32,000 samples out of 42,000 samples and consistently finding low occurrence of *Salmonella*. Without the German samples, the proportions of positive samples would be 1.6% at packing and 1.7% at retail.

One survey reported by the Czech Republic with one positive single sample out of 48 taken at retail in 2008 was not included in the tables and figures.

The findings from each year are highlighted in Figure SA13, where proportion of positive samples at packing and retail has been pooled. A distinct decrease in proportion of *Salmonella* positive batch based samples was observed, however there were insufficient data for analysis for significant temporal trends. This decrease was not evident for single samples. When analysing data without the German investigations, the values for single samples would be somewhat higher and scattered differently, but still no clear trend would be seen.

Data from eggs and egg products not specified as table eggs were reported by 12 MSs (Table SA30). The occurrence of positive samples was not different from the figures reported for table eggs as most investigations had no or low levels of *Salmonella*, ranging from 0% to 5.6%. Spain reported the highest findings in unspecified egg or egg products. This category may comprise table eggs and was therefore of particular interest.

Table SA28. *Salmonella* in table eggs, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Packing centre												
Austria	-	-	280	2.9	1,395	3.0	-	-	NS	NS	25	0
Estonia	149	0	180	0	132	0	86	0	NS	NS	-	-
Germany	-	-	-	-	646	0	797	0.6	1,352	0.1	536	0.4
Greece	NS	NS	-	-	-	-	128	0	26	0	85	0
Italy	431	2.6	524	6.3	251	0.4	186	2.2	-	-	-	-
Portugal	-	-	NS	NS	-	-	NS	NS	NS	NS	40	0
Romania	-	-	-	-	1,295	0.2	2,970	0	-	-	-	-
Slovakia	-	-	470	1.1	-	-	-	-	-	-	-	-
Spain	-	-	-	-	2,956	1.1	41	7.3	207	6.3	1,947	0.2
Processing												
Ireland	-	-	-	-	142	0	88	1.1	-	-	-	-
Retail												
Austria	318	1.3	473	0.8	316	1.9	307	0.7	71	0	30	0
Belgium	-	-	-	-	-	-	117	0	109	0	-	-
Estonia	45	0	43	0	NS	NS	NS	NS	NS	NS	NS	NS
Germany	7,410	0.2	5,649	0.5	3,419	0.8	5,521	0.7	6,003	0.3	4,587	0.3
Greece	410	0.2	197	0	-	-	101	0	178	0	96	0
Ireland	-	-	168	0	NS	NS	NS	NS	115	0.9	NS	NS
Italy	680	2.4	1,242	2.3	320	3.8	160	0.6	-	-	-	-
Latvia	-	-	-	-	-	-	-	-	128	2.3	-	-
Lithuania	NS	NS	-	-	-	-	-	-	45	4.4	-	-
Luxembourg	-	-	NS	NS	-	-	258	0.4	NS	NS	NS	NS
Romania	-	-	-	-	204	0.5	1,043	0	-	-	63	0
Slovakia	-	-	51	0	-	-	-	-	-	-	99	1.0
Slovenia	50	0	102	2.0	100	3.0	-	-	-	-	-	-
Spain	-	-	-	-	-	-	1,653	2.8	-	-	555	5.4
Sweden	-	-	34	0	28	0	-	-	-	-	-	-
MS total												
Packing/processing	NS	NS	NS	NS	6,817	1.1	4,296	0.3	NS	NS	2,633	0.2
Retail	8,913	0.4	7,959	0.8	4,387	1.1	9,160	1.0	6,649	0.4	5,430	0.8

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.

Table SA29. *Salmonella* in table eggs, batch based data, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Packing centre												
Czech Republic	-	-	478	2.7	-	-	428	0.5	451	0.4	330	0
Greece	-	-	81	2.5	197	1.0	-	-	-	-	-	-
Italy	-	-	-	-	169	1.8	155	5.8	-	-	-	-
Lithuania	-	-	-	-	42	7.1	-	-	-	-	NS	NS
Poland	-	-	401	1.2	902	0.8	605	1.2	-	-	363	0
Romania	-	-	-	-	-	-	-	-	29	0	224	0
Slovakia	-	-	-	-	143	1.4	95	1.1	81	3.7	NS	NS
Retail												
Belgium	-	-	-	-	-	-	-	-	-	-	118	0
Czech Republic	-	-	NS	NS	-	-	120	0	-	-	-	-
Greece	-	-	-	-	37	0	-	-	-	-	-	-
Hungary	-	-	-	-	54	0	158	0	846	0.4	672	0
Italy	-	-	-	-	70	2.9	NS	NS	-	-	-	-
Lithuania	-	-	-	-	-	-	-	-	-	-	26	0
Netherlands	-	-	-	-	3,223	<0.1	975	0	-	-	-	-
Poland	-	-	480	2.3	741	1.6	277	1.8	286	0	84	3.6
Romania	-	-	-	-	-	-	-	-	76	0	NS	NS
Slovakia	-	-	-	-	160	4.4	133	1.5	53	22.6	-	-
MS total												
Packing	-	-	NS	NS	1,453	1.2	NS	NS	NS	NS	NS	NS
Retail	-	-	NS	NS	4,285	0.6	1,663	0.4	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.

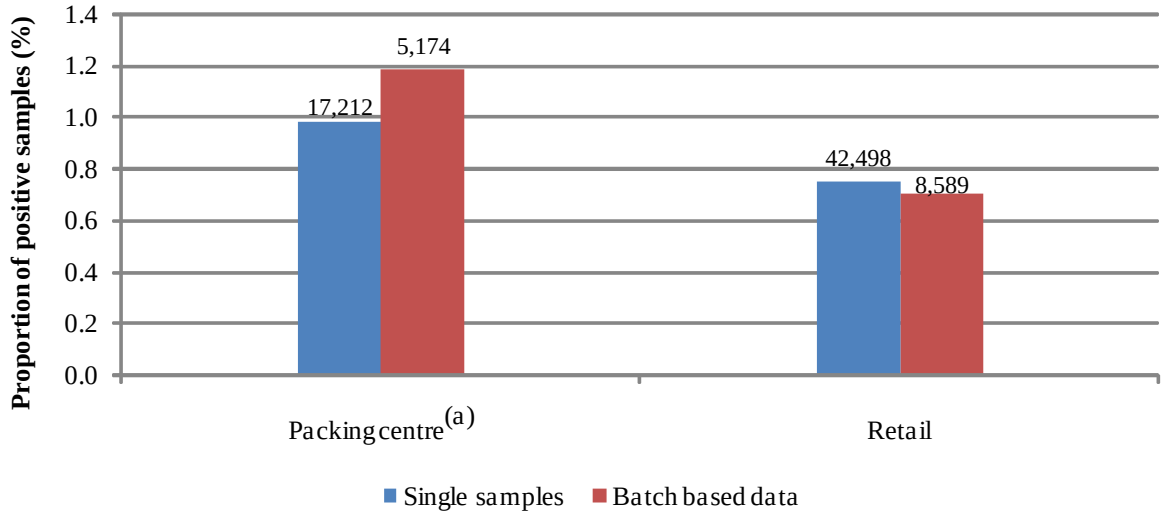

Figure SA12. *Salmonella* in table eggs, reported by MSs, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data for a sampling unit/sampling stage data point to be presented in the figure. For overview of MSs included in the figure see Table SA28 and SA29. The numbers of samples tested are shown above the columns.

(a): Packing centre includes data from processing.

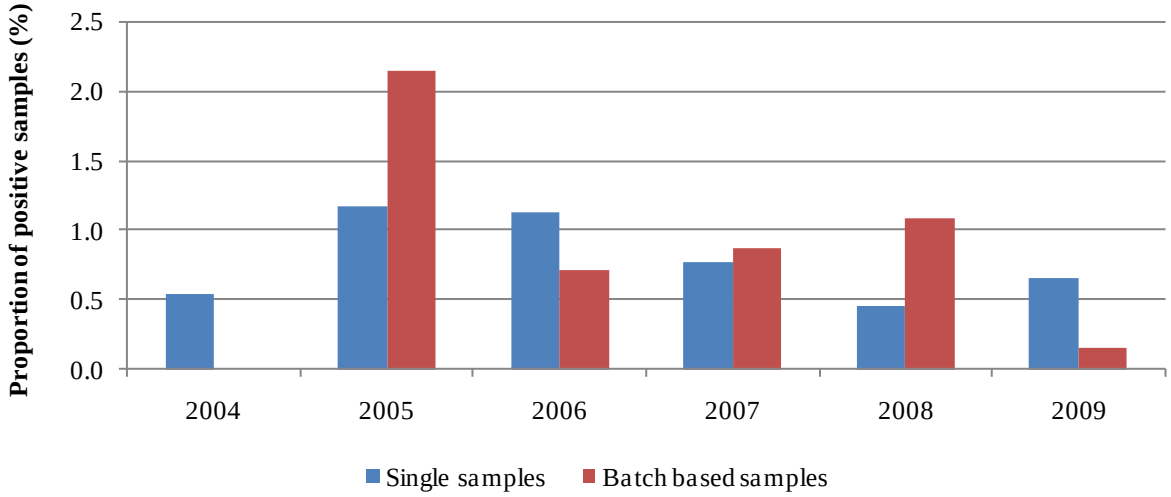

Figure SA13. *Salmonella* in table eggs at packing centre, processing and retail, reported by MSs, 2004-2009

Note: Minimum five MSs must report sufficient data for a sampling unit/year data point to be presented in the figure. For overview of MSs included in the figure and total number of samples see Table SA28 and SA29.

Table SA30. *Salmonella* in egg and egg products other than table eggs, 2004-2009 (pooled data)

	Single samples		Batch based samles	
	N	% pos	N	% pos
Dried				
Belgium	99	0	-	-
Liquid				
Austria	65	3.1	-	-
Belgium	182	0.5	-	-
Estonia	67	0	-	-
Raw material (liquid egg) for egg products				
Czech Republic	-	-	466	1.9
Ireland	1,181	0	-	-
Unspecified				
Austria	252	0.8	-	-
Belgium	192	0.5	91	1.1
Czech Republic	-	-	1,532	0.7
Estonia	98	0	-	-
Germany	644	0.5	-	-
Greece	34	0	-	-
Ireland	2,635	0	-	-
Italy	324	0.6	324	4.0
Poland	-	-	10,602	<0.1
Portugal	-	-	26	0
Romania	-	-	63	0
Spain	715	5.6	-	-

3.1.2.9. Milk, cheese and other dairy

In total, 17 MSs and one non-MS reported single sample data and 11 MSs reported batch based data on milk, cheese and other dairy products at farm, processing and retail (Table SA31 and SA32). As data were reported sporadically by few MSs each year during the period, no distinction has been made between years.

Data on non-RTE products were mainly provided on cows' milk and the investigations gave no or very low levels of positive findings. In total, 0.05% and 0.03% of single samples were positive at processing and retail, respectively, (Table SA31). *Salmonella* was only found by Germany reporting <0.1% positive samples of cows' milk at processing and retail. Only the Czech Republic reported *Salmonella* findings in batch based samples (0.3% at processing).

Four MSs reported data at farm level. Only Italy reported positive samples, namely from 0.3% to 1.2% positive single samples and 2.8% positive batches (Table SA31 and SA32).

Most of single sample data on RTE products were from other dairy products and majority of investigations had no positive findings. In total, between <0.1% and 0.2% samples were found positive at processing and retail (Table SA31).

In total, the proportion of positive single samples of RTE cheese was between <0.1% and 0.2% at processing and <0.1 at retail. Ireland, Italy and Spain reported positive findings in single samples of cheese at processing, 0.1%, 0.2% and 3.2%, respectively, and Belgium, Greece and Italy likewise reported 0.6%, 1.9% and 1.8% positive single samples at retail.

For both non-RTE and RTE products, higher proportions of positive samples were reported at processing compared to retail (Figure SA14).

Table SA31. *Salmonella* in milk, cheese and other dairy products, single samples, 2004-2009 (pooled data)

	Non ready-to-eat				Ready-to-eat									
	Milk, cows'		Milk (unspecified)		Milk, cows'		Milk (Unspecified)		Cheese (cows' milk)		Cheese (unspecified milk)		Other dairy products	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Farm														
Belgium	36	0	73	0	-	-	-	-	359	0	122	0	392	0
Germany	155	0	-	-	-	-	-	-	-	-	-	-	-	-
Italy	3,968	0.3	411	1.2	-	-	-	-	NS	NS	NS	NS	NS	NS
Processing														
Austria	131	0	NS	NS	-	-	-	-	939	0	137	0	1,371	0
Belgium	NS	NS	-	-	-	-	-	-	252	0	349	0	307	0
Estonia	132	0	-	-	-	-	-	-	204	0	-	-	454	0.2
Finland	-	-	-	-	-	-	-	-	-	-	90	0	-	-
Germany	1,379	<0.1	-	-	121	0	-	-	1,834	0	376	0	8,599	<0.1
Greece	-	-	-	-	-	-	-	-	NS	NS	370	0	-	-
Hungary	NS	NS	-	-	-	-	-	-	124	0	NS	NS	269	0
Ireland	-	-	624	0.2	-	-	55	0	-	-	1,905	<0.1	36,443	<0.1
Italy	NS	NS	NS	NS	-	-	-	-	345	0	2,795	0.2	143	0
Latvia	-	-	-	-	-	-	-	-	55	0	-	-	190	0
Portugal	-	-	-	-	-	-	-	-	-	-	58	0	NS	NS
Romania	265	0	-	-	-	-	-	-	-	-	-	-	-	-
Slovakia	271	0	-	-	-	-	-	-	-	-	-	-	-	-
Slovenia	-	-	-	-	-	-	-	-	47	0	26	0	NS	NS
Spain	-	-	-	-	-	-	-	-	187	3.2	-	-	269	0.7
Switzerland	-	-	-	-	-	-	-	-	495	0	97	0	-	-
Retail														
Austria	59	0	-	-	71	0	-	-	511	0	36	0	1,937	0
Belgium	-	-	-	-	-	-	-	-	600	0	318	0.6	221	0
Czech	-	-	-	-	-	-	-	-	60	0	-	-	36	0
Estonia	54	0	NS	NS	30	0	-	-	27	0	NS	NS	154	0
Finland	-	-	-	-	-	-	-	-	-	-	60	0	-	-
Germany	2,641	<0.1	-	-	NS	NS	-	-	5,592	0	624	0	20,556	0
Greece	144	0	NS	NS	-	-	-	-	105	1.9	725	0	1,416	<0.1
Hungary	139	0	NS	NS	-	-	-	-	87	0	105	0	262	0.4
Ireland	40	0	50	0	-	-	-	-	NS	NS	2,111	0	2,150	0
Italy	NS	NS	NS	NS	-	-	-	-	41	0	56	1.8	NS	NS
Latvia	55	0	-	-	-	-	-	-	74	0	-	-	48	0
Netherlands	NS	NS	-	-	-	-	-	-	54	0	NS	NS	67	0
Romania	-	-	-	-	-	-	-	-	393	0	373	0	NS	NS
Slovenia	NS	NS	-	-	NS	NS	NS	NS	NS	NS	94	0	300	0
Switzerland	-	-	-	-	-	-	-	-	91	0	-	-	-	-
MS total														
Processing	2,178	<0.1	NS	NS	NS	NS	NS	NS	3,987	0.2	6,106	<0.1	48,045	<0.1
Retail	3,132	<0.1	NS	NS	NS	NS	NS	NS	7,544	<0.1	4,502	<0.1	27,147	<0.1

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.

Table SA32. *Salmonella* in milk, cheese and other dairy products, batch based data, 2004-2009 (pooled data)

	Non ready-to-eat				Ready-to-eat									
	Milk, cows'		Milk (unspecified)		Milk, cows'		Milk (Unspecified)		Cheese (cows' milk)		Cheese (unspecified milk)		Other dairy products	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Farm														
Czech Republic	-	-	-	-	56	0	NS	NS	-	-	-	-	-	-
Italy	36	2.8	-	-	-	-	-	-	-	-	-	-	-	-
Processing														
Belgium	-	-	-	-	-	-	-	-	122	0	29	0	68	0
Czech Republic	344	0.3	-	-	-	-	-	-	1,645	0	88	0	16,228	0
Ireland	-	-	NS	NS	-	-	NS	NS	-	-	806	0.5	1,570	0
Italy	-	-	-	-	-	-	-	-	35	0	82	0	-	-
Poland	11,212	0	NS	NS	-	-	-	-	4,135	0	34	0	6,827	<0.1
Romania	151	0	-	-	NS	NS	-	-	1,297	0	169	0	1,428	0
Slovakia	-	-	-	-	-	-	-	-	NS	NS	349	0	59	0
Slovenia	-	-	-	-	-	-	-	-	-	-	-	-	188	0
Retail														
Belgium	-	-	-	-	-	-	-	-	100	0	-	-	72	0
Bulgaria	136	0	NS	NS	-	-	-	-	13,396	0	4,518	0	1,652	0
Czech Republic	NS	NS	-	-	-	-	-	-	121	0	NS	NS	54	0
Hungary	NS	NS	-	-	-	-	-	-	89	0	NS	NS	1,027	0
Italy	NS	NS	-	-	-	-	-	-	NS	NS	32	0	140	0
Poland	-	-	-	-	-	-	-	-	-	-	-	-	129	0
Portugal	NS	NS	-	-	-	-	-	-	202	0	828	0.7	192	0
Romania	-	-	-	-	-	-	-	-	313	0	211	0	579	0.2
Slovakia	NS	NS	-	-	NS	NS	-	-	70	0	99	0	2,763	0
MS total														
Processing	NS	NS	NS	NS	NS	NS	NS	NS	7,234	0	1,557	0.3	26,368	<0.1
Retail	NS	NS	NS	NS	NS	NS	NS	NS	14,291	0	5,688	0.1	6,608	<0.1

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals

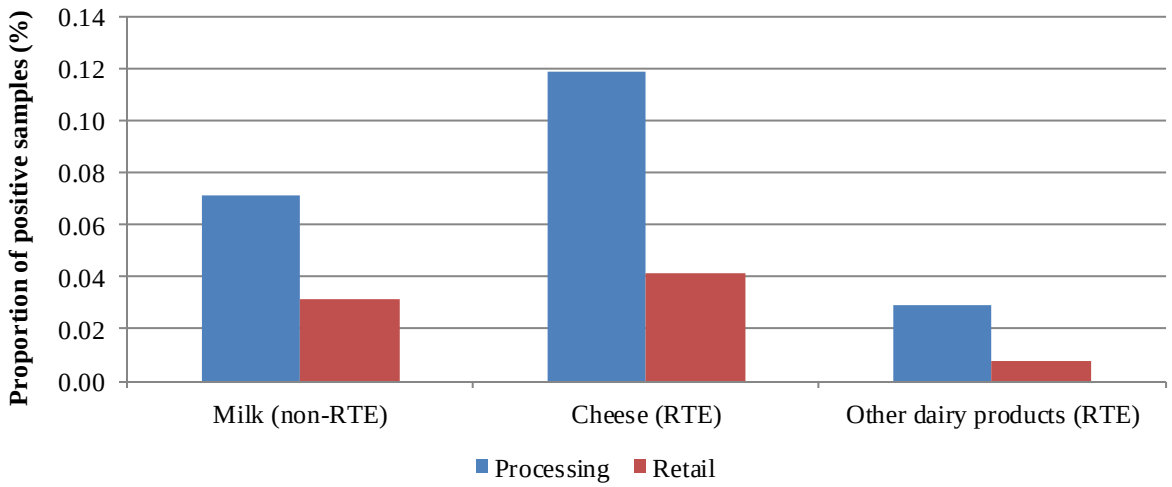

Figure SA14. *Salmonella* in non-RTE milk and RTE cheese and other dairy products, single samples reported by MSs, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data food product/sampling stage data point to be presented in the figure. For an overview of MSs included in the figure and total number of samples see Table SA31.

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3.1.2.10. Fish and fishery products

Sixteen MSs and one non-MS reported single sample data and nine MSs reported batch based data on non-RTE fish and fishery products from processing and retail. The amount of data was limited as MSs only reported sporadically during the period covered and therefore no distinction has been made between years (Table SA33 and SA34).

Majority of data were reported as non-RTE fish and fishery products (Table SA33 and SA34). In single samples at processing, Spain reported 1.2% positive fishery products and Italy reported 0.9% positive bivalve molluscs and at retail, eight of thirteen MSs reported between 0.1% and 8.5% positive findings in different products. The Czech Republic reported the highest proportion of positive single samples. Positive findings of batch based data on non-RTE fish and fishery products were only reported by Hungary; 2. 8% positive fishery products at retail.

Data on RTE fish and fishery products were reported from processing and retail by 8 MSs and one non-MS (Table SA33 and SA34). Only Belgium and the Netherlands reported positive findings; reporting 0.8% and 2.4% of single samples of crustaceans positive at retail, respectively.

Table SA33. *Salmonella* in fish and fishery products, single samples, 2004-2009 (pooled data)

	Fish		Fishery products		Crustaceans		Bivalve molluscs [(a)]	
	N	% pos	N	% pos	N	% pos	N	% pos
non-RTE								
Processing								
Belgium	30	0	-	-	61	0	-	-
Estonia	53	0	52	0	NS	NS	-	-
Germany	-	-	1,652	0	315	0	-	-
Ireland	72	0	48	0	91	0	238	0
Italy	-	-	41	0	NS	NS	107	0.9
Portugal	NS	NS	NS	NS	NS	NS	82	0
Spain	-	-	81	1.2	-	-	-	-
Norway	32	0	-	-	-	-	67	0
Retail								
Austria	140	0	65	0	45	0	-	-
Belgium	62	1.6	-	-	97	4.1	210	0.5
Czech Republic	48	4.2	NS	NS	-	-	-	-
Estonia	48	0	180	0	NS	NS	-	-
Germany	-	-	11,608	0.1	2,452	0.4	-	-
Greece	-	-	163	0.6	136	0	253	1.2
Hungary	60	1.7	43	0	86	0	NS	NS
Ireland	104	0	599	0	142	0	107	0
Italy	-	-	308	1.0	-	-	564	0.2
Latvia	-	-	46	0	-	-	-	-
Lithuania	-	-	247	8.5	-	-	-	-
Slovenia	-	-	50	0	-	-	-	-
Sweden	-	-	112	0	80	2.5	-	-

(Continue next page)

Table SA33 (contd.). *Salmonella* in fish and fishery products, single samples, 2004-2009 (pooled data)

	Fish		Fishery products		Crustaceans		Bivalve molluscs(a)	
	N	% pos	N	% pos	N	% pos	N	% pos
RTE								
Processing								
Belgium	-	-	-	-	50	0	-	-
Estonia	NS	NS	158	0	NS	NS	-	-
Ireland	138	0	31	0	NS	NS	NS	NS
Latvia	-	-	140	0	-	-	-	-
Poland	-	-	-	-	25	0	-	-
Retail								
Belgium	-	-	-	-	119	0.8	NS	NS
Czech Republic	NS	NS	NS	NS	-	-	-	-
Estonia	30	0	97	0	NS	NS	-	-
Hungary	-	-	177	0	28	0	85	0
Ireland	91	0	1,292	0	77	0	27	0
Latvia	-	-	210	0	-	-	-	-
Netherlands	NS	NS	-	-	42	2.4	-	-
Slovenia	-	-	-	-	NS	NS	-	-
United Kingdom	3,222	0	79	0	-	-	-	-
Norway	50	0	-	-	-	-	-	-
MS total								
non-RTE								
Processing	NS	NS	1,874	<0.1	NS	NS	NS	NS
Retail	462	0.9	13,421	0.3	NS	NS	NS	NS
RTE								
Processing	NS	NS	NS	NS	NS	NS	NS	NS
Retail	NS	NS	1,855	0	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Bivalve molluscs include live bivalve molluscs and molluscan shellfish.

Table SA34. *Salmonella* in fish and fishery products, batch based data, 2004-2009 (pooled data)

	Fish		Fishery products		Crustaceans		Molluscan shellfish	
	N	% pos	N	% pos	N	% pos	N	% pos
non-RTE								
Processing								
Czech Republic	-	-	53	0	55	0	NS	NS
Italy	-	-	46	0	NS	NS	33	0
Poland	-	-	1,320	0	-	-	-	-
Romania	NS	NS	431	0	NS	NS	NS	NS
Slovakia	-	-	32	0	-	-	-	-
Retail								
Belgium	-	-	62	0	60	0	38	0
Czech Republic	56	0	-	-	-	-	-	-
Hungary	-	-	72	2.8	-	-	-	-
Italy	NS	NS	NS	NS	NS	NS	53	0
Portugal	-	-	170	0	25	0	-	-
Romania	NS	NS	200	0	NS	NS	-	-
Slovakia	-	-	335	0	-	-	-	-
Bulgaria	-	-	563	0	246	0	175	0
RTE								
Processing								
Belgium	-	-	-	-	31	0	-	-
Poland	-	-	-	-	38	0	37	0
Retail								
Bulgaria	-	-	-	-	341	0	164	0
Czech Republic	34	0	-	-	-	-	-	-
Greece	NS	NS	-	-	-	-	43	0
Hungary	-	-	-	-	-	-	53	0
Portugal	-	-	-	-	95	0	NS	NS

NS: Not sufficient data, <25 samples reported by the MS.

3.1.2.11. Fruit and vegetables

Few investigations on fruits and vegetables were reported by MSs and due to the limited dataset no distinction has been made between years. Generally, fewer samples were taken of RTE than of non-RTE products (Table SA35 and SA36).

In total, 11 MSs reported data on non-RTE fruits, vegetables, spices and herbs, mushrooms and sprouted seeds (Table SA35) and the majority of investigations revealed no positive findings. The highest proportions of positive samples were reported for spices and herbs. Hungary and the Netherlands reported 1.0% and 3.3% single samples positive, respectively.

Nine MSs reported data on RTE fruits, vegetables, nuts and juice (Table SA36) and the majority of investigations comprised only negative findings. Ireland and the Netherlands reported 3.4% and 0.6% of single samples of sprouted seeds positive, respectively, and Ireland reported 1.4% of nuts and nut products positive.

Table SA35. *Salmonella* in non-RTE fruits, vegetables, mushrooms, 2004-2009 (pooled data)

	Fruits		Vegetables		Spices and herbs		Mushrooms		Seeds, sprouted	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Single										
Processing										
Austria	-	-	NS	NS	26	0	-	-	-	-
Estonia	NS	NS	96	0	-	-	-	-	NS	NS
Ireland	-	-	-	-	-	-	223	0	-	-
Netherlands	-	-	655	0.2	-	-	-	-	-	-
Retail										
Austria	62	0	107	0.9	164	0	NS	NS	-	-
Belgium	169	0	111	0	205	0	52	0	-	-
Czech Republic	35	0	132	0	-	-	NS	NS	-	-
Estonia	-	-	NS	NS	39	0	-	-	-	-
Hungary	-	-	29	0	198	1.0	NS	NS	-	-
Ireland	141	0	393	0.3	145	0	753	0.1	-	-
Netherlands	-	-	-	-	4,393	3.3	-	-	-	-
Slovenia	-	-	-	-	30	0	-	-	-	-
United Kingdom	-	-	-	-	3,760	0.5	-	-	-	-
Batch										
Processing										
Romania	-	-	NS	NS	1,429	0	-	-	NS	NS
Slovakia	-	-	-	-	108	0	-	-	-	-
Retail										
Romania	-	-	26	0	197	0	-	-	-	-

NS: Not sufficient data, <25 samples reported by the MS.

Table SA36. *Salmonella* in RTE fruits, vegetables, mushrooms, 2004-2009 (pooled data)

	Fruits		Vegetables		Seeds, sprouted		Nuts and nut products		Juice	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Single										
Retail										
Austria	50	0	-	-	-	-	98	0	42	0
Belgium	-	-	87	0	-	-	-	-	NS	NS
Estonia	NS	NS	NS	NS	NS	NS	NS	NS	30	0
Greece	-	-	31	0	-	-	-	-	-	-
Hungary	-	-	49	0	44	0	78	0	-	-
Ireland	-	-	-	-	29	3.4	70	1.4	407	0
Netherlands	-	-	-	-	174	0.6	-	-	-	-
Batch										
Retail	-	-	-	-	-	-	-	-	-	-
Portugal	-	-	-	-	25	0	-	-	100	0
Romania	-	-	-	-	NS	NS	-	-	260	0

NS: Not sufficient data, <25 samples reported by the MS.

3.1.2.12.Infant formula

Six MSs reported a total of 1,034 single samples and 1,139 batches of infant formula and none were positive.

3.1.2.13.Other food categories

Data on *Salmonella* in RTE food products were reported by 13 MSs sporadically during the years and no distinction between sampling stage or years has been made (Table SA37). In total, 0.3% of bakery products were positive, but most of the positive samples were reported by Lithuania from one investigation at retail (10 out of 35 samples). In RTE salads, Lithuania reported 3.5% of batch based samples positive for *Salmonella*.

In non-RTE food products based on single samples, 14 MSs reported 130 positive samples out of 64,798 samples analysed at different sampling stages; e.g. four positive samples out of 1,525 samples of cereals and one positive sample out of 71 samples of coconut. In batches of non-RTE foodstuffs at different sampling stages, one out of 1,417 batches was positive. The positive batch was noodles reported as other processed food products and prepared dishes. These data were not included in the tables and figures.

Table SA37. *Salmonella* in RTE food products, 2004-2009 (pooled data)

	Bakery products		Ready-to-eat salads		Confectionery products and sweets		Unspecified food products[(a)]	
	N	% pos	N	% pos	N	% pos	N	% pos
Single								
Austria	618	0	237	0	44	0	237	0
Belgium	188	0.5	-	-	-	-	533	0.2
Czech Republic	-	-	NS	NS	48	0	-	-
Estonia	1,244	<0.1	2,749	0.1	137	0	645	0
Greece	46	0	95	0	-	-	332	0.3
Hungary	-	-	815	0.1	-	-	1,079	0
Ireland	2,093	0	684	0	71	0	14,207	<0.1
Lithuania	35	28.6	NS	NS	-	-	-	-
Portugal	-	-	-	-	-	-	3,042	<0.1
Romania	43	0	-	-	-	-	-	-
Slovakia	NS	NS	-	-	NS	NS	1,611	0
Slovenia	250	0	128	0	800	0	1,231	0
United Kingdom	-	-	-	-	-	-	1,242	<0.1
Batch								
Czech Republic	-	-	791	0	914	0	2,045	0.2
Lithuania	-	-	86	3.5	-	-	-	-
Portugal	130	0	-	-	-	-	-	-
Romania	324	0	-	-	-	-	3,196	<0.1
Slovakia	122	0	3,329	0	2,540	0	430	0
MS Total								
Single	4,517	0.3	4708	<0.1	1,100	0	24,159	<0.1

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs for calculations of totals.
(a): unspecified food products include beverages, chocolate, honey, sauces and dressing, soups, other food products and prepared dishes, foodstuffs intended for special nutritional use.

3.1.3. Serovars

The reported distributions of *Salmonella* serovars in food for each of the years 2004 to 2009 are presented in Table SA38 to SA44. Each table shows the ten most common serovars reported from a specific food category. Unfortunately, a large proportion of the *Salmonella* isolates was reported without information on type of serovar and some of these isolates are most likely to be one of the top ten serovars.

Most years, *S.* Enteritidis was the most common serovar in broiler meat, but in 2007 it was outnumbered by *S.* Infantis and *S.* Kentucky and in 2009 by *S.* Infantis, being by far the most common serovar that year (Table SA38). In total, *S.* Infantis became the most common serovar in broiler meat. The shift in serovar distribution during the period is illustrated in figure SA15, which also shows that untyped isolates/other serovars constitute a significant segment of data.

The results for turkey meat are shown in Table SA39. The number of serovars reported was relatively low and varied much during the years, making comparison of proportions difficult. In 2005 e.g., only one MS reported data on serovars found in turkey meat. *S.* Typhimurium and *S.* Hadar were isolated every year, but not always in large numbers. Overall, *S.* Typhimurium was the most commonly found serovar in turkey meat, but the largest single number reported was 65 isolates of S. Bredeney found in

2009, making this serovar the second most common, even though it was found in only two out of the six years.

In pig meat, presented in Table SA40, *S.* Typhimurium was consistently the most common serovar followed by *S.* Derby. No other serovar constituted more than 3.5% of all isolates from one year except for *S.* Infantis, reaching 11.0% in 2006.

S. Typhimurium was also the most common serovar in bovine meat (Table SA41). S. Dublin, which in food is found almost exclusively in meat from bovine animals, was the second most common serovar and outnumbered *S.* Typhimurium in 2005 and 2006.

Overall in meat from unspecified animal species (Table SA42), *S.* Typhimurium and *S.* Enteritidis were reported with similar frequencies, but with large fluctuations between years. All other serovars were reported in proportions of less than 10% each year.

Data on *Salmonella* serovars found in other food categories are presented in Table SA43 and SA44. Among these, substantial figures were only reported for eggs and egg products, where *S.* Enteritidis was the most common serovar.

An overview of data is given in Table SA45. Most isolates have been isolated from meat and meat products, which has been reported by a total of 26 MSs. *S.* Typhimurium is the most common serovar followed by *S.* Enteritidis and *S.* Infantis. *S.* Enteritidis dominates only among isolates from eggs and egg products (Table SA45).

Pooled data from selected food categories are presented in more detail in figure SA16. *S.* Typhimurium is the most common serovar in pig meat, bovine meat and dairy products, while *S.* Enteritidis is most common among isolates from eggs. For broiler and turkey meat, the picture is not similarly dominated by one single serovar.

Table SA38. Distribution of the ten most common *Salmonella* serovars in broiler meat, 2004-2009

Serovars	No of isolates per serovar	2004	2005	2006	2007	2008	2009
Infantis	865	5.6	0.8	1.8	15.1	3.5	34.3
Enteritidis	681	25.7	32.1	26.4	7.4	22.6	4.4
Kentucky	355	1.9	7.5	8.2	15.9	3.5	0.5
Typhimurium	193	10.8	5.0	4.0	2.0	6.5	1.7
Agona	185	3.3	2.5	9.8	2.3	5.3	2.7
ParatyphiB	73	0.8	2.9	1.1	0.5	1.9	2.1
Hadar	70	3.7	0.4	1.6	0.4	2.9	0.9
Blockley	70	7.1	5.8	3.2	0.2	0.8	-
Bredeney	59	1.0	2.5	8.2	0.1	0.5	0.7
Mbandaka	53	0.2	4.6	8.4	0.3	0.2	0.1
Salmonella spp./ other serovars	2,574	39.8	35.8	27.4	55.9	52.2	52.5
No of isolates per year		482	240	379	1,640	828	1,609

Note: *Salmonella* isolates from investigations with <25 samples are included in the table. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

Table SA39. Distribution of the ten most common *Salmonella* serovars in turkey meat, 2004-2009

Serovars	No of isolates per serovar	2004	2005	2006	2007	2008	2009
Typhimurium	71	44.0	12.5	3.4	2.3	18.5	5.5
Bredeney	69	-	-	-	1.0	-	14.3
Infantis	43	-	-	-	2.8	-	7.1
Saintpaul	36	4.0	-	6.9	5.0	3.8	1.8
Enteritidis	16	8.0	-	-	0.3	6.2	1.1
Agona	16	-	-	-	3.3	-	0.7
Hadar	15	8.0	12.5	24.1	0.8	0.8	0.2
Indiana	8	-	62.5	-	0.5	-	0.2
Blockley	4	4.0	12.5	-	-	0.8	0.2
Kentucky	2	-	-	-	0.5	-	-
Salmonella spp./ other serovars	763	32.0	0	65.5	83.7	70.0	68.9
No of isolates per year		25	8	29	398	130	453

Note: *Salmonella* isolates from investigations with <25 samples are included in the table. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

Table SA40. Distribution of the ten most common *Salmonella* serovars in pig meat, 2004-2009

Serovars	No of isolates per serovar	2004	2005	2006	2007	2008	2009
Typhimurium	1,628	52.5	37.1	36.6	43.5	36.4	33.4
Derby	479	19.0	13.1	8.2	13.8	9.2	8.2
Infantis	118	3.5	2.1	11.0	2.1	1.9	1.8
Enteritidis	72	2.6	1.5	1.2	2.1	2.0	0.8
Agona	41	-	-	-	0.7	2.5	1.0
Ohio	40	2.8	2.4	-	<0.1	0.2	1.7
Brandenburg	40	0.2	1.8	-	1.2	0.6	1.7
Rissen	36	0.7	0.3	1.5	0.3	0.7	1.9
London	36	0.6	-	0.9	0.9	0.9	1.3
Bredeney	34	0.6	0.3	1.2	1.4	1.0	0.1
Salmonella spp./ other serovars	1,561	17.5	41.3	39.3	33.9	44.6	47.9
No of isolates per year		537	329	328	1,073	992	826

Note: *Salmonella* isolates from investigations with <25 samples are included in the table. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

Table SA41. Distribution of the ten most common *Salmonella* serovars in bovine meat, 2004-2009

Serovars	No of isolates per serovar	2004	2005	2006	2007	2008	2009
Typhimurium	241	54.3	6.7	29.8	23.0	17.4	16.1
Dublin	111	17.3	44.4	33.0	10.8	2.3	2.2
Enteritidis	83	19.1	2.2	4.3	4.4	11.3	4.4
Derby	16	-	2.2	3.2	3.9	1.1	0.6
Agona	15	0.6	-	1.1	2.5	2.3	1.1
Mbandaka	10	-	-	3.2	2.0	-	1.7
Infantis	8	-	-	2.1	2.0	0.4	0.6
Brandenburg	7	-	-	2.1	2.5	-	-
Bredeney	6	-	-	1.1	-	-	2.8
Livingstone	5	-	-	-	0.5	1.5	-
Salmonella spp./ other serovars	448	8.6	44.4	20.2	48.5	63.8	70.6
No of isolates per year		162	45	94	204	265	180

Note: *Salmonella* isolates from investigations with <25 samples are included in the table. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

Table SA42. Distribution of the ten most common *Salmonella* serovars in meat from unspecified animals species, 2004-2009

Serovars	No of isolates per serovar	2004	2005	2006	2007	2008	2009
Typhimurium	254	26.2	7.2	15.3	14.7	20.7	21.2
Enteritidis	241	16.4	21.6	27.7	13.8	2.2	29.1
Infantis	52	3.3	4.5	0.7	3.4	1.6	6.6
Derby	39	6.6	0.9	3.6	2.4	4.5	0.7
Brandenburg	27	-	9.0	2.9	0.7	2.2	0.7
Virchow	27	-	2.7	-	0.6	2.2	4.6
Rissen	23	-	0.9	5.1	1.9	-	1.7
Livingstone	19	1.6	2.7	3.6	0.4	1.9	0.7
Bredeney	16	-	3.6	3.6	-	2.2	-
Agona	15	1.6	2.7	-	1.5	0.3	0.7
Salmonella spp./ other serovars	753	44.3	44.1	37.2	60.7	62.1	34.1
No of isolates per year		61	111	137	537	314	302

Note: *Salmonella* isolates from investigations with <25 samples are included in the table. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

Table SA43. Distribution of the ten most common *Salmonella* serovars in egg and egg products, and milk cheese and other dairy products, 2004-2009

Serovars	No of isolates per serovar	2004	2005	2006	2007	2008	2009
Egg and egg products							
Number of reporting MS		4	8	11	10	12	9
Enteritidis	427	80.8	32.4	73.4	49.6	66.9	56.2
Typhimurium	25	5.8	4.2	3.3	0.7	4.2	4.1
Livingstone	10	-	-	1.1	5.1	0.7	-
Infantis	7	3.8	0.7	-	2.2	0.7	-
Agona	7	-	2.8	-	1.5	0.7	-
Rissen	6	-	-	-	4.4	-	-
Anatum	4	-	-	-	2.9	-	-
Derby	3	-	-	-	2.2	-	-
Virchow	1	-	-	0.5	-	-	-
Ohio	1	-	-	-	0.7	-	-
Salmonella spp./ other serovars	239	9.6	59.9	21.7	30.7	26.8	39.7
No of isolates per year		52	142	184	137	142	73
Milk, cheeses and other dairy products							
Number of reporting MS				1	4	7	5
Typhimurium	9	-	-	-	-	20.9	-
Enteritidis	5	-	-	-	14.3	7.0	11.1
Bredeney	4	-	-	50.0	-	-	-
Mbandaka	2	-	-	25.0	-	-	-
Infantis	1	-	-	-	-	-	11.1
Agona	1	-	-	-	14.3	-	-
Brandenburg	1	-	-	12.5	-	-	-
Dublin	1	-	-	-	14.3	-	-
Salmonella spp.	43	-	-	12.5	57.1	72.1	77.8
No of isolates per year		0	0	8	7	43	9.0

Note: *Salmonella* isolates from investigations with <25 samples are included in the table. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

Table SA44. Distribution of the ten most common *Salmonella* serovars in fruit and vegetables, fish and fishery products and unspecified products, 2004-2009

Serovars	No of isolates per serovar	2004	2005	2006	2007	2008	2009
Fruit and vegetables							
Number of reporting MS		-	1	-	1	3	1
Typhimurium	2	-	-	-	-	2.7	-
Enteritidis	1	-	-	-	-	1.4	-
Salmonella spp.	118	-	100	-	100	95.9	100
No of isolates per year		0	5	0	42	73	1
Fish and fishery products							
Number of reporting MS		-	-	1	6	9	4
Enteritidis	6	-	-	-	11.8	4.4	22.2
Typhimurium	5	-	-	-	17.6	4.4	-
Salmonella spp.	61	-	-	100	70.6	91.1	77.8
No of isolates per year		0	0	1	17	45	9
Unspecified food categories							
Number of reporting MS		1	4	3	5	5	6
Enteritidis	27	-	50.0	45.5	50.0	11.5	-
Anatum	22	-	-	-	-	-	26.2
Typhimurium	13	-	-	18.2	19.2	15.4	2.4
Mbandaka	9	-	-	9.1	7.7	-	7.1
Infantis	3	-	-	-	3.8	7.7	-
Senftenberg	2	-	-	-	-	-	2.4
Derby	2	-	-	18.2	-	-	-
Kentucky	2	100	-	-	-	-	1.2
Virchow	1	-	-	-	-	-	1.2
Hadar	1	-	-	-	-	-	1.2
Salmonella spp./ other serovars	78	-	50.0	9.1	19.2	65.4	58.3
No of isolates per year		1	12	11	26	26	84

Note: *Salmonella* isolates from investigations with <25 samples are included in the table. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

Table SA45. Distribution of *Salmonella* serovars in different food categories, 2004-2009 (pooled data)

Serovars	No of isolates per serovar	Meat and meat products	Eggs and egg products	Milk, cheese and dairy	Fruit and vegetables	Fish and fishery products	Other food
Number of reporting MS		26	18	12	5	11	15
Typhimurium	2,441	18.8	3.4	13.4	1.7	6.9	8.1
Enteritidis	1,559	8.6	58.5	7.5	0.8	8.3	16.9
Infantis	1,097	8.5	1.0	1.5	-	-	1.9
Derby	557	4.3	0.4	-	-	-	1.3
Kentucky	379	3	-	-	-	-	1.3
Agona	281	2.1	1.0	1.5	-	-	0.6
Bredeney	189	1.4	-	6.0	-	-	0.6
Dublin	120	0.9	-	1.5	-	-	0.6
Hadar	102	0.8	-	-	-	-	0.6
Livingstone	95	0.7	1.4	-	-	-	-
Blockley	86	0.7	-	-	-	-	-
Mbandaka	84	0.6	-	3.0	-	-	5.6
Brandenburg	77	0.6	-	1.5	-	-	-
Virchow	75	0.6	0.1	-	-	-	0.6
Saintpaul	73	0.6	0.1	-	-	-	-
Rissen	69	0.5	0.8	-	-	-	-
Ohio	69	0.5	0.1	-	-	-	-
Anatum	61	0.3	0.5	-	-	-	13.8
Indiana	54	0.4	-	-	-	-	-
London	44	0.3	-	-	-	-	-
Thompson	29	0.2	-	-	-	-	-
Montevideo	17	0.1	-	-	-	-	0.6
Senftenberg	13	<0.1	-	-	-	-	1.3
Give	9	<0.1	-	-	-	-	-
Monophasic Typhimurium	4	<0.1	-	-	-	-	-
Salmonella spp.	6,286	45.2	32.6	64.2	97.5	84.7	46.3
No of isolates per food category		12,718	730	67	121	72	160

Note: *Salmonella* isolates from investigations with <25 samples are included in the table. Investigations reported as HACCP, baseline, import, non-food and biased samples (clinical investigations, suspect sampling, outbreak related, selective sampling) were excluded.

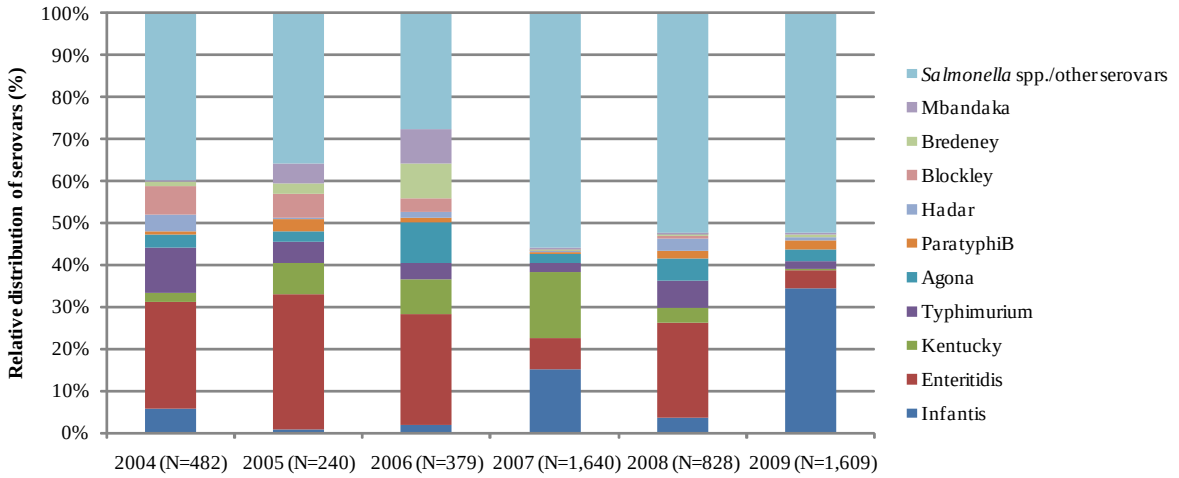

Figure SA15. Relative distribution of the ten most common *Salmonella* serovars in broiler meat, reported by MSs, 2004-2009 (pooled data)

Note: Data from Table SA38.

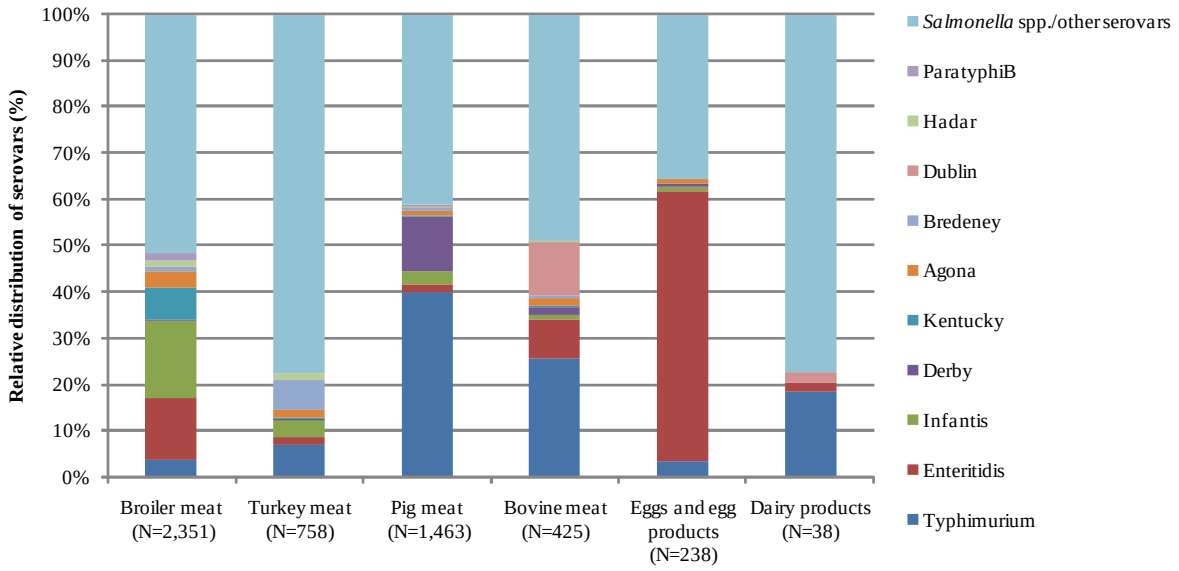

Figure SA16. Relative distribution of the ten most common *Salmonella* serovars in different food categories, 2004-2009 (pooled data)

Note: Only food categories with a total of 25 or more samples are presented. Data from Table SA38-41 and SA43.

3.1.4. Overview of *Salmonella* in the food chain

For some food categories the proportion of *Salmonella* positive samples at retail and at one or more processing stages can be compared. The overall proportion of positive meat samples at different sampling stages is presented in Figure SA17. All food producing animal species and meat categories treated in this chapter were collated in the figure.

The overall proportion of positive samples is seen to be somewhat higher at retail than at slaughter and at processing. This is also the general picture for each year separately, even though large variations are found.

The totals from processing and retail can be separated in non-RTE and RTE meat as shown in Table SA46. Both categories were more often contaminated with *Salmonella* at retail than at processing, but at both stages a lower proportion of *Salmonella* positive samples were found for RTE meat than for non-RTE meat.

When focusing on meat from one food producing animal species at the time a more complex picture was observed compared to the overview for all food producing animal species. The general observation of more contamination at retail than at processing was also observed for single samples of fresh broiler meat (Figure SA4), but not for batch based samples, where the proportion of positive samples was much lower at retail (Figure SA5). Single samples showed no distinct difference between non-RTE processed broiler meat at processing and retail while batch based samples of non-RTE processed meat was less contaminated at retail. Similarly, single samples of RTE meat was most contaminated at retail, but batch based RTE samples were less contaminated compared to samples collected at processing. RTE broiler meat was, however, consistently less contaminated than non-RTE broiler meat.

Similar comparisons can be made for pig meat (Figure SA7 and SA8) and for meat from bovine animals (Figure SA10 and SA11). Some categories were more frequently contaminated at retail than at processing (e.g. non-RTE pig meat and meat from bovine animals, single samples), while other categories were equally contaminated at the two stages (e.g. RTE pig meat and meat from bovine animals, single samples). The only cases of clearly lower contamination at retail than at processing were found in batch based samples of fresh and RTE meat from bovine animals (Figure SA11).

The only other meat category where totals could be compared at different production stages was fresh turkey meat (single samples, Table SA22). Here, frequency of contamination was lower at processing compared to slaughter and retail.

Proportions of *Salmonella* positive samples of table eggs at packing and at retail are presented in Figure SA12. Both single and batch based samples were less contaminated at retail, but the opposite would be true if data from one MS (Germany) were omitted.

Comparisons of data from non-RTE milk, RTE cheese and other RTE dairy products are shown in Figure SA14 (single samples). For these categories, occurrence of *Salmonella* was consistently lower at retail than at processing, but the numbers of positive samples were very low.

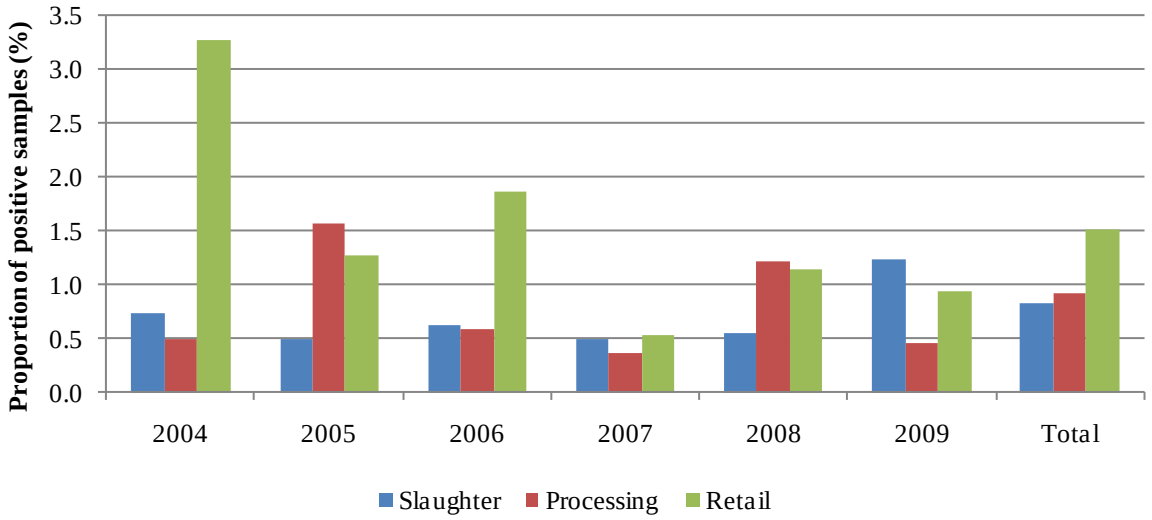

Figure SA17. Overall prevalence of *Salmonella* positive samples in meat[(a)] at different production stages, single and batch based samples, 2004-2009

(a): Meat comprises all non ready-to-eat and ready-to-eat fresh and processed meat (meat preparation, meat product, mechanically separated meat and minced meat) from animal species with ≥ 25 samples as well as from unspecified animal species.

Table SA46. *Salmonella* in meat[(a)], single and batch based samples, 2004-2009 (pooled data)

	N	% pos
Non ready-to-eat		
Slaughter	607,039	0.8
Processing	309,932	1.1
Retail	186,421	1.8
Ready-to-eat		
Processing	93,841	0.3
Retail	59,768	0.7

(a): Meat includes all fresh and processed meat (meat preparation, meat product, mechanically separated meat and minced meat) from all animal species with ≥ 25 samples as well as from unspecified animal species.

3.1.5. Overview of temporal variation

For this historical data analysis it was of particular interest to see if a temporal progress concerning *Salmonella* contamination of food could be found. However, following the validation of data, too few data points were available to carry out an analysis according to the criteria defined in Chapter 1 for all food categories (i.e. data from five MSs per year must be available for at least three years for analysis of temporal trends).

A shift to lower proportions of *Salmonella* positive samples during the period 2004 to 2009 were observed for non-RTE processed pig meat at retail (single samples, Table SA12). Increasing proportions, on the other hand, were found for non-RTE processed broiler meat at retail (single samples, in the years from 2007 to 2009 (Table SA6). These observations could not be statistically tested as insufficient data were available.

No distinct development in time could be identified for fresh broiler meat, fresh pig meat and fresh meat from bovine animals at different stages of production (single samples, Figure SA4, SA10 and SA16). Likewise, no distinct increase or decrease was found for RTE broiler meat at retail (single samples, Table SA8), for non-RTE processed pig meat at processing (single samples, Table SA13), for RTE pig meat at retail (single samples, Table SA14), or for non-RTE processed meat from bovine animals at retail (single samples, Table SA18).

For table eggs at packing a slight decrease was seen from 2006 to 2009 (single samples, Table SA28). At retail no development over time was evident, but if data from packing and retail were pooled as shown in Figure SA13 (single and batch based samples) a slight tendency towards lower values in later years may be noticeable.

3.1.6. Discussion

A total of 1,210,166 single samples and 555,806 batch based samples were included in the present analysis of *Salmonella* in food from 2004 to 2009. During the period, MSs have reported a total of 2,931,178 single samples and batch based samples which represent the occurrence of *Salmonella* of domestically produced food. However, due to missing information on details such as sampling stage a substantial number of data were omitted before analysis (see Chapter 1 for more details about the data quality).

The amount of data was limited considering the number of food categories, MSs and years included. Moreover, MSs often reported highly variable numbers of samples from specific categories in separate

years and frequently only reported data for one or two years within the whole period. Therefore, the amount of observations constituting the basis for calculating *Salmonella* prevalence varies a lot and may in some years be highly influenced by a limited number of MSs. Data were often reported too sporadic for calculation of EU or MS group totals (minimum five MSs/year) and few MSs comply with the criteria required for statistical analysis of temporal trends as described in Chapter 1, Table MM2. Conclusions have thus only been based on visual inspection of descriptive tables and figures.

In general, more data were reported for 2007 to 2009 than for 2004 to 2006, which provided a better basis for evaluating *Salmonella* prevalence in the last part of the period. The increase in reported data was observed for both single and batch based samples. There was thus no indication that sampling was becoming more standardised, which otherwise could have improved the comparability and usefulness of data.

Use of data was also hampered by the fact that many investigations of food of animal origin were reported without indication of specific animal species. These data could not be included in discussions normally focusing on a particular animal species. Especially Sweden, Ireland, the Czech Republic and Poland reported large amounts of such unspecified data.

An increase or decrease in *Salmonella* prevalence from 2004 to 2009 could only be demonstrated in very few cases. One such case was meat samples at retail, where the proportion of *Salmonella* positive samples seemed to stabilize at a relatively low level of about 1% in 2008 and 2009 (Figure SA 17). This may be a consequence of the microbiological criteria coming into force in 2006 and 2007.

It was also of interest to see if the prevalence of *Salmonella* changed along the production chain, from slaughter/processing to retail. In several cases the proportion of positive samples increased along the chain, but the picture was not clear. In samples of fresh broiler meat for example, single samples were more frequently contaminated at retail than at processing, however the opposite was true for batch based samples.

An increased proportion of contaminated samples at retail compared to previous production stages could be explained by cross contamination during handling-

In contrast, for those foodstuffs where the proportion of positive samples declined along the production line, this could also be due to *Salmonella* reducing steps such as heat treatment. The impact of this was demonstrated by the fact that RTE food in most cases was less frequently contaminated than non-RTE food.

Findings at retail are of special importance, because contamination at this level directly reflects consumer exposure to *Salmonella* thus the risk of infection. At this stage fresh poultry meat (broiler and turkey) stood out with proportions of positives ranging from 6.4% to 8.9%. Of almost similar concern was non-RTE processed meat at retail. Pooled results from all MSs concerning non-RTE processed pig meat and broiler meat at retail showed *Salmonella* occurrence up to 6.2% and 4.5%, respectively, for single years. A value of 5.9% was found for non-RTE processed turkey meat at retail (all MSs and years pooled).

Other findings of special interest were findings of *Salmonella* in RTE meat at retail, which pose an immediate risk for the consumer. For pig meat such findings peaked at 7.8% of single samples of minced meat reported by Germany in 2008 and for meat products from bovine animals values up to 5.0% were reported by Spain for single samples in 2008.

Given the fact that meat from poultry, pig and bovine animals are widely eaten throughout the EU, the presence of *Salmonella* in relatively high proportions in these types of foodstuffs are likely to contribute considerably to consumer exposure to *Salmonella*.

Table eggs are also a potential source of *Salmonella* infections, as they are a very common food and in some MSs often eaten raw. MS totals of up to 1.0% positive were reported for single samples at retail and one investigation on batch samples with a finding as high as 22.6% was reported.

In spite of all shortcomings concerning data and data treatment, it should be emphasised that the vast majority of investigations revealed no *Salmonella* at all or only very low levels of positive samples, which in itself is an important observation.

3.2. *Campylobacter*

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. Thermotolerant *Campylobacter* spp. is widespread in nature and the main reservoirs are the alimentary tracts of wild and domesticated birds and mammals.

The most common sources of infections in sporadic human cases are contact with live poultry, consumption of poultry meat, drinking water from untreated water sources, and contact with pets and other animals. Cross-contamination during food-preparation in the home has also been described as an important transmission route.

The majority of MSs and two non-MSs reported data on *Campylobacter* in food during the period 2004 to 2009 (Table CA1). The number of samples and batches tested within food categories ranged from less than 25 (not included in the report) to thousands. The majority of samples reported were food of animal origin; primarily from poultry meat. Most data were reported as single samples and therefore data on batch based sampling and data from surveys were not included in the figures and tables, however they were addressed in the text when relevant.

Table CA1. Overview of countries reporting data included in the analysis for *Campylobacter*, 2004-2009

Food categories	No of reporting MSs		Non-MSs
Meat and meat products			
2004	13	AT, BE, CZ, DE, DK, EE, FI, FR, IT, LV, PT, SE, SI	NO
2005	5	BE, EE, IE, LV, SI	-
2006	8	AT, BE, DK, EE, ES, IE, SI, UK	-
2007	14	AT, BE, CZ, DE, DK, EE, ES, FR, HU, IE, LU, LV, NL, SI	NO
2008	17	AT, BE, CZ, DE, DK, EE, ES, HU, IE, IT, LU, LV, NL, RO, SI, SK, UK	-
2009	17	AT, BE, CZ, DE, DK, EE, ES, FR, HU, IE, LU, NL, PL, PT, RO, SI, SK	CH
Other food			
2004	4	CZ, FI, IT, SI	-
2005	4	BE, DE, EE, IE	-
2006	1	BE	-
2007	2	AT, BE	-
2008	4	AT, DE, HU, IT	-
2009	4	AT, DE, IE, SK	-
Fish and fishery products			
2005	1	IE	-
2006	1	BE	-
2007	3	AT, BE, IE	-
2008	1	UK	-
2009	1	BE	-
Fruit and vegetables			
2007	1	AT	-
2008	1	NL	-
2009	1	CZ	-
Other food			
2005	1	IE	-
2006	2	ES, IE	-
2007	3	AT, IE, SI	-
2008	4	AT, IE, SI, UK	-
2009	2	IE, NL	-

Note: MSs reporting >24 samples per food category per sampling unit were included.

3.2.1. *Campylobacter* in food

3.2.1.1. Poultry meat and products thereof

Fifteen MSs and one non-MS reported the occurrence of *Campylobacter* in single samples of fresh broiler meat at slaughter, processing and retail based on single samples from 2004 to 2009 (Table A2). The proportion of positive samples at retail ranged from 6.0% to 80.0%, with extremely high incidence (>70%) in France, Luxembourg and Slovenia. The total proportion of positive samples at

reporting MSs at retail increased from 29.5% and 29.2% in 2007 and 2008 to 34.9% in 2009. At slaughter and processing the proportion of positive samples varied from 4.7% to 95.8%. At both sampling stages, Spain reported the highest levels on *Campylobacter*.

Batch based data for fresh broiler meat at different sampling stages were reported by Estonia, France Romania and Switzerland reported data from slaughter with proportion of positive batches varying from 6.3% to 86.5%. These data were not included in the tables and figures.

Survey data based on single samples from fresh broiler meat were reported by Spain in 2008, where 349 of 389 samples at slaughter were positive (89.7% positive). These data were not included in the tables and figures.

Eleven MSs reported the occurrence of *Campylobacter* in single samples of non ready-to-eat (non-RTE) processed meat (minced meat, meat preparations and meat products) from broiler meat at processing and retail based on single samples, but only with sufficient data (>25 samples) from 2007 to 2009 (Table CA3). The occurrence of *Campylobacter* in samples of processed broiler meat ranged from 0% to 89.5%. The total proportion of positive non-RTE single samples collected at retail increased from 14.7% in 2007 to 20.9% in 2009. RTE products were only reported by Ireland (from 0% to 0.4%) and Germany (from 0% to 1.8%).

Batch based data for non-RTE meat products of broiler meat at processing and retail were reported by Belgium, Poland, Slovakia and Slovenia. At processing, the occurrence of *Campylobacter* in batches varied from 0% to 33.0%. At retail, the occurrence of *Campylobacter* in batches was 0%, 1.1% and 47.7% in Slovakia, Belgium and Slovenia respectively. These data were not included in the tables and figures.

Nine MSs and two non-MSs reported the occurrence of *Campylobacter* in fresh turkey meat and unspecified poultry meat at slaughter, processing and retail in single samples (Table CA4). Data for turkeys were mainly reported after 2006 and the proportion of positive samples ranged from 1.2% to 55.2%. Data for unspecified poultry were mainly reported before 2007 and reporting MS group total at retail in 2004 was 53.1%, but the proportion of positive samples among MSs ranged from 0% to 17.2% when pooling all data reported over the years.

Twenty nine batch based samples were reported from Poland in 2009 for fresh turkey meat at slaughter (89.7% positive). In France in 2004, all 142 tested batches of unspecified poultry at slaughter were positive. In Latvia in 2004 and 2005, positive findings in batches of unspecified poultry ranged from 1.8 to 24.0% at slaughter (490 batches) and from 2.2 to 19.2% at retail (135 batches). These data were not included in the tables and figures.

Survey data based on single samples for fresh unspecified poultry meat at different sampling stages were reported by Belgium and Finland in 2004. Belgium reported 27.9%, 26.0% and 35.1% of samples positive at slaughter, processing and retail, respectively, and Finland reported 20.2% samples positive at retail. These data were not included in the tables and figures.

Table CA2. *Campylobacter* in fresh broiler meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter												
Belgium	-	-	270	19.6	-	-	235	22.6	222	32.0	261	32.2
Denmark	-	-	-	-	-	-	439	8.2	484	14.7	986	12.4
Estonia	-	-	235	4.7	-	-	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	232	31.9	-	-	-	-
Ireland	-	-	-	-	-	-	-	-	-	-	157	84.7
Slovenia	81	39.5	-	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	-	-	147	55.8	31	41.9	72	95.8
Processing												
Belgium	-	-	249	22.9	326	12.3	257	9.3	523	7.3	1,007	9.0
Germany	-	-	-	-	-	-	35	40.0	78	33.3	45	35.6
Hungary	-	-	-	-	-	-	-	-	-	-	291	26.8
Ireland	-	-	854	51.4	150	45.3	112	63.4	NS	NS	116	25.0
Italy	108	30.6	-	-	-	-	-	-	NS	NS	-	-
Slovenia	-	-	73	35.6	336	39.9	-	-	-	-	101	67.3
Spain	-	-	-	-	-	-	168	17.3	50	58.0	99	70.7
Retail												
Austria	-	-	-	-	-	-	202	64.9	138	8.0	37	24.3
Belgium	-	-	154	12.3	112	24.1	415	11.1	-	-	199	12.1
Czech Republic	-	-	-	-	-	-	-	-	-	-	240	55.8
Denmark	-	-	2,686	19.1	1,563	11.7	695	37.6	1,057	36.6	1,250	29.9
Estonia	-	-	32	21.9	50	6.0	NS	-	-	-	-	-
France	-	-	-	-	-	-	-	-	-	-	361	76.2
Germany	-	-	-	-	-	-	574	40.9	887	36.4	633	28.6
Hungary	-	-	-	-	-	-	-	-	-	-	64	17.2
Italy	570	24.4	-	-	-	-	-	-	NS	NS	-	-
Latvia	-	-	-	-	-	-	-	-	205	9.8	-	-
Luxembourg	-	-	-	-	-	-	182	37.9	122	49.2	84	79.8
Netherlands	-	-	-	-	-	-	1,407	10.9	1,421	14.1	657	10.8
Slovenia	95	80.0	-	-	-	-	343	67.1	315	74.6	106	78.3
Spain	-	-	-	-	-	-	208	30.8	165	13.3	273	49.5
Norway	1,067	5.1	-	-	-	-	305	9.5	-	-	-	-
MS total												
Processing	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1659	21.2
Retail	NS	NS	NS	NS	NS	NS	4,026	29.5	4,310	29.2	3,904	34.9

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs.

Table CA3. *Campylobacter* in processed meat(a) of broiler meat, single samples, 2004-2009

	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Non-RTE[(b)]												
Processing												
Belgium	-	-	-	-	-	-	-	-	-	-	53	0
Portugal	-	-	-	-	-	-	-	-	-	-	44	18.2
Spain	-	-	-	-	-	-	NS	NS	-	-	25	48.0
Retail												
Austria	-	-	-	-	-	-	155	5.2	-	-	-	-
Belgium	-	-	-	-	-	-	718	0.8	-	-	-	-
Denmark	-	-	-	-	-	-	695	37.6	-	-	-	-
Estonia	-	-	NS	NS	NS	NS	NS	NS	41	7.3	27	7.4
Germany	-	-	-	-	-	-	91	22.0	60	18.3	142	27.5
Ireland	-	-	NS	NS	NS	NS	NS	NS	211	0.5	233	1.3
Netherlands	-	-	-	-	-	-	NS	NS	-	-	368	6.8
Poland	-	-	-	-	-	-	-	-	-	-	143	89.5
Slovakia	-	-	-	-	-	-	-	-	-	-	29	0
Spain	-	-	-	-	-	-	355	0.3	-	-	NS	NS
RTE[(b)]												
Proccesing												
Ireland	-	-	NS	NS	NS	NS	NS	NS	NS	NS	32	0
Retail												
Germany	-	-	-	-	-	-	NS	NS	55	1.8	71	0
Ireland	-	-	608	0	464	0	399	0	162	0	236	0.4
MS total Non-RTE												
Retail	NS	NS	NS	NS	NS	NS	2,037	14.7	NS	NS	942	20.9

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs for calculation of MS total
(a): Processed meat includes minced meat, meat products and meat preparations.
(b): Non-RTE = not ready to eat, RTE = ready to eat.

Table CA4. *Campylobacter* in fresh poultry meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Turkeys												
Slaughter												
Belgium	-	-	29	13.8	-	-	50	24.0	166	7.8	278	5.0
Hungary	-	-	-	-	-	-	166	18.1	219	4.6	-	-
Slovenia	NS	NS	-	-	-	-	102	34.3	-	-	-	-
Processing												
Germany	-	-	-	-	-	-	27	22.2	35	8.6	41	29.3
Hungary	-	-	-	-	-	-	-	-	-	-	171	1.2
Ireland	-	-	98	28.6	NS	NS	NS	NS	NS	NS	-	-
Slovenia	-	-	26	3.8	79	8.9	-	-	-	-	NS	NS
Norway	-	-	-	-	-	-	121	5.8	-	-	-	-
Switzerland	-	-	-	-	-	-	-	-	-	-	127	18.1
Retail												
Austria	-	-	-	-	-	-	92	28.3	-	-	-	-
Germany	-	-	-	-	-	-	345	17.7	384	11.5	317	15.5
Hungary	-	-	-	-	-	-	-	-	-	-	131	5.3
Luxembourg	-	-	-	-	-	-	-	-	-	-	29	55.2
Netherlands	-	-	-	-	-	-	711	15.8	-	-	-	-
Slovenia	NS	NS	-	-	-	-	42	33.3	69	26.1	28	39.3
Poultry, unspecified												
Slaughter												
Belgium	-	-	64	10.9	246	6.5	149	35.6	-	-	-	-
Estonia	27	37.0	-	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	242	58.3	-	-	-	-	66	71.2
Processing	-	-	-	-	-	-	-	-	-	-	-	-
Germany	151	53.0	-	-	-	-	-	-	-	-	-	-
Portugal	33	0	-	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	87	25.3	-	-	-	-	-	-
Retail												
Austria	525	53.0	-	-	-	-	NS	NS	-	-	-	-
Belgium	-	-	57	21.1	-	-	113	18.6	-	-	-	-
Denmark	584	23.5	-	-	-	-	-	-	-	-	-	-
Germany	2,000	34.5	-	-	-	-	-	-	-	-	-	-
Italy	64	31.3	-	-	-	-	-	-	-	-	-	-
Portugal	47	8.5	-	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	215	12.6	-	-	-	-	NS	-
Sweden	27	55.6	-	-	-	-	-	-	-	-	-	-
MS total Poultry, unspecified												
Retail	3,247	35.2	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs for calculation of MS total.

3.2.1.2. Pig meat and products thereof

Twelve MSs reported the occurrence of *Campylobacter* in single samples of fresh pig meat at slaughter, processing and retail from 2004 to 2009 (Table CA5). At slaughter, four MSs reported that the occurrence of *Campylobacter* in samples of pig meat ranged from 0% to 18.8%. At processing and retail, the occurrence of *Campylobacter* was low (from 0% to 6.3%).

Survey data (single samples) for fresh pig meat was reported by Belgium in 2004 at different sampling stages with positive findings in 4.9%, 1.5% and 5.0% of 344, 266 and 161 samples at slaughter, processing and retail, respectively. These data were not included in the tables and figures.

Eight MSs reported the occurrence of *Campylobacter* in non-RTE processed meat from single samples of pig meat at processing and retail from 2004 to 2009 (Table CA6). The proportion of positives samples was <1.0% except for Austria, that reported 2.2% positive samples at retail in 2004. RTE meat was only reported by four MSs and no positive findings were reported.

Table CA5. *Campylobacter* in fresh pig meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter												
Belgium	-	-	694	6.9	-	-	213	12.2	500	16.6	-	-
France	226	11.9	-	-	-	-	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	178	2.8	207	0.5	-	-
Spain	-	-	-	-	NS	NS	-	-	50	0	80	18.8
Processing	-	-	-	-	-	-	-	-	-	-	-	-
Germany	NS	NS	-	-	-	-	26	3.8	31	3.2	39	0
Hungary	-	-	-	-	-	-	-	-	-	-	283	1.4
Italy	83	2.4	-	-	-	-	-	-	NS	NS	-	-
Slovenia	-	-	101	0	159	0.6	-	-	281	1.1	-	-
Spain	-	-	-	-	NS	NS	NS	NS	96	6.3	NS	NS
Retail	-	-	-	-	-	-	-	-	-	-	-	-
Austria	NS	NS	-	-	93	1.1	109	0.9	NS	NS	-	-
Germany	454	2.0	-	-	-	-	123	0.8	212	0.5	238	0.8
Hungary	-	-	-	-	-	-	-	-	-	-	52	1.9
Italy	51	2.0	-	-	-	-	-	-	NS	NS	-	-
Latvia	-	-	-	-	-	-	-	-	440	0	-	-
Luxembourg	-	-	-	-	-	-	-	-	-	-	26	3.8
Netherlands	-	-	-	-	-	-	269	1.1	-	-	308	0.3
Spain	-	-	-	-	40	0	36	0	33	6.1	-	-
United Kingdom	-	-	-	-	-	-	-	-	1,693	0.6	-	-

NS: Not sufficient data, <25 samples reported by the MS.

Table CA6. *Campylobacter* in processed meat[(a)] of pig meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Non-RTE[(b)]												
Processing												
Belgium	-	-	288	0.7	-	-	-	-	-	-	-	-
Italy	53	0	-	-	-	-	-	-	-	-	-	-
Portugal	-	-	-	-	-	-	-	-	-	-	50	0
Spain	-	-	-	-	NS	NS	42	0	-	-	NS	NS
Retail												
Austria	89	2.2	-	-	-	-	NS	NS	-	-	-	-
Belgium	-	-	155	0.6	-	-	-	-	-	-	-	-
Germany	-	-	-	-	-	-	-	-	-	-	475	0.4
Ireland	-	-	-	-	NS	NS	NS	NS	212	0	113	0
Italy	243	0.8	-	-	-	-	-	-	NS	NS	-	-
Netherlands	-	-	-	-	-	-	-	-	-	-	153	0.7
Spain	-	-	-	-	45	0	NS	NS	-	-	NS	-
RTE[(b)]												
Processing												
Germany	-	-	-	-	-	-	-	-	26	0	NS	NS
Ireland	-	-	-	-	NS	NS	NS	NS	-	-	29	0
Retail												
Austria	-	-	-	-	-	-	32	0	NS	NS	NS	NS
Germany	-	-	-	-	-	-	-	-	31	0	131	0
Ireland	-	-	234	0	215	0	165	0	66	0	92	0
United Kingdom	-	-	-	-	-	-	-	-	1,096	0	-	-

NS: Not sufficient data, <25 samples reported by the MS.
(a): Include minced meat, meat products and meat preparations.
(b): Non-RTE = not ready to eat, RTE = ready to eat.

3.2.1.3. Bovine meat and products thereof

Eleven MSs reported the occurrence of *Campylobacter* in single samples of fresh bovine meat at slaughter, processing and retail from 2004 to 2009 (Table CA7). The occurrence of *Campylobacter* in samples of bovine meat in MS ranged from 0% to 11.9%, but was mainly 0% to 1%, particularly at processing.

Batch based data on fresh bovine meat at slaughter and processing were reported by Romania for 2008, where no *Campylobacter* was found in 495 and 335 batches, respectively. These data were not included in the tables and figures.

Seven MSs reported the occurrence of *Campylobacter* in non-RTE meat products of bovine meat at processing and retail from 2004 to 2009 in single samples (Table CA8). No *Campylobacter* was found except in the Netherlands (0.6%). RTE products were only reported for five MSs and no positive findings were reported except by Spain (1.6%).

Batch data on RTE meat products of bovine meat at retail were reported by Belgium for 2009, where no *Campylobacter* was found in 27 batches. These data were not included in the tables and figures.

Table CA7. *Campylobacter* in fresh bovine meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter												
Czech Republic	42	11.9	-	-	-	-	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	144	1.4	198	0	-	-
Italy	55	7.3	-	-	-	-	-	-	59	0	-	-
Processing												
Germany	NS	NS	-	-	-	-	25	0	NS	NS	NS	NS
Hungary	-	-	-	-	-	-	-	-	-	-	274	0.4
Italy	40	0	-	-	-	-	-	-	-	-	-	-
Slovenia	-	-	109	0	154	0	-	-	265	0.8	-	-
Retail												
Austria	34	2.9	-	-	-	-	NS	NS	-	-	-	-
Denmark	96	0	-	-	-	-	-	-	-	-	-	-
Estonia	-	-	-	-	42	0	NS	NS	-	-	-	-
Germany	NS	NS	-	-	-	-	35	0	86	4.7	28	0
Hungary	-	-	-	-	-	-	-	-	-	-	57	1.8
Italy	196	0	-	-	-	-	-	-	NS	NS	-	-
Luxembourg	-	-	-	-	-	-	62	0	-	-	151	0
Netherlands	-	-	-	-	-	-	264	0	322	0.9	201	1.0
United Kingdom	-	-	-	-	-	-	-	-	3,249	0.1	-	-

NS: Not sufficient data, <25 samples reported by the MS.

Table CA8. *Campylobacter* in processed meat[(a)] of bovine meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Non-RTE[(b)]												
Processing												
Portugal	-	-	-	-	-	-	-	-	-	-	42	0
Retail												
Austria	60	0	-	-	103	0	NS	NS	-	-	-	-
Germany	113	0	-	-	-	-	-	-	-	-	26	0
Ireland	-	-	NS	NS	NS	NS	NS	NS	37	0	43	0
Italy	88	0	-	-	-	-	-	-	NS	NS	-	-
Netherlands	-	-	-	-	-	-	325	0.6	523	0.6	703	0
Spain	-	-	-	-	41	0	-	-	-	-	NS	NS
RTE[(b)]												
Processing												
Germany	-	-	-	-	-	-	-	-	30	0	NS	NS
Retail												
Germany	-	-	-	-	-	-	-	-	34	0	28	0
Ireland	-	-	115	0	89	0	64	0	36	0	49	0
Luxembourg	-	-	-	-	-	-	44	0	-	-	-	-
Spain	-	-	-	-	-	-	-	-	61	1.6	-	-
United Kingdom	-	-	-	-	-	-	-	-	134	0	-	-

NS: Not sufficient data, <25 samples reported by the MS.
(a): Include minced meat, meat products and meat preparations.
(b): Non-RTE = not ready to eat, RTE = ready to eat.

3.2.1.4. Products of meat origin

From 2004 to 2009, the overall occurrence of *Campylobacter* in non-RTE and RTE processed meat (minced meat, meat preparations and products) of bovine, pig, poultry and unspecified origin at processing and retail was presented for 15 MSs and one non-MSs (Table CA9). Non-RTE broiler meat had the highest proportion of positive samples of *Campylobacter* (MS total non-RTE at retail, 15.9%) but ranged from 0% to 89.5% between MSs. In non-RTE meat from other poultry, the *Campylobacter* findings ranged from 0% to 10.3% in turkeys and from 0% to 17.2% in unspecified poultry. *Campylobacter* findings in non-RTE bovine meat products were only reported by one of seven MSs (the Netherlands, 0.3%). In non-RTE pig meat products, the occurrence of positive samples was 2.2% in Austria but otherwise very low (<1%) or 0%. In RTE meat, findings of *Campylobacter* were reported for by four MSs in different types of meat. Spain reported 1.6% of bovine meat samples positive, Germany and Ireland reported 1.4% and 0.1% of broiler meat samples positive and Austria reported 13.9% of unspecified poultry meat positive.

Belgium reported survey data (single samples) in 2004 for non-RTE unspecified poultry meat with 64 of 106 samples positive. These data were not included in the tables and figures.

Table CA9. *Campylobacter* in processed meat[(a)] at processing and retail, single samples, 2004-2009 (pooled data)

	Bovine		Pig		Broiler		Turkey		Poultry other/ unspecified		Other/ unspecified	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Non-RTE[(b)]												
Processing												
Belgium	-	-	288	0.7	53	0	-	-	330	3.6	-	-
Germany	NS	NS	-	-	39	23.1	29	10.3	-	-	-	-
Italy	NS	NS	53	0	NS	NS	-	-	NS	NS	NS	NS
Portugal	42	0	50	0	44	18.2	49	6.1	-	-	NS	NS
Spain	NS	NS	68	0	27	44.4	-	-	NS	NS	NS	NS
Norway	-	-	-	-	-	-	-	-	70	4.3	-	-
Retail												
Austria	166	0	91	2.2	155	5.2	-	-	NS	-	50	2.0
Belgium	-	-	155	0.6	718	0.8	-	-	189	2.6	153	0
Denmark	-	-	-	-	695	37.6	-	-	-	-	-	-
Estonia	NS	NS	34	0	93	9.7	NS	-	NS	NS	42	0
Germany	139	0	475	0.4	478	23.6	388	7.0	174	17.2	-	-
Ireland	92	0	338	0	474	1.9	87	0	NS	NS	110	0
Italy	89	0	248	0.8	NS	NS	-	-	NS	NS	NS	NS
Netherlands	1,551	0.3	153	0.7	383	6.8	-	-	-	-	75	2.7
Poland	-	-	-	-	143	89.5	-	-	-	-	-	-
Slovakia	-	-	-	-	29	0	NS	NS	-	-	-	-
Spain	45	0	71	0	359	0.3	-	-	46	0	60	0
Sweden	-	-	-	-	-	-	-	-	28	0	-	-
RTE[(b)]												
Processing												
Germany	37	0	34	0	NS	NS	NS	NS	-	-	-	-
Ireland	NS	NS	35	0	84	0	85	0	58	0	NS	NS
Retail												
Austria	NS	NS	43	0	NS	NS	-	-	79	13.9	-	-
Belgium	-	-	-	-	-	-	-	-	-	-	128	0
Estonia	NS	NS	NS	NS	-	-	NS	NS	-	-	69	0
Germany	62	0	162	0	147	1.4	65	0	-	-	-	-
Ireland	353	0	772	0	1,869	<0.1	358	0	52	0	287	0
Luxembourg	44	0	-	-	-	-	-	-	-	-	-	-
Spain	61	1.6	-	-	-	-	-	-	-	-	-	-
United Kingdom	134	0	1,096	0	-	-	-	-	402	0	1,589	0
MS total Non-RTE												
Retail	2,102	0.2	1,565	0.5	3,527	15.9	NS	NS	NS	NS	490	0.6

NS: Not sufficient data, <25 samples reported by the MS or less than 5 reporting MSs for calculation of MS total.
(a): Include minced meat, meat products and meat preparations.
(b): Non-RTE = not ready to eat, RTE = ready to eat.

3.2.1.5. Other food categories

From 2004-2009, nine MSs reported on the occurrence of *Campylobacter* in single samples of non-RTE milk primarily from cows and RTE cheese primarily made from cow's milk (Table CA10). The occurrence of *Campylobacter* in samples of non-RTE milk ranged from 0% to 5.2% while no *Campylobacter* was found in RTE cheese (545 samples).

Batch data for non-RTE cow's milk at farm (one of 27 samples positive) and at processing (37 negative samples) were reported by Italy. Slovakia found *Campylobacter* in seven of 100 batch samples of RTE cheeses made from sheep's milk. No *Campylobacter* was found in 150 survey samples of cheeses made from unspecified milk (Finland). These data were not included in the tables and figures.

Investigations of *Campylobacter* in single samples of unspecified vegetable samples and spices and herbs were reported by primarily by the Netherlands, but also by Austria and Ireland (Table CA11). In total, 0.7% of the unspecified vegetable samples were positive and for spices and herbs, *Campylobacter* was only found in curry (one of 412 samples positive).

Table CA10. *Campylobacter* in milk and cheese[(a)], single samples, 2004-2009 (pooled data)

	non-RTE[(b)] milk		RTE cheese	
	N	% pos	N	% pos
Farm				
Belgium	-	-	216	0
Germany	682	0.7	-	-
Hungary	80	2.5	-	-
Italy[(c)]	4,270	2.9	-	-
Processing	-	-	-	-
Austria	160	0	-	-
Belgium	-	-	37	0
Italy[(d)]	NS	NS	50	0
Slovakia	268	5.2	-	-
Retail	-	-	-	-
Austria	73	1.4	NS	NS
Belgium	-	-	101	0
Estonia[(d)]	NS	NS	32	0
Ireland[(e)]	NS	NS	39	0
Slovenia[(e)]	-	-	70	0

NS: Not sufficient data, <25 samples reported by the MS.
(a): Cheeses made from cow's milk if nothing else stated.
(b): Non-RTE = not ready to eat, RTE = ready to eat.
(c): 254 samples from other animal species than cow.
(d): 18 (Italy) and 14 (Estonia) samples from cheeses made from unspecified milk.
(e): Cheeses made from unspecified milk.

Table CA11. *Campylobacter* in vegetables, spices and herbs, single samples, 2004-2009 (pooled data)

	N	% pos
Vegetables		
unspecified	954	0.7
Spices and herbs		
unspecified	326	0
curry	412	0.2
cardamom	94	0
celery	52	0
coriander	378	0
cumminseed	426	0
dill	37	0
ginger	268	0
maw-seed	71	0
mint leaves	120	0
mixed spices	124	0
onion powder	26	0
other flavourings	150	0
parsley	155	0
sesame-seed	279	0
sweet basil	52	0
tumeric	125	0

3.2.2. *Campylobacter* species

The distribution of *Campylobacter* species among a total of 11,352 isolates obtained from 10,748 *Campylobacter* positive samples of non-RTE fresh and processed meat (minced meat, meat preparations and meat products) from bovine animals, pigs, poultry and unspecified origin (2004-2009) is shown in Figure CA1. Overall, 4,486 *Campylobacter* isolates were identified to species level (39.5%), while the remaining *Campylobacter* isolates were reported as *Campylobacter* spp. or thermophilic *Campylobacter*. *C. jejuni* (26.8% of isolates) dominated over *C. coli* (12.4% of isolates) in all meat types except pig meat, where *C. coli* was more common. Only 33 (0.29%) isolates of *C. lari* were reported in either poultry or pig meat and three (0.03%) isolates of *C. upsaliensis* were found in poultry.

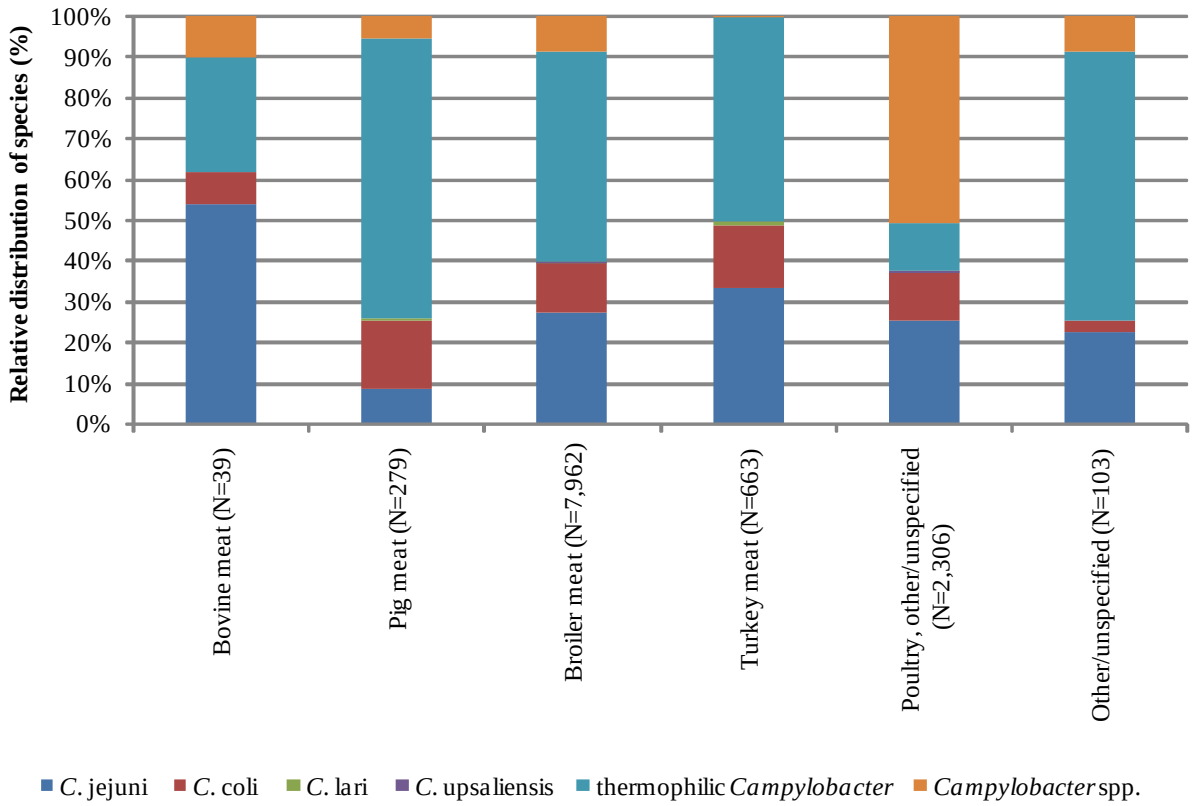

Figure CA1. Relative distribution of *Campylobacter* species in non ready-to-eat fresh and processed meat[(a)] of different animal origin, single samples reported by MSs, 2004-2009 (pooled data)

(a): Processed meat includes meat products, meat preparations and minced meat.

3.2.3. Overview of *Campylobacter* in the food chain

The total proportion of *Campylobacter* positive single samples from 2004-2009 in non-RTE fresh and processed meat (minced meat, meat preparations and products) of bovine animals, pigs, poultry and unspecified origin at different sampling stages (slaughter, processing and retail) is shown in Figure CA2. *Campylobacter* was mainly found in poultry meat and with small differences in the proportion positive at the different sampling stages, except for other/unspecified poultry where more *Campylobacter* was found at retail than at processing.

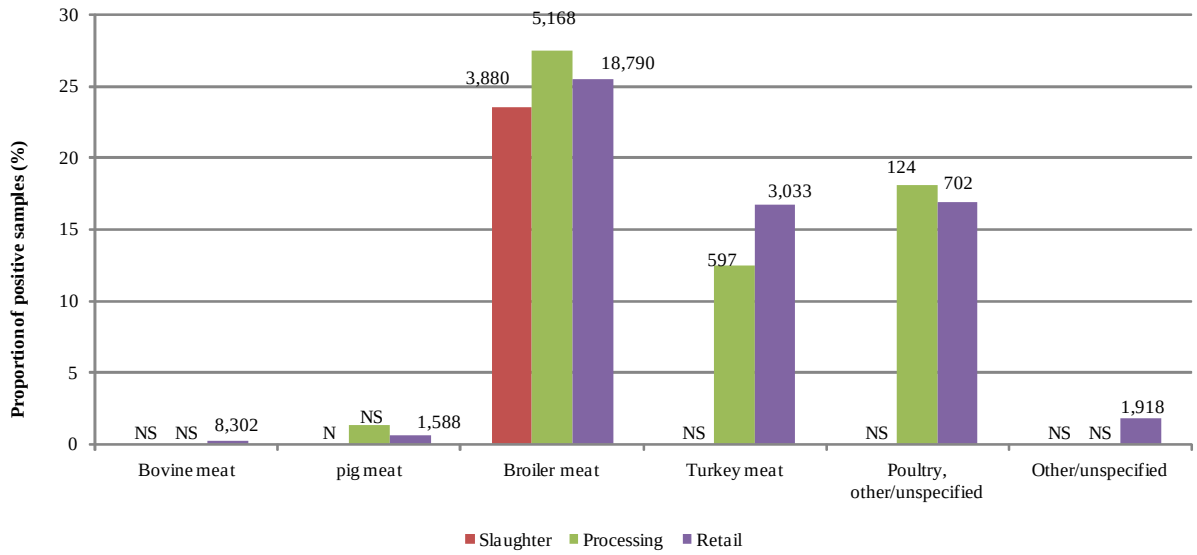

Figure CA2. *Campylobacter* in non ready-to-eat fresh and processed meat[(a)] of different animal origin, single samples reported by MSs, 2004-2009 (pooled data)

Note: The numbers of samples tested are shown above the columns, NS: Not sufficient data because less than five reporting MSs.

(a): Meat products include fresh meat, meat products, meat preparations and minced meat.

3.2.4. Discussion

A total of 90,075 single samples and batch based samples were included in the present analysis of *Campylobacter* in food from 2004 to 2009. During the period, MSs have reported a total of 183,390 single samples and batch based samples which represent the occurrence of *Campylobacter* of domestically produced food, however due to missing information (e.g. sampling stage) a substantial number of data were not included in analysis (see Chapter 1, Material and Methods, for more details about the data quality).

Data on the occurrence of *Campylobacter* in food were reported by most MSs and most consistently for poultry and fresh broiler meat. However, the reported data from 2004 to 2006 were sparse and no MS has reported data consistently every year from 2004 to 2009 for specific foodstuffs. Poultry meat was the major food vehicle for *Campylobacter* in with the highest proportions of positive samples compared to pig and bovine meat. Generally, less data were reported on RTE meat than on non-RTE products and *Campylobacter* were only reported in a few cases and at low prevalence. Broiler meat showed a marked difference in the occurrence of *Campylobacter* between non-RTE and RTE products, whereas bovine and pig meat had a low prevalence in both non-RTE and RTE products.

Very little consistency was observed concerning reporting from individual MSs during the period. No clear changes were observed in the proportion of positive samples along the food chain or in the

development in the proportions of positive samples over the years, except for fresh and non-RTE processed broiler meat at retail, where the reporting MS group total increased by 22.3% and 44.9% from 2007 to 2009, respectively.

Data on other food categories were sparse. In dairy products, *Campylobacter* was found in non-RTE milk and in one investigation of RTE cheese made from sheep's milk. This finding indicates that cheese can be a vehicle of *Campylobacter*. Only three MSs reported data for vegetables and spices and herbs with few positive findings, however due to the few reports it cannot be considered representative at the EU level, where vegetable production systems may vary considerably. More information on vegetables and fruits is needed before anything can be concluded on the risk of these products with respect to *Campylobacter*.

3.3. *Listeria monocytogenes*

The bacterial genus *Listeria* currently comprises six species, but human cases of listeriosis are almost exclusively caused by the species *Listeria monocytogenes. Listeria* is an ubiquitous organism that is 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.

During the period 2004 to 2009 an increasing number of MSs reported data on *L. monocytogenes* in food (Table LI1). Data cover a substantial number of food samples and food categories and the data presented include both non-RTE and RTE foods. The majority of data were reported as single samples.

Table LI1. Overview of countries reporting data included in the analysis for *L.monocytogenes,* 2004-2009

Food categories	No of reporting MSs	Non-MSs
Meat and meat products		
2004	13 MSs: AT, BE, CY, CZ, DE, EE, GR, IT, LV, PL, PT, SE, SI	-
2005	6 MSs: BE, CZ, EE, GR, IE, LV	-
2006	7 MSs: AT, BE, CZ, EE, GR, IE, UK	-
2007	17 MSs: AT, BE, BG, CZ, DK, EE, ES, GR, IE, LU, LV, NL, PT, RO, SE, SI, UK	-
2008	20 All MSs except CY, DE, DK, FI, HU, MT, SK	-
2009	18 MSs: AT, BE, BG, CY, CZ, EE, FR, GR, HU, IE, LV, NL, PL, PT, RO, SI, SK, UI	-
Eggs and egg products		
2007	1 MS: IE	-
2008	1 MS: IE	-
2009	1 MS: IE	-
Milk, cheese and dairy		
2004	12 MSs: AT, BE, CZ, DE, EE, FI, GR, IT, LT, LV, PT, SI	Non-MS: NO
2005	7 MSs: BE, CZ, DK, EE, GR, IE, LV	-
2006	7 MSs: BE, CZ, DK, EE, GR, IE, UK	-
2007	15 MSs: AT, BE, BG, CZ, EE, GR, HU, IE, LV, NL, PL, PT, RO, SI, UK	Non-MS: CH
2008	16 MSs: AT, BE, BG, CZ, EE, GR, HU, IE, IT, LV, MT, PL, PT, RO, SI, UK	Non-MS: CH
2009	16 MSs: AT, BE, BG, CY, CZ, EE, GR, HU, IE, LV, PL, PT, RO, SI, SK, UK	Non-MS: CH
Fish and fishery products		
2004	9 MSs: AT, BE, DE, EE, FI, IT, LV, SE, SI	-
2005	4 MSs: BE, EE, IE, LV	Non-MS: NO
2006	5 MSs: AT, BE, EE, GR, IE	-
2007	13 MSs: AT, BE, BG, CZ, DK, EE, GR, IE, LV, NL, PT, RO, SE	Non-MS: NO
2008	18 MSs: AT, BE, BG, CZ, EE, FI, GR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, UK	Non-MS: NO
2009	15 MSs: AT, BE, BG, CY, CZ, EE, FI, HU, IE, NL, PL, RO, SI, SK, UK	-

Table LI1 (contd.). Overview of countries reporting data included in the analysis for *L. monocytogenes*, 2004-2009

Food categories	No of reporting MSs	Non-MSs
Fruit and vegetables		
2005	4 MSs: BE, CZ, IE, LV	-
2006	4 MSs: BE, EE, FI, IE	-
2007	4 MSs: CZ, DK, IE, NL	-
2008	6 MSs: AT, CZ, EE, HU, IE, PT	-
2009	4 MSs: AT, CZ, EE, IE	-
Special food		
2006	1 MS: BE	-
2007	1 MS: IE	-
2008	2 MSs: CZ, IE	-
2009	4 MSs: CZ, HU, IE, SK	-
Other food		
2004	10 MSs: AT, CY, DE, EE, GR, IT, LV, PL, PT, SI	Non-MS: NO
2005	6 MSs: BE, CZ, EE, FR, IE, LV	-
2006	5 MSs: BE, EE, GR, IE, UK	-
2007	10 MSs: AT, BG, CZ, EE, GR, IE, PT, SE, SI, UK	-
2008	12 MSs: AT, BE, CZ, EE, GR, IE, IT, LT, PT, RO, SI, UK	-
2009	11 MSs: AT, CZ, EE, HU, IE, NL, PL, PT, RO, SI, SK	-

Note: MSs reporting <25samples per food category per sampling unit were included.

3.3.1. Compliance with *Listeria* food safety criteria

The EU Regulation (EC) No 2073/2005 lays down food safety criteria for *Listeria monocytogenes* in RTE foods. This regulation came into force in January 2006 The Regulation states that:

L. monocytogenes must not be present in levels above 100 cfu/g during the shelf life of a product.

Products which support the growth of the bacterium must not contain *L. monocytogenes* in 25 g at the time they leave the production plant, unless the producer can document, to the satisfaction of the competent authority, that the product will not exceed the 100 cfu/g limit throughout shelf life.

Data reported reflect the Regulation, and investigations have therefore focused on testing RTE foods for compliance with these limits (Tables LI2 and LI3).

Investigations with less than 25 samples are included in the dataset and used in the evaluation of compliance with the *L. monocytogenes* food safety criteria.

Batch based data on the different food categories both at processing and retail were generally in compliance with the *L. monocytogenes* criteria. Soft cheeses and other dairy products and meat products were the categories that most frequently were reported to be in non-compliance. In 2007, 8.1% of 9,970 batches of soft cheeses were found to be in non-compliance with the criteria. However the reported frequency decreased in 2008 and 2009 to 2.1% and 1.3%, respectively. For batches of fish products, high frequencies in non-compliance with the criteria was also reported in 2007 (10.4%), however with a lower level in 2008 (4.5%) and 2009 (5.8%).

Table LI2. Compliance with the *L. monocytogenes* criteria "Absence in 25g" laid down by Regulation (EC) No 2073/2005 in food categories, 2007-2009

	2007		2008		2009	
	N	% in non-compliance	N	% in non-compliance	N	% in non-compliance
Single						
Processing [(a)]						
RTE food intended for infants or for medical purpose	10	0	2	0	206	0
RTE products of meat origin other than fermented sausage	5,434	1.0	978	5.3	2,425	6.6
Soft and semi-soft cheeses, RTE	7,594	<0.1	748	0.8	796	0.5
Other dairy products, RTE	3,689	0.1	1,272	1.0	3,491	0.3
Fishery products, RTE	616	3.6	542	5.5	500	6.4
Other RTE products	54	7.4	96	2.1	37	8.1
Retail						
RTE food intended for infants or for medical purpose	52	0	-	-	180	0
Batch						
Processing [(a)]						
RTE food intended for infants or for medical purpose	52	0	692	0	518	0
RTE products of meat origin other than fermented sausage	6,994	0.5	15,445	2.0	22,130	1.8
Soft and semi-soft cheeses, RTE	9,970	8.1	3,051	2.1	2,706	1.3
Other dairy products, RTE	1,420	3.2	4,299	1.0	1,424	0
Fishery products, RTE	316	10.4	1,078	4.5	604	5.8
Fruit and vegetables, RTE	43	0	-	-	3	0
Other RTE products	1,532	6.3	759	11.7	981	1.1
Retail						
RTE food intended for infants or for medical purpose	16	0	-	-	506	0

Note: investigations with <25 samples are included in the table.
(a): Processing includes "at packing centre".

Table LI3. Compliance with the *L. monocytogenes* criteria "≤100 cfu" laid down by Regulation (EC) No 2073/2005 in food categories, 2007-2009

	2007		2008		2009	
	N	% in non-compliance	N	% in non-compliance	N	% in non-compliance
Single						
Processing [(a)]						
RTE products of meat origin, fermented sausage	-	-	14	0	17	0
Hard cheeses, RTE	620	1.8	243	0	453	0.2
Retail						
RTE products of meat origin other than fermented sausage	7,144	0.4	13,330	0.2	4,035	0.2
RTE products of meat origin, fermented sausage	598	0.2	1,828	0.5	144	0
Hard cheeses, RTE	3,168	<0.1	1,760	0.2	2,076	0
Soft and semi-soft cheeses, RTE	1,549	0	905	0.2	953	1.0
Other dairy products, RTE	2,431	<0.1	2,045	0.1	1,087	<0.1
Fishery products, RTE	2,274	2.3	7,013	0.5	1,828	0.5
Fruit and vegetables, RTE	350	0	9	0	43	0
Other RTE products	6,775	0.1	6,838	<0.1	5,229	0
Batch						
Processing [(a)]						
Hard cheeses, RTE	-	-	2,162	0	58	0
Retail						
RTE products of meat origin other than fermented sausage	561	1.2	1,188	0.9	9,420	<0.1
RTE products of meat origin, fermented sausage	14	0	13	0	53	0
Hard cheeses, RTE	4	0	255	0	8,366	0
Soft and semi-soft cheeses, RTE	366	0.3	538	3.0	3,537	0
Other dairy products, RTE	28	0	209	0	768	0
Fishery products, RTE	138	2.9	156	0	430	0.7
Fruit and vegetables, RTE	11	0	123	0	31	0
Other RTE products	444	0	263	0	393	0.5

Note: investigations with <25 samples are included in the table.
(a): Processing includes data from packing centre.

3.3.2. *Listeria* in food

3.3.2.1. Poultry meat and products thereof

The occurrence of *L. monocytogenes* in RTE broiler meat based on single samples was reported by 13 MSs at processing and retail during the period from 2004 to 2009 (Table LI4). Among the MS reporting positive findings, the proportion of positive samples ranged from 3.2% to 8.2% at processing, and from <0.1 to 14.0% at retail, with Greece reporting the highest proportion of positive samples. Ireland and Estonia were the only MSs to report data for more than two years.

Six MSs reported batch based data on *L. monocytogenes* in RTE broiler meat at processing and retail in the period from 2007 to 2009 (Table LI5). Only the Czech Republic and Romania reported data all three years at processing, however no changes were observed over time. Overall, the proportion of positive samples was generally low except for the Czech Republic, reporting 11.1% positive samples at retail in 2007.

Single sample data on RTE meat from other or unspecified poultry meat were reported by nine MSs at processing and retail (Table LI6). At processing and retail, none to 5.2% and 4.9% positive samples were reported, respectively. No MSs provided batch based data on RTE meat from other or unspecified poultry meat.

Single sample and batch based data on *L. monocytogenes* in fresh poultry meat as well as non-RTE and RTE poultry meat, at different sampling stages, in the period 2004 to 2009 (pooled data) are presented in Table LI7 and Table LI8. Austria, the Czech Republic and Greece reported data on fresh broiler meat (single samples, retail); they reported 1.5%, 10.4% and 0% positive samples, respectively. Batch based data on fresh broiler meat were reported by Estonia, the Czech Republic, Romania and Slovakia. The proportion of positive samples was generally low. Estonia, however, reported 55.9% positive samples.

Belgium, Greece Ireland and Slovenia reported >25 single sample data concerning non-RTE processed broiler meat collected at processing or retail (Table LI7). The proportion of positive samples was 19.9%, 4.1% 0.3% and 30%, respectively. No MSs provided batch based data on non-RTE processed broiler meat.

Belgium and Ireland reported single sample data on non-RTE processed meat of other or unspecified poultry meat at different stages of the production chain (Table LI7). Belgium reported 7.5% and 34.3% positive samples at processing and retail respectively. Ireland only reported at retail and found 0.3% positive samples. Only Poland provided batch based data on non-RTE meat of other or unspecified poultry meat; 89 batches were tested and none of the batches were found positive (Table LI8).

Table LI4. *L. monocytogenes* in ready-to-eat processed broiler meat[(a)], single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Bulgaria	-	-	-	-	-	-	171	0	-	-	-	-
Cyprus	-	-	-	-	-	-	-	-	-	-	50	0
Estonia	-	-	-	-	-	-	31	3.2	NS	NS	NS	NS
Germany	58	5.2			-	-	-	-	-	-	144	4.2
Hungary	-	-	-	-	-	-	-	-	-	-	146	8.2
Ireland	-	-	NS	NS	65	0	69	0	78	6.4	62	0
Retail	-	-										
Czech Republic	-	-	-	-	NS	NS	-	-	36	0	36	0
Estonia	-	-	32	3.1	28	0	29	0	NS	NS	NS	NS
Germany	-	-	225	4.9	-	-	-	-	-	-	215	3.7
Greece	-	-	-	-	-	-	43	14.0	30	13.3	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	171	1.8
Ireland	-	-	1,108	<0.1	649	5.9	992	1.0	372	0.8	411	0.2
Netherlands	-	-		-	-	-	-	-	31	0	-	-
Slovenia	-	-		-	-	-	-	-	49	2.0	-	-
Spain	-	-		-	-	-	76	9.2	NS	NS	-	-
Sweden	-	-		-	-	-	29	0	-	-	-	-
United Kingdom	-	-		-	-	-	-	-	188	1.6	NS	NS
MS total												
Retail	NS	NS	NS	NS	NS	NS	1,169	2.0	706	1.6	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product and meat preparations.

Table LI5. *L. monocytogenes* in ready-to-eat processed broiler meat[(a)], batch based data, 2007-2009

	2007		2008		2009	
	N	% pos	N	% pos	N	% pos
Processing						
Czech Republic	561	2.1	439	1.8	294	4.4
Poland	-	-	-	-	1,592	1.3
Romania	295	0	98	0	77	0
Slovakia	-	-	-	-	25	0
Retail						
Bulgaria	-	-	957	0.1	1,721	0.2
Czech Republic	36	11.1	NS	NS	NS	NS
Portugal	NS	NS	-	-	165	0
Romania	-	-	79	0	-	-
Slovakia	-	-	-	-	175	0.6

NS: Not sufficient data, <25 samples reported by the MS.
(a): Includes minced meat, meat product and meat preparations.

Table LI6. *L. monocytogenes* in ready-to-eat processed meat[(a)] from other or unspecified poultry meat, single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Germany	58	5.2	-	-	-	-	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	87	2.3
Ireland	-	-	48	0	79	0	108	0	61	0	97	0
Italy	718	1.1	-	-	-	-	-	-	-	-	-	-
Poland	182	2.7	-	-	-	-	-	-	-	-	-	-
Retail												
Austria	66	4.5	-	-	104	2.9	-	-	NS	NS	NS	NS
Estonia	32	0	-	-	NS	NS	NS	NS	-	-	-	-
Germany	225	4.9	-	-	-	-	-	-	-	-	-	-
Greece	126	4.0	-	-	-	-	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	201	4.0
Ireland	-	-	231	0	104	3.8	163	0	69	0	106	4.7
Italy	152	3.3	-	-	-	-	-	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-	-	402	0.5	-	-
MS total												
Retail	601	4.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Poultry meat other/unspecified includes poultry meat unspecified, turkey meat, duck meat and geese.

Table LI7. *L. monocytogenes* in poultry meat, single samples, 2004-2009 (pooled data)

	Broiler						Other or unspecified poultry[(b)]					
	Fresh		Non-RTE processed meat[(a)]		RTE processed meat[(a)]		Fresh		Non-RTE processed meat[(a)]		RTE processed meat[(a)]	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Belgium	-	-	386	19.9	-	-	-	-	280	7.5	-	-
Bulgaria	-	-	-	-	171	0	-	-	-	-	-	-
Cyprus	-	-	-	-	50	0	-	-	-	-	-	-
Estonia	-	-	NS	NS	64	1.6	-	-	NS	NS	NS	NS
Germany	-	-	-	-	202	4.5	-	-	-	-	-	-
Hungary	-	-	-	-	146	8.2	-	-	-	-	87	2.3
Ireland	NS	NS	NS	NS	298	1.7	NS	NS	NS	NS	393	0
Italy	NS	NS	-	-	-	-	-	-	-	-	718	1.1
Poland	-	-	-	-	-	-	-	-	-	-	182	2.7
Portugal	-	-	-	-	NS	NS	-	-	-	-	42	9.5
Slovenia	-	-	30	30.0	-	-	-	-	NS	NS	-	-
Retail												
Austria	68	1.5	-	-	NS	NS	-	-	-	-	205	2.9
Belgium	-	-	-	-	-	-	-	-	464	34.3	-	-
Czech Republic	48	10.4	-	-	96	1.0	NS	NS	-	-	-	-
Estonia	NS	NS	NS	NS	123	0.8	-	-	NS	NS	36	0
Germany	-	-	-	-	440	4.3	-	-	-	-	-	-
Greece	44	0	73	4.1	73	13.7	-	-	-	-	126	4.0
Hungary	-	-	-	-	171	1.8	-	-	-	-	201	4.0
Ireland	NS	NS	1,742	0.3	3,532	1.5	-	-	319	0.3	675	1.3
Italy	NS	NS	NS	NS	-	-	NS	NS	-	-	152	3.3
Netherlands	-	-	-	-	31	0	-	-	-	-	-	-
Slovenia	-	-	-	-	49	2.0	-	-	-	-	NS	NS
Spain	-	-	-	-	79	8.9	-	-	-	-	-	-
Sweden	-	-	-	-	29	0	-	-	-	-	-	-
United Kingdom	-	-	-	-	189	1.6	-	-	-	-	402	0.5
MS total												
Processing	NS	NS	NS	NS	931	2.9	-	-	NS	NS	1,422	1.3
Retail	NS	NS	NS	NS	4,812	2.0	-	-	NS	NS	1,797	1.9

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product, meat preparations and mechanically separated meat.
(b): Includes turkey, duck, geese and unspecified poultry.

Table LI8. *L. monocytogenes* in poultry meat, batch based data, 2004-2009 (pooled data)

	Broiler				Other or unspecified poultry[(b)]					
	Fresh		RTE processed meat[(a)]		Fresh		Non-RTE processed meat[(a)]		RTE processed meat[(a)]	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Slaughter										
Romania	914	0	-	-	-	-	-	-	-	-
Processing										
Czech Republic	351	2.0	1,294	2.6	-	-	-	-	-	-
Estonia	34	55.9	-	-	-	-	-	-	-	-
Poland	-	-	1,592	1.3	-	-	89	0	-	-
Romania	98	0	470	0	-	-	-	-	-	-
Slovakia	-	-	25	0	-	-	-	-	NS	NS
Retail										
Bulgaria	-	-	2,678	0.1	-	-	-	-	-	-
Czech Republic	-	-	61	11.5	-	-	-	-	-	-
Portugal	-	-	170	0	-	-	-	-	-	-
Romania	60	0	79	0	-	-	-	-	-	-
Slovakia	NS	NS	175	0.6	NS	NS	-	-	NS	NS
MS total										
Retail	NS	NS	3,163	0.4	NS	NS	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product and meat preparations.
(b): Includes turkey, duck, geese and unspecified poultry.

3.3.2.2. Pig meat and products thereof

Single sample data on *L. monocytogenes* in non-RTE processed pig meat are presented in Table LI9. Only three MSs reported data at processing and all MSs reported a proportion of positive samples >10%, ranging from 10.2% and 34.3%, with the highest proportion of positive samples reported by Estonia in 2007. At retail, the occurrence of on *L. monocytogenes* ranged from 0% to 20.0%.

In RTE pig meat, at processing, most MSs reported positive findings, and the proportion of positive single samples ranged from 0.3% to 19.2% (Table LI10). At retail, the proportion of positive samples ranged from 0.1% to 40%, with Poland reporting the highest occurrence in 2009. Only Belgium and Ireland reported sufficient data from more than two years during the period, however no trends were observed over the years. Overall, the proportion of positive samples increased at processing from 2007 to 2009 from 0.4% to 4.0%, however, this increase was related to the high occurrences in Austria, Estonia and Portugal in 2009 only. At retail, no changes were observed in the proportion of positive samples.

Batch based data on *L. monocytogenes* in RTE pig meat are presented in Table LI11 Most data were reported from 2007 to 2009 and the proportion of positive samples was below 3%, except from Poland at processing in 2009 and Slovenia at retail in 2007, who reported 7.3% and 16.7% positive samples, respectively.

Eight MSs reported the occurrence of *L. monocytogenes* in fresh pig meat from 2004 to 2009; five MSs reported single sample data and four MSs reported batch based data at different stages of the

production. The MSs reported none to 12.6% positive samples, with the highest incidence reported by Luxembourg at retail (Table LI12).

Seven MSs reported single sample data on non-RTE processed pig meat from different sampling stages during 2004 to 2009, and the occurrence varied between 0% and 32.4%, with Estonia reporting the highest proportion of positive samples at processing (Table LI12). Batch based data, from non-RTE processed pig meat, were only reported by Italy, which tested 97 batches at processing and 94 batches at retail and 2.1% and none of the tested batches, respectively, were found positive (Table LI13).

The majority of the single sample data was reported on RTE pig meat at processing and at retail, and 21 MSs provided data from 2004 to 2009 (Table LI12). At processing, MSs reported 0.3% to 24.7% positive samples and at retail the proportion of positive samples ranged from 0.6% to 40.0%, with Poland reporting the highest proportion of positive samples. Batch based data were reported by ten MSs and the proportion of positive samples was generally low, except for Poland at processing and Slovakia at retail, which reported 7.3% and 22.2% positive samples, respectively (Table LI13).

Table LI9. *L. monocytogenes* in non ready-to-eat processed pig meat[(a)], single samples, 2005-2009

	2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing										
Belgium	283	10.2	123	11.4	-	-	-	-	-	-
Estonia	-	-	NS	NS	35	34.3	NS	NS	-	-
Italy	-	-	-	-	-	-	81	18.5	-	-
Retail										
Austria	-	-	96	4.2	-	-	NS	NS	NS	NS
Belgium	155	1.3	30	20.0	68	0	31	0	-	-
France	-	-	-	-	-	-	-	-	420	11.9
Ireland	NS	NS	NS	NS	NS	NS	623	0.5	697	0.9
Italy	-	-	-	-	-	-	37	0	-	-
Netherlands	-	-	-	-	83	1.2	77	3.9	148	0.7

NS: Not sufficient data, <25 samples reported by the MS.
(a): Includes minced meat, meat product and meat preparations.

Table LI10. *L. monocytogenes* in ready-to-eat processed pig meat[(a)], single samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Austria	-	-	-	-	-	-	NS	NS	62	3.2	26	11.5
Belgium	262	17.6	831	3.2	206	2.4	58	1.7	57	7.0	-	-
Bulgaria	-	-	-	-	-	-	4,174	0.3	-	-	-	-
Cyprus	-	-	-	-	-	-	-	-	-	-	435	0
Estonia	-	-	-	-	-	-	92	8.7	110	4.5	103	7.8
Germany	-	-	-	-	-	-	-	-	-	-	313	2.9
Greece	NS	NS	-	-	-	-	62	0	-	-	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	444	6.3
Ireland	-	-	175	5.7	119	0	59	0	86	8.1	111	0
Italy	1,551	2.8	-	-	-	-	-	-	-	-	-	-
Latvia	-	-	-	-	-	-	-	-	-	-	71	0
Poland	262	0.4	-	-	-	-	-	-	-	-	-	-
Portugal	25	0	-	-	-	-	-	-	NS	NS	78	19.2
Retail												
Austria	317	9.1	-	-	-	-	219	9.1	147	8.8	174	6.3
Belgium	152	5.3	460	0	110	0.9	56	0	45	0	-	-
Czech Republic	-	-	-	-	120	4.2	-	-	60	3.3	60	6.7
Estonia	NS	NS	50	0	NS	NS	NS	NS	26	0	35	2.9
France	-	-	-	-	-	-	-	-	-	-	272	1.8
Germany	-	-	-	-	-	-	-	-	-	-	567	3.7
Greece	NS	NS	-	-	-	-	29	20.7	122	2.5	-	-
Hungary	-	-	-	-	-	-	-	-	-	-	361	4.4
Ireland	-	-	1,835	0.1	600	5.8	899	2.0	258	0.0	340	1.2
Italy	2,700	3.7	-	-	-	-	-	-	-	-	-	-
Netherlands	-	-	-	-	-	-	-	-	774	1.3	294	0.7
Poland	-	-	-	-	-	-	-	-	-	-	25	40.0
Portugal	89	19.1	-	-	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	-	-	33	0
Slovenia	-	-	-	-	-	-	-	-	57	7.0	-	-
Spain	-	-	-	-	-	-	766	5.1	860	18.3	-	-
United Kingdom	-	-	-	-	-	-	-	-	1,814	1.9	27	0
MS total												
Processing	NS	NS	NS	NS	NS	NS	4,445	0.4	NS	NS	1,581	4.0
Retail	NS	NS	NS	NS	NS	NS	1,969	4.2	4,163	5.4	2,188	3.4

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product and meat preparations.

Table LI11. *L. monocytogenes* in ready-to-eat processed pig meat[(a)], batch based data, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Cyprus	340	0.6	-	-	-	-	-	-	-	-	-	-
Czech Republic	-	-	-	-	-	-	12,290	0.2	8,401	1.4	8,409	2.5
Latvia	45	0	NS	NS	-	-	-	-	-	-	-	-
Poland	-	-	-	-	-	-	-	-	-	-	9,511	7.3
Romania	-	-	-	-	-	-	2,108	0	305	0	543	0
Slovakia	-	-	-	-	-	-	-	-	-	-	360	1.4
Retail												
Bulgaria	-	-	-	-	-	-	-	-	7,991	0.4	6,517	0
Czech Republic	-	-	NS	NS	-	-	36	2.8	-	-	116	0.9
Poland	-	-	-	-	-	-	-	-	-	-	158	0
Portugal	-	-	-	-	-	-	330	1.2	1,065	1.9	886	1.6
Romania	-	-	-	-	-	-	-	-	561	0	-	-
Slovakia	-	-	-	-	-	-	-	-	-	-	171	0
Slovenia	-	-	-	-	-	-	42	16.7	-	-	-	-
MS total												
Retail	NS	NS	NS	NS	-	-	NS	NS	NS	NS	7,848	0.2

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product and meat preparations.

Table LI12. *L. monocytogenes* in pig meat, single samples, 2004-2009 (pooled data)

	Fresh		Non-RTE processed meat[(a)]		RTE processed meat[(a)]	
	N	% pos	N	% pos	N	% pos
Slaughter						
Italy	30	0	-	-	-	-
Processing						
Austria	NS	NS	-	-	103	5.8
Belgium	-	-	406	10.6	1,414	5.9
Bulgaria	-	-	-	-	4,174	0.3
Cyprus	-	-	-	-	435	0
Estonia	-	-	37	32.4	305	6.9
Germany	-	-	-	-	313	2.9
Greece	-	-	-	-	296	24.7
Hungary	-	-	-	-	444	6.3
Ireland	NS	NS	NS	NS	550	3.1
Italy	NS	NS	81	18.5	1,551	2.8
Latvia	-	-	-	-	71	0
Poland	-	-	-	-	262	0.4
Portugal	-	-	-	-	112	13.4
Retail						
Austria	NS	NS	98	4.1	857	8.5
Belgium	-	-	284	2.8	823	1.1
Czech Republic	-	-	-	-	240	4.6
Estonia	NS	NS	NS	NS	169	0.6
France	-	-	420	11.9	272	1.8
Germany	-	-	-	-	567	3.7
Greece	42	0	-	-	162	5.6
Hungary	-	-	-	-	361	4.4
Ireland	-	-	1,332	0.7	3,932	1.5
Italy	78	2.6	37	0	2,700	3.7
Luxembourg	223	12.6	-	-	-	-
Netherlands	629	0.8	308	1.6	1,068	1.1
Poland	-	-	-	-	25	40.0
Portugal	-	-	-	-	89	19.1
Romania	-	-	-	-	33	0
Slovenia	-	-	-	-	57	7.0
Spain	-	-	-	-	1,626	12.1
United Kingdom	1,693	2.8	-	-	1,841	1.9
MS total						
Processing	NS	NS	NS	NS	10,030	3.1
Retail	2,665	3.1	2,479	3.1	14,822	3.9

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product and meat preparations.

Table LI13. *L. monocytogenes* in pig meat, batch based data, 2004-2009 (pooled data)

	Fresh		Non-RTE processed meat[(a)]		RTE processed meat[(a)]	
	N	% pos	N	% pos	N	% pos
Slaughter						
Poland	360	0	-	-	-	-
Romania	1,355	1.3	-	-	-	-
Processing						
Cyprus	-	-	-	-	340	0.6
Czech Republic	176	9.1	-	-	29,100	1.2
Italy	-	-	97	2.1	-	-
Latvia	-	-	-	-	47	0
Poland	NS	NS	-	-	9,511	7.3
Romania	1,299	1.5	-	-	2,956	0
Slovakia	NS	NS	-	-	360	1.4
Retail						
Bulgaria	-	-	-	-	14,508	0
Czech Republic	-	-	-	-	160	0
Italy	NS	NS	94	0	-	-
Poland	-	-	-	-	158	1.9
Portugal	-	-	-	-	2,281	0
Romania	574	0	-	-	561	0
Slovakia	41	0	-	-	171	22.2
Slovenia	-	-	-	-	42	0
MS total						
Processing	NS	NS	NS	NS	42,314	<0.1
Retail	NS	NS	NS	NS	17,881	0

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals
(a): Includes minced meat, meat product and meat preparations

3.3.2.3. Bovine meat and products thereof

Single sample data on *L. monocytogenes* in RTE bovine meat at processing and retail in the period 2004 to 2009 are presented in Table LI14. At processing, only a few MSs reported positive findings ranging from 0.8% to 13.9%. At retail, MSs reported from 0.5% to 48.6% positive samples, with Portugal reporting the highest proportion of positive samples. Only the Netherlands reported sufficient data from more than two years during the period, however no changes were observed over time.

Seven MSs reported data on *L. monocytogenes* in fresh bovine meat; four MSs reported single sample data and three MSs reported batch based data. MSs reported from 0% to 3.2% positive single samples; all tested at retail. For the batch based data the proportion of positive samples ranged from 0.3% to 5.2% (Table LI15 and LI16).

Five MSs reported single sample data on non-RTE processed bovine meat from different sampling stages, ranging from none to 6.7% positive samples. The Czech Republic was the only MS reporting batch based data and of the 41 batches tested none were found positive (Table LI15 and LI16).

Single sample data on RTE bovine meat from different sampling stages were reported by 14 MSs. Most MSs reported positive findings, and at processing, the proportion of positive samples ranged from 0.8% to 13.9%, with the highest incidence reported by Belgium. At retail, the proportion of positive samples ranged from 0.5% to 48.6% and five out of the 13 reporting MSs, reported a proportion of positive samples > 10%. Four MSs reported batch based data on RTE bovine meat and most (90%) of the samples were tested at processing; however, the proportion of positive samples was generally low both at processing and at retail (Table LI15 and LI16).

Table LI14. *L. monocytogenes* in bovine meat[(a)], single samples, 2004-2009

	Fresh		Non-RTE processed meat[(a)]		RTE processed meat[(a)]	
	N	% pos	N	% pos	N	% pos
Slaughter						
Netherlands	-	-	459	3.3	-	-
Processing						
Belgium	-	-	284	6.7	303	13.9
Bulgaria	-	-	-	-	138	0
Estonia	-	-	-	-	49	2.0
Germany	711	6.0	-	-	-	-
Greece	NS	NS	NS	NS	45	0
Ireland	NS	NS	NS	NS	127	0.8
Italy	-	-	-	-	804	3.2
Retail						
Austria	NS	NS	112	5.4	28	3.6
Belgium	68	0	-	-	1,143	1.5
Estonia	NS	NS	-	-	29	0
France	-	-	-	-	566	10.2
Germany	-	-	-	-	2,880	13.0
Greece	-	-	55	0	114	0.9
Ireland	NS	NS	611	0.2	1,419	1.7
Italy	189	1.6	NS	NS	374	0.5
Luxembourg	-	-	-	-	239	29.3
Netherlands	532	0.9	1,018	3.0	729	1.9
Portugal	-	-	-	-	35	48.6
Slovenia	-	-	-	-	58	22.4
United Kingdom	3,249	3.2	-	-	369	1.6
MS total						
Processing	NS	NS	NS	NS	1,466	4.8
Retail	NS	NS	NS	NS	7,983	7.5

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product and meat preparations.

Table LI15. *L. monocytogenes* in bovine meat, batch samples, 2004-2009 (pooled data)

	Fresh		Non-RTE processed meat[(a)]		RTE processed meat[(a)]	
	N	% pos	N	% pos	N	% pos
Slaughter						
Romania	893	1.6	-	-	-	-
Processing						
Bulgaria	153	1.3	-	-	327	0
Czech Republic	NS	NS	-	-	7,867	1.8
Poland	901	0.9	-	-	325	2.2
Romania	689	0.3	-	-	412	0
Retail						
Bulgaria	-	-	-	-	970	0
Czech Republic	-	-	41	0	41	0
Romania	344	5.2	-	-	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product and meat preparations.

Table LI16. *L. monocytogenes* in ready-to-eat processed bovine meat[(a)], batch samples, 2004-2009

	2004		2005		2006		2007		2008		2009	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing												
Belgium	236	13.6	-	-	67	14.9	-	-	-	-	-	-
Bulgaria	-	-	-	-	-	-	138	0	-	-	-	-
Estonia	-	-	-	-	-	-	NS	NS	NS	NS	NS	NS
Germany	-	-	-	-	-	-	-	-	-	-	NS	NS
Greece	35	0	-	-	-	-	NS	NS	-	-	-	-
Ireland	-	-	40	2.5	NS	NS	NS	NS	28	0	NS	NS
Italy	804	3.2	-	-	-	-	-	-	-	-	-	-
Retail												
Austria	25	4.0	-	-	-	-	NS	NS	-	-	NS	NS
Belgium	98	2.0	287	1.0	153	0.7	316	2.5	289	1.0	-	-
France	-	-	-	-	-	-	-	-	566	10.2	-	-
Germany	2,825	13.3	-	-	-	-	-	-	-	-	55	0
Greece	82	0	-	-	-	-	31	3.2	-	-	NS	NS
Ireland	-	-	408	0.7	252	2.8	338	1.8	218	0.9	203	3.0
Italy	374	0.5	-	-	-	-	-	-	-	-	-	-
Luxembourg	-	-	-	-	-	-	-	-	239	29.3	-	-
Netherlands	-	-	-	-	-	-	28	10.7	409	1.7	292	1.4
Portugal	35	48.6	-	-	-	-	-	-	-	-	-	-
Slovenia	-	-	-	-	-	-	50	20.0	NS	NS	-	-
United Kingdom	-	-	-	-	-	-	-	-	361	1.7	NS	NS
MS total												
Retail	3,439	11.5	NS	NS	NS	NS	763	3.7	2,082	7.0	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals
(a): Includes minced meat, meat product and meat preparations.

3.3.2.4. Overview of meat of animal origin

In total, 22 MSs reported single sample data on *L. monocytogenes* in RTE meat of different animal origin at processing and retail during the period 2004 to 2009 (Table LI17 and Figure LI1). The majority of data were reported at retail. Overall, meat from pigs, bovine animals and broilers accounted for 44.1%, 18.0% and 9.7% of all samples and the proportion of positive samples was 3.6%, 7.0% and 2.3%, respectively. The total proportion of positive samples at processing and retail was 2.9% and 3.8%, respectively.

18 MSs reported single sample data on RTE meat of other or unspecified poultry or meat, this data represented 28.2% of all samples reported and the occurrence ranged from 0% to 25.0% (Table LI17).

Batch based data on *L. monocytogenes* in RTE meat of different animal origin at processing and at retail were reported by 10 MSs in the period 2004 to 2009 (Table LI18). At processing, the occurrence ranged from 0% to 8.4%, with the highest proportion of positive samples reported by Latvia on processed meat of other or unspecified animals. At retail the proportion of positive samples ranged up to 16.7%, with Slovenia reporting the highest proportion of positive samples for processed pig meat.

24 MSs reported single sample data on *L. monocytogenes* in non-RTE and RTE processed meat of different animal origin during the period 2004 to 2009 (Table LI19 and Figure LI2). The majority of data were reported as RTE and the total proportions of positive samples of non-RTE and RTE processed meat were 6.0% and 3.6%, respectively. Overall, meat from pigs, bovine animals and broilers accounted for 39.1%, 21.4% and 10.0% of all samples and the proportions of positive samples were 3.6%, 5.3% and 2.8%, respectively.

22 MSs reported single sample data on non-RTE and RTE meat of other or unspecified poultry or meat, this data represented 29.5% of all samples reported and the occurrence ranged from 0% to 47.8% (Table LI19).

Batch based data on non-RTE and RTE processed meat from different animal origin were reported by 12 MSs in the period 2004 to 2009 (Table LI20). Generally, the proportions of positive samples were low, below 10%, for both non-RTE and RTE processed meat, except for Estonia and Slovenia, which reported 55.9% on non-processed meat from broilers and 16.7% on RTE meat made from pig meat, respectively.

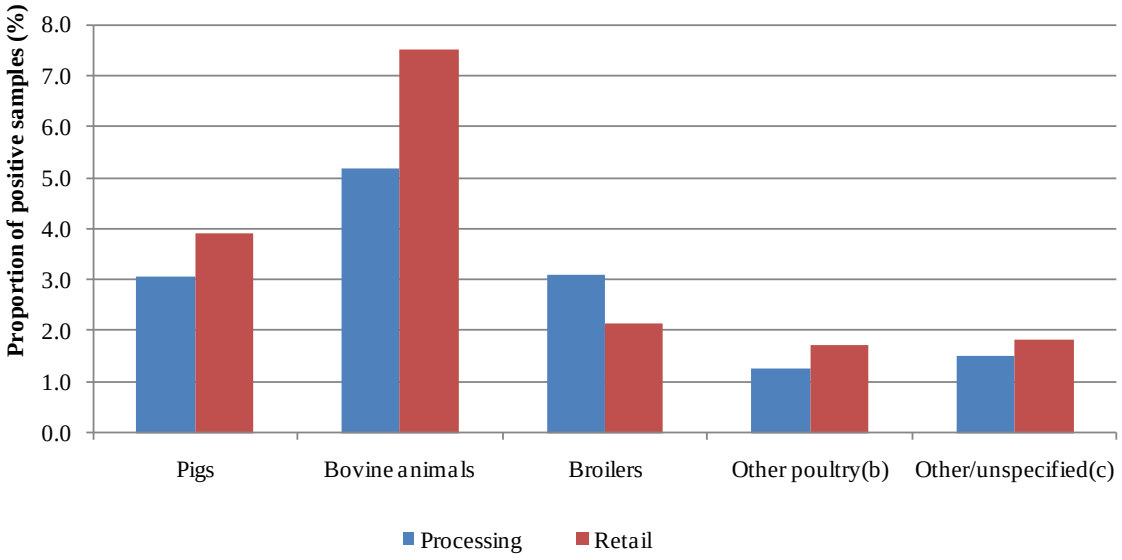

Figure LI1. L. *monocytogenes* in ready-to-eat processed meat[(a)] for different animal species, single samples, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data for an animal species/sampling stage data point to be presented in the figure. For overview of MSs included in the figure and total number of samples see Table LI11.
(a): Include minced meat, meat product, meat preparations and sliced meat.
(b): Includes turkey, duck, geese and unspecified poultry.
(c): Includes horse, rabbit, sheep, bovine animals and pigs, deer, game mammals and unspecified.

Table LI17. *L. monocytogenes* in ready-to-eat processed meat[(a)] for different animal species, single samples, 2004-2009 (pooled data)

	Pig		Bovine animals		Broilers		Poultry other/ unspecified[(b)]		Other/ unspecified[(c)]	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing										
Austria	103	5.8	-	-	-	-	NS	NS	44	2.3
Belgium	1,414	5.9	303	13.9	-	-	-	-	58	1.7
Bulgaria	4,174	0.3	138	0	171	0.0	-	-	-	-
Cyprus	435	0	-	-	50	0	-	-	-	-
Estonia	305	6.9	49	2.0	64	1.6	NS	NS	67	0
Germany	313	2.9	717	6.0	144	4.2	58	5.2	-	-
Greece	296	24.7	45	0	NS	NS	-	-	-	-
Hungary	444	6.3	NS	NS	146	8.2	87	2.3	-	-
Ireland	550	3.1	127	0.8	298	1.7	393	0.0	37	2.7
Italy	1,551	2.8	804	3.2	-	-	718	1.1	187	3.7
Latvia	71	0	NS	NS	NS	NS	-	-	350	0
Poland	262	0.4	NS	NS	-	-	182	2.7	2,204	0.5
Portugal	112	13.4	NS	NS	NS	NS	42	9.5	NS	NS
Slovenia	-	-	-	-	-	-	-	-	100	25.0
Retail										
Austria	857	8.5	28	3.6	NS	NS	205	2.9	406	4.4
Belgium	823	1.1	1,143	1.5	-	-	-	-	490	0.2
Czech Republic	240	4.6	-	-	96	1.0	-	-	216	5.6
Estonia	169	0.6	29	0	123	0.8	36	0.0	130	2.3
France	272	1.8	566	10.2	-	-	-	-	-	-
Germany	567	3.7	2,880	13.0	215	3.7	225	4.9	-	-
Greece	162	5.6	114	0.9	73	13.7	126	4.0	197	0.5
Hungary	361	4.4	NS	NS	171	1.8	201	4.0	-	-
Ireland	3,932	1.5	1,419	1.7	3,532	1.5	675	1.3	1,150	1.4
Italy	2,700	3.7	374	0.5	-	-	152	3.3	718	0.7
Latvia	-	-	NS	NS	-	-	-	-	420	1.2
Luxembourg	-	-	239	29.3	NS	NS	-	-	-	-
Netherlands	1,068	1.1	729	1.9	31	0.0	-	-	329	0.3
Poland	25	40.0	-	-	-	-	-	-	-	-
Portugal	89	19.1	35	48.6	-	-	NS	NS	NS	NS
Romania	33	0	NS	NS	NS	NS	-	-	-	-
Slovenia	57	7.0	58	22.4	49	2.0	NS	NS	46	0
Spain	1,626	12.1	NS	NS	79	8.9	-	-	25	4.0
Sweden	-	-	-	-	29	0	-	-	177	0
United Kingdom	1,841	1.9	369	1.6	189	1.6	402	0.5	5,058	2.2
MS total										
Processing	10,030	3.1	2,183	5.2	873	2.7	1,480	1.5	3,047	1.5
Retail	14,822	3.9	7,983	7.5	4,587	1.9	2,022	2.3	9,362	1.8

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product, meat preparations and sliced meat.
(b): Includes turkey, duck, geese and unspecified poultry.
(c): Includes horse, rabbit, sheep, bovine animals and pigs, deer, game mammals and unspecified.

Table LI18. *L. monocytogenes* in ready-to-eat processed meat[(a)] for different animal species, batch based data, 2004-2009 (pooled data)

	Pig		Bovine animals		Broilers		Poultry other/ unspecified[(b)]		Other/ unspecified[(c)]	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing										
Belgium	-	-	-	-	-	-	-	-	185	7.6
Bulgaria	-	-	327	0.0	-	-	-	-	-	-
Cyprus	340	0.6	-	-	-	-	-	-	-	-
Czech Republic	29,100	1.2	7,867	1.8	1,294	2.6	-	-	4,858	1.2
Latvia	47	0	NS	NS	-	-	-	-	190	8.4
Poland	9,511	7.3	325	2.2	1,592	1.3	-	-	3,605	2.0
Romania	2,956	0	412	0	470	0	-	-	-	-
Slovakia	360	1.4	-	-	25	0.0	NS	NS	248	2.0
Retail										
Belgium	-	-	-	-	-	-	-	-	49	0.0
Bulgaria	14,508	0.2	970	0.0	2,678	0.1	-	-	-	-
Czech Republic	160	1.9	-	-	61	11.5	-	-	248	0.8
Latvia	NS	NS	NS	NS	-	-	-	-	108	0.9
Poland	158	0	-	-	-	-	-	-	-	-
Portugal	2,281	1.7	-	-	170	0.0	-	-	-	-
Romania	561	0	NS	NS	79	0	-	-	-	-
Slovakia	171	0	-	-	175	0.6	NS	NS	193	0
Slovenia	42	16.7	-	-	-	-	-	-	-	-
MS total										
Processing	42,314	2.5	NS	NS	NS	NS	NS	NS	9,086	1.6
Retail	17,881	0.4	NS	NS	3,163	0.4	NS	NS	NS	NS

Note: Processing include data from packing centre. NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes minced meat, meat product, meat preparations and sliced meat.
(b): Includes turkey, duck, geese and unspecified poultry.
(c): Includes horse, rabbit, sheep, bovine animals and pigs, deer, game mammals and unspecified.

Table LI19. *L. monocytogenes* in meat from different animal species, single samples, 2004-2009 (pooled data)

	Pig		Bovine animals		Broilers		Poultry other/ unspecified[(b)]		Other/ unspecified[(c)]	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Non-RTE										
Austria	101	5.9	117	6.0	68	1.5	-	-	54	9.3
Belgium	690	7.4	352	5.4	386	19.9	744	24.2	-	-
Czech Republic	-	-	-	-	48	10.4	NS	NS	NS	NS
Denmark	-	-	-	-	-	-	-	-	803	0.5
Estonia	66	24.2	NS	NS	NS	NS	25	12.0	698	4.7
France	420	11.9	-	-	-	-	-	-	388	41.2
Greece	123	2.4	92	0.0	117	2.6	74	8.1	205	0
Ireland	1,429	0.7	638	0.5	1,766	0.4	339	0.3	672	0.3
Italy	240	7.1	211	1.4	NS	NS	NS	NS	397	6.3
Lithuania	-	-	-	-	-	-	39	5.1	-	-
Luxembourg	223	12.6	-	-	NS	NS	35	11.4	680	47.8
Netherlands	937	1.1	2,009	2.5	-	-	-	-	733	1.2
Romania	-	-	-	-	-	-	-	-	34	0.0
Slovenia	-	-	-	-	30	30.0	NS	NS	214	20.6
United Kingdom	1,693	2.8	3,249	3.2	-	-	-	-	1,056	3.1
RTE										
Austria	960	8.2	28	3.6	NS	NS	206	2.9	450	4.2
Belgium	2,237	4.1	1,446	4.1	-	-	-	-	548	0.4
Bulgaria	4,174	0.3	138	0	171	0	-	-	-	-
Cyprus	435	0	-	-	50	0	-	-	-	-
Czech Republic	240	4.6	-	-	96	1.0	-	-	216	5.6
Estonia	474	4.6	78	1.3	187	1.1	39	0	197	1.5
France	272	1.8	566	10.2	-	-	-	-	-	-
Germany	880	3.4	3,597	11.6	359	3.9	283	4.9	-	-
Greece	458	17.9	159	0.6	91	16.5	126	4.0	197	0.5
Hungary	805	5.5	27	0	317	4.7	288	3.5	-	-
Ireland	4,482	1.7	1,546	1.6	3,830	1.5	1,068	0.8	1,187	1.4
Italy	4,251	3.4	1,178	2.4	-	-	870	1.5	905	1.3
Latvia	71	0	NS	NS	NS	NS	-	-	770	0.6
Luxembourg	-	-	239	29.3	NS	NS	-	-	-	-
Netherlands	1,068	1.1	729	1.9	31	0	-	-	329	0.3
Poland	287	3.8	NS	NS	-	-	182	2.7	2,204	0.5
Portugal	201	15.9	41	43.9	NS	NS	47	12.8	27	25.9
Romania	33	0	NS	NS	NS	NS	-	-	-	-
Slovenia	57	7.0	58	22.4	49	2.0	NS	NS	146	17.1
Spain	1,626	12.1	NS	NS	79	8.9	-	-	25	4.0
Sweden	-	-	-	-	29	0	-	-	177	0
United Kingdom	1,841	1.9	369	1.6	189	1.6	402	0.5	5,058	2.2
MS total										
non-RTE	5,922	4.0	6,668	2.8	2,415	4.2	1,256	15.6	5,934	10.8
RTE	24,852	3.6	10,199	7.0	5,478	2.1	3,511	2.0	12,436	1.8

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes turkey, duck, geese and unspecified poultry.
(b): Includes horse, rabbit, sheep, bovine animals and pigs, deer, game mammals and unspecified animals.

Table LI20. *L. monocytogenes* in meat from different animal species, batch based data, 2004-2009 (pooled data)

	Pig		Bovine animals		Broilers		Poultry other/ unspecified[(b)]		Other/ unspecified[(c)]	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Non-RTE										
Czech Republic	176	9.1	194	1.0	351	2.0	-	-	NS	NS
Estonia	-	-	-	-	34	55.9	-	-	-	-
Italy	196	3.6	31	0	NS	NS	NS	NS	NS	NS
Poland	382	0	901	0.9	-	-	89	0	72	0
Portugal	-	-	-	-	-	-	60	6.7	-	-
Romania	3,228	1.8	1,926	1.8	1,072	0	-	-	1,953	5.6
Slovakia	62	1.6	-	-	NS	NS	NS	NS	NS	NS
RTE										
Belgium	-	-	-	-	-	-	-	-	234	6.0
Bulgaria	14,508	0.2	1,297	0	2,678	0.1	-	-	-	-
Cyprus	340	0.6	-	-	-	-	-	-	-	-
Czech Republic	29,260	1.2	7,867	1.8	1,355	3.0	-	-	5,106	1.1
Latvia	48	0	NS	NS	-	-	-	-	298	5.7
Poland	9,669	7.2	325	2.2	1,592	1.3	-	-	3,605	2.0
Portugal	2,281	1.7	-	-	170	0	-	-	-	-
Romania	3,517	0	436	0	549	0	-	-	-	-
Slovakia	531	0.9	-	-	200	0.5	NS	NS	441	1.1
Slovenia	42	16.7	-	-	-	-	-	-	-	-
MS total										
non-RTE	4,044	2.1	NS	NS	NS	NS	NS	NS	NS	-
RTE	60,196	1.8	NS	NS	6,544	1.0	NS	NS	9,684	1.7

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): Includes turkey, duck and unspecified poultry.
(b): Includes horse, bovine animals and pigs, wild boars, game mammals and unspecified.

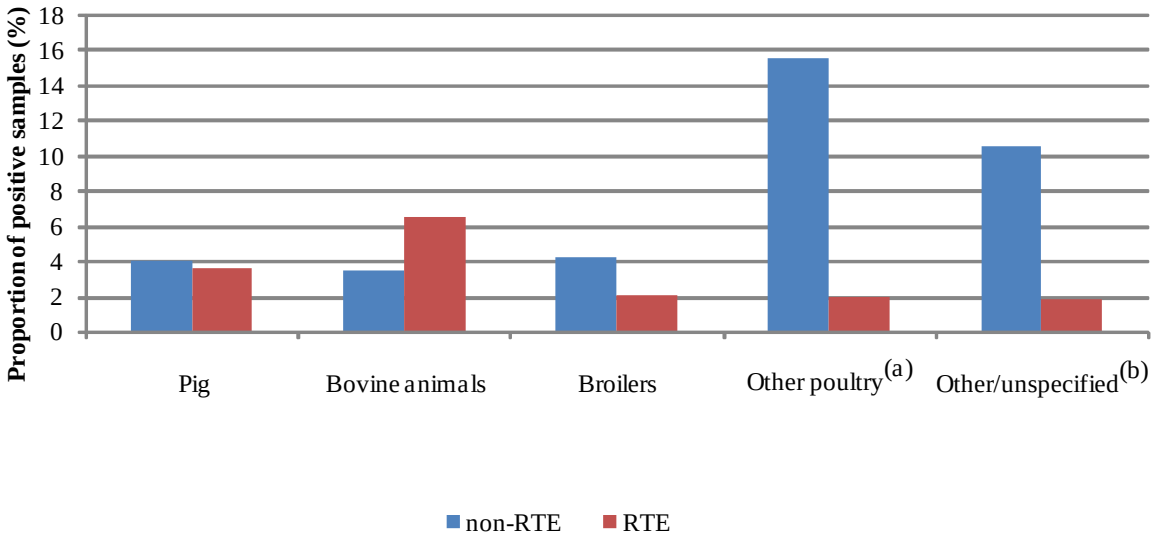

Figure LI2. *L. monocytogenes* in non ready-to-eat and ready-to-eat meat for different animal species, single samples, 2004-2009 (pooled data)

Note: Minimum five MSs must report sufficient data for an animal species/food category data point to be presented in the figure. For overview of MSs included in the figure and total number of samples see Table LI16.
(a): Includes turkey, duck, geese and unspecified poultry.
(b): Includes horse, rabbit, sheep, bovine animals and pigs, deer, game mammals and unspecified.

3.3.2.5. Egg and egg products

Only Ireland reported data on egg and egg products. All data were from retail and between 0% and 2.3% of single samples were positive.

3.3.2.6. Cheeses

Generally, the reported data on cheeses were sporadic and making it impossible to observe any trends over the years.

Overall, 14 MSs and one non-MS reported single sample data on soft and hard cheeses made from different types of milk and sampled at different stages of the production during the period 2004 to 2009 (Table LI21). The majority of investigations was reported on cheeses made from cow's milk. In soft cheeses, six out of 14 MSs and one non-MS reported positive findings ranging from none to 5.2% positive samples in cheeses made from pasteurised milk and from none to 2.1% positive samples in cheeses made from raw or low-heat treated milk. In hard cheeses, five out of 11 MSs and one non-MS reported positive findings and the proportion of positive samples ranged from 0.4% to 1.9% in cheeses made from pasteurised milk and 0.2% to 4.0% in cheeses made from raw or low-heat treated milk.

Few investigations were reported for both soft and hard cheeses made from different types of goat's milk and none of the tested samples were found positive. In cheeses made from sheep milk, *L. monocytogenes* was detected in one out of seven investigations of soft cheeses and three out of seven of hard cheeses (Table LI21).

Nine MSs reported batch based data on soft and hard cheeses made from different types of milk and sampled at different stages of the production during the period 2004 to 2009 (Table LI22). Overall, were few MSs reported positive findings in soft cheeses and the proportion of positive samples ranged from 0.8% to 5.9%. In the investigations on hard cheeses made from different types of milk, only one

positive finding was reported by the Czech Republic in cheeses made from pasteurised milk from cows and sampled at processing.

Single sample data of cheeses made from different types of milk at different stages of the production in the period 2004 to 2009 are presented as pooled data in Table LI23. Overall, soft cheeses, hard cheeses and unspecified cheeses accounted for 32.7%, 28.8% and 38.5% of all samples and the proportions of positive samples were 0.3%, 0.4% and 1.2%, respectively. The different types of milk such as: raw/low heat-treated, pasteurised and unspecified accounted for 41.2%, 21.3% and 37.5% and the proportions of positive samples were 0.5%, 0.9% and 2.6%, respectively. Of the total reported data, unspecified cheeses made from unspecified milk accounted for 31.0%, with 70.1% of data reported in 2004. The large number of reported samples was obtained in 2004 alone and was related to a substantial number data reported by Italy, Austria and Norway. For unspecified cheeses made from raw/low heat-treated and pasteurised milk, data were only reported in 2008 and 2009.

The occurrence of *L. monocytogenes* in batch based data from cheeses made from different types of milk and sampled at different stages of the production during the period 2004 to 2009 are presented as pooled data in Table LI24. Overall, soft cheeses, hard cheeses and unspecified cheeses accounted for 53.6%, 42.5% and 3.9% of all samples and the proportions of positive samples were 0.8%, 2.2% and 0.8%, respectively. Most of the reported data were reported on soft and hard cheeses made from pasteurised milk and overall, cheeses made from pasteurised milk accounted for 82.0% of the total reported data. The large amount of reported data on cheeses made from pasteurised milk were obtained through large investigations carried out by the Czech Republic, Romania and Bulgaria in the period 2007 to 2009.

Table LI21. *L. monocytogenes* in cheeses, single samples, 2004-2009 (pooled data)

	Soft and semi-soft				Hard			
	Pasteurised milk		Raw/low heat-treated milk		Pasteurised milk		Raw/low heat-treated milk	
	N	% pos	N	% pos	N	% pos	N	% pos
Cheeses made from cows' milk								
Farm								
Belgium	32	0	376	2.1	-	-	-	-
Processing								
Austria	139	0	114	0	NS	NS	137	0
Belgium	223	0.4	68	1.5	-	-	-	-
Bulgaria	1,282	0	3,314	0.1	3,089	0	334	0
Estonia	67	0	-	-	133	0.8	NS	NS
Germany	46	2.2	NS	NS	754	0.4	25	4.0
Hungary	99	0	-	-	-	-	-	-
Latvia	56	0	NS	NS	110	0	-	-
Poland	2,368	0	123	0	935	0	150	0
Portugal	32	0	-	-	-	-	-	-
Switzerland	329	0	418	0.5	-	-	167	1.2
Retail								
Austria	142	0.7	57	0	-	-	96	0
Belgium	329	0	209	0	-	-	-	-
Czech Republic	96	5.2	-	-	60	1.7	-	-
Germany	550	2.2	94	0	2,507	0.4	278	0.4
Greece	47	0	-	-	34	0	-	-
Hungary	85	0	-	-	NS	NS	-	-
Latvia	75	0	-	-	-	-	-	-
Netherlands	26	3.8	-	-	52	1.9	NS	NS
Portugal	-	-	40	0	-	-	-	-
Romania	NS	NS	-	-	NS	NS	195	0
United Kingdom	460	0	NS	NS	-	-	1,238	0.2

(Continue next page)

Table LI21(contd.). *L. monocytogenes* in cheeses, single samples, 2004-2009 (pooled data)

	Pasteurised milk		Raw/low heat-treated milk		Pasteurised milk		Raw/low heat-treated milk	
	N	% pos	N	% pos	N	% pos	N	% pos
Cheeses made from goats' milk								
Processing	-	-	-	-	-	-	-	-
Bulgaria	68	0	NS	NS	91	0	NS	NS
Germany	NS	NS	NS	NS	52	0	-	-
Switzerland	NS	NS	90	0	-	-	-	-
Retail								
Belgium	NS	NS	25	0	-	-	-	-
Germany	NS	NS	NS	NS	87	0	-	-
United Kingdom	27	0	-	-	-	-	-	-
Cheeses made from sheep milk								
Processing								
Bulgaria	275	0	170	0	53	0	404	0
Germany	NS	NS	NS	NS	30	3.3	-	-
Greece	-	-	40	0	186	0	-	-
Portugal	-	-	50	6.0	-	-	-	-
Retail								
Austria	NS	NS	32	0	-	-	-	-
Belgium	NS	NS	25	0	-	-	-	-
Germany	NS	NS	NS	NS	108	0.9	-	-
Greece	1,017	0	-	-	382	0.5	-	-
Romania	-	-	NS	NS	-	-	95	0
MS total								
Cheeses made from cows' milk	6,483	0.3	4,813	0.3	7,674	0.2	2,620	0.2
Cheeses made from goats' milk	NS	NS	NS	NS	NS	NS	NS	NS
Cheeses made from sheep milk	NS	NS	317	0.9	759	0.5	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.

Table LI22. *L. monocytogenes* in cheeses, batch based data, 2004-2009 (pooled data)

	Soft and semi-soft				Hard			
	Pasteurised milk		Raw/low heat-treated milk		Pasteurised milk		Raw/low heat-treated milk	
	N	% pos	N	% pos	N	% pos	N	% pos
Cheeses made from cows' milk								
Processing								
Belgium	102	1.0	62	1.6	-	-	-	-
Czech Republic	16,892	5.4	182	0	6,618	1.0	79	0
Hungary	285	0	NS	NS	-	-	-	-
Poland	-	-	-	-	56	0	-	-
Romania	86	0	284	0	1,652	0	288	0
Slovakia	178	2.2	-	-	NS	NS	-	-
Retail								
Belgium	80	0	-	-	-	-	-	-
Bulgaria	3,314	0	3,352	0	9,662	0	2,136	0
Czech Republic	363	0.8	NS	NS	48	0	-	-
Portugal	262	0	-	-	-	-	-	-
Romania	26	0	1,160	0	58	0	NS	NS
Slovakia	114	0	-	-	NS	NS	-	-
Cheeses made from goats' milk								
Processing								
Belgium	-	-	35	2.9	-	-	-	-
Czech Republic	252	0	71	0	-	-	-	-
Retail								
Bulgaria	521	0	39	0	623	0	41	0
Malta	654	0	-	-	-	-	-	-
Portugal	30	0	52	0	-	-	-	-
Cheeses made from sheep milk								
Processing	-	-	-	-	-	-	-	-
Czech Republic	61	0	-	-	NS	NS	-	-
Poland	-	-	-	-	33	0	-	-
Romania	38	0	99	0	393	0	47	0
Slovakia	NS	NS	364	1.1	-	-	-	-
Retail								
Bulgaria	742	0	40	0	2,282	0	141	0
Hungary	114	0	-	-	-	-	-	-
Romania	-	-	370	5.9	-	-	-	-
Slovakia	-	-	25	0.0	-	-	-	-
MS total								
Cheeses made from cows' milk	21,702	4.2	5,040	<0.1	18,094	0.4	NS	NS
Cheeses made from goats' milk	NS	NS	NS	NS	NS	NS	NS	NS
Cheeses made from sheep milk	NS	NS	898	2.9	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.

Table LI23. *L. monocytogenes* in cheeses, single samples, 2004-2009 (pooled data)

	Soft and semi-soft		Hard		Unspecified	
	N	% pos	N	% pos	N	% pos
Made from raw or low heat-treated milk						
Farm	404	2.0	-	-	63	0
Processing	4,616	0.3	1,227	0.2	864	1.5
Retail	635	0.2	1,908	0.2	666	0.6
Made from pasteurised milk						
Farm	44	0	-	-	NS	NS
Processing	5,377	<0.1	6,249	<0.1	1,465	0.3
Retail	3,086	0.6	3,261	0.5	555	0
Unspecified						
Farm	-	-	-	-	26	0
Processing	579	0	937	1.6	7,755	1.9
Retail	1,180	0	423	2.1	7,314	0.9
MS total						
Raw or low heat-treated milk	8,507	0.2	9,510	0.2	2,020	0.2
Pasteurised milk	5,655	0.4	3,135	0.2	1,593	1.1
Unspecified	1,759	0	1,360	1.8	15,095	1.4
Total	15,921	0.3	14,005	0.4	18,708	1.2

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.

Table LI24. *L. monocytogenes* in cheeses, batch based data, 2004-2009 (pooled data)

	Soft and semi-soft		Hard		Unspecified	
	N	% pos	N	% pos	N	% pos
Made from raw or low heat-treated milk						
Processing	1,163	0.6	438	0.2	680	7.5
Retail	5,174	0.4	2,338	0	-	-
Made from pasteurised milk						
Processing	18,068	5.1	8,802	0.7	1,085	3.6
Retail	6231	<0.1	12,706	0	NS	NS
Unspecified						
Processing	43	0	34	0	371	0.8
Retail	-	-	-	-	85	1.2
MS total						
Raw or low heat-treated milk	6,337	0.5	2,776	<0.1	680	7.5
Pasteurised milk	24,299	3.8	21,508	0.3	1,085	3.6
Unspecified	43	0	34	0	456	0.9
Total	30,679	3.1	24,318	0.3	2,221	4.2

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.

3.3.2.7. Fishery products

Single sample data on *L. monocytogenes* in non-RTE fish, fishery products and crustaceans collected at processing and at retail from 2004 to 2009 are presented in Table LI25. Most of the reported data were sampled at retail, and among the MSs reporting positive findings, the proportion of positive samples ranged from 0.6% to 22.8%, with the Netherlands reporting the highest proportion of positive samples in fishery products. At processing, the proportion of positive sampled varied between 0.9% and 27.1%.

On non-RTE fish, Norway accounted for 59.0% of the reported data. Of the 588 tested samples at processing, 78.1% was tested on raw fish and the proportion of positive samples was 3.7% (Table LI25).

Overall, 14 MSs and one non-MS reported single sample data non-RTE fishery products, which accounted for 79.0% of all the reported data. The proportion of positive samples ranged from 0% to 27.1%, with Estonia reporting the highest prevalence at processing. Only the Netherlands provided information on the type of fishery products. Most of the 1,028 samples were reported on Atlantic mackerel, eel and salmon, however positive samples were only found in eel and salmon and the proportions of positive samples were 33.7% and 40.2%, respectively (Table LI25).

Ireland, Austria, the Czech Republic and Hungary reported single samples data on non-RTE crustaceans at processing and at retail. Of the five reported investigations, four were positive with proportions of positive samples between 0% and 10%, with Austria reporting the highest incidence at retail (Table LI25).

Only four MSs reported batch based data on non-RTE fish and fishery products at different stages of production in the period 2004 to 2009. In non-RTE fish, none of the tested batches were found positive and only few were found positive in non-RTE fishery products. Data not presented in tables and figures.

A total of 20 MSs and one non-MS reported single sample and batch based data on fish, fishery products and crustaceans at different stages of the production in the period 2004 to 2009 (Table LI26). The majority of the reported data, both single sample and batch based data were on RTE smoked fish. 17 MSs reported single sample data at processing and at retail. The proportion of positive samples from smoked fish was the highest reported from all investigated food categories. In total, 7.6% of single samples were found to be contaminated at processing and 10.5% at retail.

Few data were reported on RTE unspecified fishery products and the proportion of positive samples ranged from 0% to 3.6% at processing and from 0.9% to 15.2% at retail, with Estonia and Austria reporting the highest incidences (Table LI26).

Six MSs reported both single sample data on RTE unspecified crustaceans and the proportion of positive samples were generally low, except for Germany which reported 15.2% and 6.5% at processing and at retail, respectively. Batch based data were only reported by Bulgaria and Portugal at retail and none of the tested batches were found positive (Table LI26).

Only Ireland reported single sample data on RTE cooked fish at retail and one of 31 samples were found positive. On RTE gravad fish, Finland tested 541 samples at retail and 124 samples were found positive. Norway tested RTE unspecified fish (sushi) and seven of 205 samples were found positive. On RTE cooked fishery products Hungary tested 80 samples at retail and one sample was found positive. Ireland tested 559 samples of RTE cooked fishery products and 69 samples of RTE smoked fishery products; all tested at retail, and for both investigations five samples were found positive. Austria was the only MS reporting single sample data on RTE cooked crustaceans and none of 105 samples tested at processing, were found positive. Greece reported single sample data on RTE molluscan shellfish at retail and one out of 27 samples was positive. Hungary tested 79 samples respectively and none of the samples were found positive. Data are not presented in tables and figures.

Table LI25. *L. monocytogenes* in non ready-to-eat fishery products, single samples, 2004-2009 (pooled data)

	Fish		Fishery products		Crustaceans[(a)]	
	N	% pos	N	% pos	N	% pos
Processing						
Austria	NS	NS	56	14.3	-	-
Estonia	-	-	118	27.1	-	-
Ireland	30	13.3	102	2.9	105	1.0
Italy	-	-	751	0.9	NS	NS
Norway	588	3.7	-	-	-	-
Retail						
Austria	92	8.7	1,029	4.0	30	10.0
Belgium	-	-	121	1.7	-	-
Czech Republic	-	-	-	-	44	0
Denmark	177	0.6	-	-	-	-
Finland	-	-	29	0	-	-
Germany	-	-	191	4.7	-	-
Greece	33	0	NS	NS	-	-
Hungary[(a)]	NS	NS	-	-	27	7.4
Ireland	76	0	574	0.5	101	1.0
Italy	-	-	452	11.1	NS	NS
Lithuania	-	-	387	9.0	-	-
Netherlands	-	-	1,028	22.8	-	-
Romania	-	-	57	0	-	-
MS total						
Retail	NS	NS	3,868	9.7	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.
(a): 27 samples were tested on raw crustaceans.

Table LI26. *L. monocytogenes* in ready-to-eat fish and fishery products, single samples and batch based data, 2004-2009 (pooled data)

	Fish Smoked		Fishery products Unspecified		Crustaceans Unspecified	
	N	% pos	N	% pos	N	% pos
Single sample						
Processing						
Belgium	458	14.6	-	-	-	-
Bulgaria	130	1.5	-	-	150	0
Cyprus	30	10.0	-	-	-	-
Estonia	73	12.3	196	3.6	NS	NS
Germany	269	5.2	-	-	33	15.2
Ireland	204	6.4	30	0	-	-
Latvia	271	0.4	-	-	NS	NS
Norway	80	0	-	-	-	-
Retail						
Austria	749	8.9	33	15.2	NS	NS
Belgium	593	1.7	-	-	-	-
Czech Republic	36	13.9	NS	NS	-	-
Estonia	32	6.3	68	8.8	-	-
Finland	477	22.4	-	-	-	-
Germany	995	4.8	-	-	294	6.5
Greece	87	1.1	-	-	-	-
Hungary	73	1.4	71	1.4	28	0
Ireland	72	6.9	441	0.9	63	1.6
Italy	79	11.4	-	-	-	-
Latvia	295	0.7	-	-	-	-
Netherlands	1,803	17.6	-	-	53	0
Slovenia	120	25.0	-	-	NS	NS
Sweden	275	12.7	-	-	NS	NS
United Kingdom	3,441	9.2	79	3.8	179	3.9
Batch						
Processing						
Belgium	26	15.4	-	-	-	-
Czech Republic	984	6.0	-	-	-	-
Latvia	185	3.2	-	-	-	-
Poland	873	10.1	528	5.9	NS	NS
Romania	141	0	-	-	-	-
Retail						
Belgium	199	1.5	-	-	-	-
Bulgaria	809	1.9	-	-	55	0
Czech Republic	118	4.2	-	-	-	-
Latvia	106	0	-	-	-	-
Portugal	145	0	-	-	50	0
MS total						
Single sample						
Processing	1,435	7.6	NS	NS	NS	NS
Retail	9,127	10.5	692	2.7	617	4.4
Batch						
Processing	2,209	7.1	NS	NS	NS	NS
Retail	1,377	1.7	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.

3.3.2.8. Fruit and vegetables

Eight MSs reported data on samples of non-RTE fruit, vegetables, sprouted seeds and spices and herbs collected at processing and at retail from 2004 to 2009 (Table LI27). The majority of the reported data concerned fruits and vegetables at retail and the occurrence of *L. monocytogenes* was generally low; between 0% and 1.3% for fruits and 0% and 3.7% for vegetables. Only the Netherlands reported data on sprouted seeds, and 0.2% of the 1722 tested single samples were found positive. Belgium and Ireland tested 62 and 60 samples of spices and herbs at retail and none of the samples were found positive.

Data on non-RTE mushrooms were only reported by Ireland at retail and nine out of the 463 tested single samples were found positive. Data are not presented in tables and figures.

Finland, the Czech Republic, Latvia and Portugal reported a few investigations with batch based data on non-RTE fruits, vegetables and sprouted seeds; only the Czech Republic and Latvia reported five of 245 vegetable samples and two out of 29 sprouted seed samples positive, respectively. Belgium and the Czech Republic reported batch based data on RTE fruits and vegetables. The Czech Republic reported five out of 134 batches positive. Data are not presented in tables and figures.

Ireland and Portugal reported 370 single samples and 100 batches on juice respectively and none of the tested samples were found positive. Data are not presented in tables and figures.

Table LI27. *L. monocytogenes* in non-ready-to-eat fruit, vegetables, sprouted seeds and spices and herbs, single samples, 2004-2009 (pooled data)

	Fruits		Vegetables		Seeds, sprouted		Spices and herbs	
	N	% pos	N	% pos	N	% pos	N	% pos
Processing								
Estonia	-	-	116	1.7	-	-	-	-
Retail								
Austria	39	0	NS	NS	-	-	NS	NS
Belgium	-	-	127	0	-	-	62	0
Czech Republic	35	0	180	2.2	-	-	-	-
Denmark	70	0	-	-	-	-	-	-
Estonia	-	-	48	0	-	-	-	-
Hungary	-	-	54	3.7	-	-	-	-
Ireland	77	1.3	251	1.6	-	-	60	0
Netherlands	769	0	-	-	1,722	0.2	-	-
MS total								
Retail	990	0.1	660	1.5	NS	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.

3.3.2.9. Other foods (bakery products etc.)

Single sample and batch based data on *L. monocytogenes* in non-RTE food products sampled at different sampling stages during the period 2004 to 2009 are presented in Table LI28. Most of the reported data were obtained from unspecified food products (unspecified food products include cocoa and cocoa preparations, coffee and tea, fats and oils, potato chips, snails and other foodstuffs). At retail the occurrence ranged from 0% to 3.3% for single sample data and for batch based data, from 0% to 20%, with the highest incidence reported by France. At processing, Austria and Estonia tested 81 and 79 samples and 1.2% and 2.5% were found positive, respectively. Batch based data at processing were only reported by the Czech Republic and no positive findings were reported.

Only Hungary, and Ireland reported single sample data on non-RTE cereals and meals and only Ireland reported few positive samples (Table LI28).

Single sample and batch based data on *L. monocytogenes* in RTE food products sampled at different sampling stages during the period 2004 to 2009 are presented in Table LI29 and Table LI30.

In total, RTE unspecified food products accounted for 57.1% of all the reported data and the proportion of positive samples ranged up to 1.8% at processing and up to 4.3% at retail (Table LI29).

Seven MSs reported data on RTE bakery products and the proportion of positive samples was generally low, except for Greece at processing, which reported 34.4% positive samples. Six MSs reported data on RTE confectionary products and sweets and the Czech Republic, Hungary, Slovenia and the United Kingdom found few positive samples (Table LI29).

On RTE salads, only Estonia reported data at processing and of the 233 single samples tested samples 9.0% was found positive. At retail, the proportion of positive samples ranged from 0.5% to 7.3%, with the highest incidence reported by Lithuania (Table LI29).

On batch based data 52.6% was reported as RTE unspecified food products and the occurrence ranged from 0% to 8.9% at processing and from 0% to 4.4% at retail (Table LI30).

Table LI28. *L. monocytogenes* in non-ready-to-eat food products, 2004-2009 (pooled data)

	Cereals and meals		Unspecified[(a)]	
	N	% pos	N	% pos
Single sample				
Processing				
Austria	-	-	81	1.2
Estonia	-	-	79	2.5
Hungary	29	0	-	-
Retail				
Austria	-	-	155	2.6
Estonia	NS	NS	64	0
Greece	-	-	167	0.6
Hungary	154	0	-	-
Ireland	907	0.8	8,540	1.0
Italy	-	-	60	0
Lithuania	-	-	60	3.3
Slovakia	-	-	220	0
Sweden	-	-	494	1.6
Batch				
Processing				
Czech Republic	-	-	38	0
Retail				
France	-	-	55	20.0
Italy	-	-	118	2.5
Portugal	-	-	50	0
Slovakia	-	-	1,227	1.4

NS: Not sufficient data, <25 samples reported by the MS.
(a): Unspecified food products include cocoa and cocoa preparations, coffee and tea, fats and oils, potato chips, snails and other foodstuffs.

Table LI29. *L. monocytogenes* in ready-to-eat food products, single samples, 2004-2009 (pooled data)

	Bakery products		Confectionary products and sweets		RTE salads		Unspecified[(a)]	
	N	% pos	N	% pos	N	% pos	N	% pos
Processing								
Austria	NS	NS	-	-	NS	NS	NS	NS
Czech Republic	-	-	36	2.8	-	-	-	-
Estonia	33	0	-	-	233	9.0	109	1.8
Germany	-	-	-	-	-	-	945	0.1
Greece	32	34.4	-	-	-	-	130	0
Italy	-	-	NS	NS	-	-	1,475	0
Norway	-	-	-	-	-	-	190	0
Poland	-	-	-	-	-	-	4,440	<0.1
Retail								
Austria	279	0.4	NS	NS	35	2.9	928	0.6
Belgium	188	0.5	-	-	-	-	370	0
Bulgaria	-	-	-	-	-	-	4,793	0.2
Czech Republic	-	-	NS	NS	NS	NS	-	-
Estonia	236	0	43	0	1,325	1.7	252	0
Germany	-	-	-	-	-	-	4,400	0.5
Greece	NS	NS	-	-	NS	NS	828	0.7
Hungary	30	0	248	2.4	503	4.8	986	0.6
Ireland	1,764	0.2	59	0	663	0.5	7,546	0.9
Italy	-	-	NS	NS	-	-	929	0
Lithuania	NS	NS	-	-	55	7.3	NS	NS
Netherlands	-	-	-	-	-	-	1,583	0.1
Portugal	-	-	-	-	-	-	1,809	1.1
Romania	-	-	NS	NS	-	-	247	0
Slovenia	500	0	800	1.0	256	1.6	1,517	2.2
United Kingdom	-	-	678	1.2	335	0.9	6,823	4.3

NS: Not sufficient data, <25 samples reported by the MS.
(a): Unspecified food products include chocolate, non-alcoholic beverages, sauces and dressings, soups and other foodstuffs.

Table LI30. *L. monocytogenes* in ready-to-eat food products, batch based data, 2004-2009 (pooled data)

	Bakery products		Confectionary products and sweets		RTE salads		Unspecified[(a)]	
	N	% pos	N	% pos	N	% pos	N	% pos
Processing								
Cyprus	-	-	-	-	-	-	1,190	1.3
Czech Republic	309	0.3	417	0	3,207	3.3	852	8.7
Latvia	-	-	-	-	-	-	100	0
Poland	-	-	-	-	-	-	380	8.9
Romania	36	0	85	0	-	-	63	0
Slovenia	-	-	-	-	-	-	188	0
Retail								
Czech Republic	102	0	27	0	349	0	90	4.4
Latvia	-	-	-	-	-	-	260	0
Portugal	-	-	-	-	330	0	-	-
Romania	NS	NS	-	-	-	-	2,652	0
Slovakia	-	-	-	-	-	-	490	0.8

NS: Not sufficient data, <25 samples reported by the MS.
(a): Unspecified food products include chocolate, non-alcoholic beverages, sauces and dressings, soups and other foodstuffs.

3.3.2.10. Infant food

Belgium, Estonia, Czech Republic, Hungary, Ireland and Slovakia reported data concerning single sample or batch based investigations of infant formula collected at processing or retail. All samples were negative.

3.3.3. Discussion

Listeria monocytogenes is a very versatile microorganism. It grows in cold environments, it endures drying and high salt concentrations, and it survives mild heat treatment. With these traits the ubiquitous presence of the organism – the widespread presence in nature - is understandable. Furthermore it is able to colonise and take part in biofilm-formation, and hereby establish itself in food production environments. Raw foods and raw materials for food production are likely to be contaminated with *L. monocytogenes*, and heat treated foods may be easily be re-contaminated from contact with raw materials, tools or handling, or even through dust from ventilation systems.

The very large amount of data gathered from sampling of various food categories in the EU over the five-year period from 2004 to 2009 bears evidence to the saying “search and you shall find”: *L. monocytogenes* is found in most of the foods examined, from meat, fish over dairy products to vegetables.

A total of 421,120 single samples and batch based samples were included in the present analyses of *L. monocytogenes* in foodstuffs from 2004 to 2009. During this period, MSs have reported a total of 878,799 single samples and batch based samples which represent the occurrence of *L. monocytogenes* of domestically produced food, however the scope of this report is to describe, in depth, the occurrence of this microbiological contaminant in domestically produced foodstuff, therefore due to lack of information (e.g. sampling stage) a substantial number of data were not included in the analysis (see Chapter 1 for more details about the data quality).

Data from the different investigations that are accumulated and presented in this report are not directly comparable. Variations in sampling strategies, methodology and laboratory practices and experience must be acknowledged, and caution must be exercised when comparing results of different investigations, different food categories or different MSs. Nevertheless when the vast amounts of data from the very large number of investigations, a picture emerges. In descending order, ready-to-eat fishery products, meat products and cheeses, have been found to be the foodstuffs most frequently contaminated with *L. monocytogenes.* The majority of the samples were collected from different types of RTE meat products. Bovine meat appears to be more often contaminated with *L. monocytogenes* compared to pig meat, and poultry meat. Thus 7.0% of bovine meat was reported contaminated, compared to 3.6% of pig meat, and 2.1% of broiler meat. For RTE bovine meat and pig meat, the contamination was found to be higher at retail compared to processing.

Cheeses have been the focus of a large number of investigations. It appears that *L. monocytogenes* may be found in both soft and hard cheeses, and both in cheeses made from unpasteurised and pasteurised milk. The result shows that cheeses made from pasteurised milk were more often contaminated than cheeses made from unpasteurised or low heat-treated milk. Soft cheeses have been found to be more often contaminated compared to hard cheeses. This was especially obvious from data from batch based investigations.

Fishery products, especially smoked fish products, have been found to be contaminated in higher frequencies than other food categories.

Data, mainly from investigations of single samples, were available from retail, and from processing, where the results were mainly reported as batch based samples. When sampling for batch control, five samples were collected according to the EU regulation on microbiological criteria, thus increasing the sensitivity of the test procedure. This makes comparison of the results from retail and processing difficult. For smoked fish, single samples were collected at both processing and retail showing that 7.6% were found positive at processing, compared to 10.5% at retail, suggesting growth from the processing step to retail.

No apparent trend was observed for either meat products, cheeses or fish products over the five-year period.

Within EU, microbiological criteria have been established for *L. monocytogenes* in RTE foods. Data on compliance with these criteria were available for the years 2007 to 2009. Two categories of criteria applies, 100 cfu/g for foods for which limited growth is documented, and absence in 25g for foods that enable growth. When documentation on growth potential is not satisfactory, *L. monocytogenes* must not be detected in 25g when the product leaves the processing facility. RTE meat products, soft cheeses and fishery products were the foods that were most often found not to be in compliance with the microbiological criteria, with the highest incidence in meat products and fishery products. In some cases i.e. batch based samples for soft cheeses sampled at processing it could appear that the frequency of non-compliance was somewhat higher in 2007 as compared to 2008 and 2009, but generally a trend was not apparent.

In 2010 and 2011, an EU baseline survey on *L. monocytogenes* in RTE food is being carried out, and the food categories targeted in the survey were smoked and gravad fish, soft and semi-soft cheeses, and heat-treated meat products that have been handled between the heat treatment and packaging. During the same period, *Listeria* isolates were also collected from human cases in 18 MSs. This survey will provide valuable information on the occurrence of *L. monocytogenes* in these RTE food categories perceived as being at high risk regarding *Listeria* contamination. The typing of both food and human isolates will provide important information to the knowledge of which strain characteristics that are important in food-borne listeriosis in EU.

3.4. *Yersinia*

Yersiniosis in humans is most often caused by *Y. enterocolitica* and mostly acquired by eating contaminated food, particularly raw or undercooked pig meat. However, majority of isolates from food and environmental sources are non-pathogenic types and it is, therefore, very important to discriminate between the strains that are pathogenic and those that are non-pathogenic for humans.

Table YE1. Overview of countries reporting data included in the analysis for *Yersinia* spp., 2004-2009

Food categories	No of reporting MSs	
Meat and meat products		
2004	5	MSs: BE, DE, IT, SE, SI
2005	1	MS: BE
2006	3	MSs: AT, BE, ES
2007	2	MSs: BE, ES
2008	6	MSs: AT, BE, IT, PT, RO, UK
2009	4	MSs: EE, ES, PT, RO
Milk, cheese and dairy		
2004	1	MS: SI
2008	1	MS: IT
Fruit and vegetables		
2005	1	MS: FI
2006	1	MS: FI
2007	1	MS: EE

Note: MSs reporting >24 samples per food category per sampling unit were included.

3.4.1. *Yersinia* in food

Only 11 MSs reported data on *Yersinia* in food during the period 2004 to 2009 (Table YE1). Majority of data were collected from meat and meat product, mainly from pig meat. Among the 28 investigations with positive single samples, 16 investigations indicated the occurrence of *Y. enterocolitica* positive samples, while the remaining reported the occurrence as *Yersinia* spp.

The results from the most important foodstuffs (non ready-to-eat pig meat and bovine meat) are presented in Table YE2 as pooled single sample data since no trend was observed during the period. The majority of single samples from pig meat and bovine meat was collected at retail and this was also where the highest proportions of positive samples were reported (Figure YE2).

The proportion of positive samples of pig meat ranged up to 24.5%, with the highest proportion of positive samples reported by Austria. For bovine meat, the occurrence was between 0% and 15.5% with the highest proportions reported by the United Kingdom (Table YE2). These data were primarily from an investigation conducted in 2008, where none of the typed isolates from bovine meat were of the human pathogenic types.

Ready-to-eat meat from bovine animals and pigs was only reported by Austria and Belgium, and Austria reported one positive sample out of 62 samples. Only Romania reported data from batch based investigations on pig meat. From five investigations, 3,936 batches were tested with no positive findings. Data are not presented in the tables and figures.

Slovenia reported 188 batches of dairy products and none of the tested batches were positive. Italy reported 349 samples of cheese made from unspecified milk, and none of the samples were found positive. Although *Y. enterocolitica* was mostly associated with pig meat, Finland reported 31 of 36 samples and 43 of 93 batches of non ready-to-eat (non-RTE) vegetables positive at farm and retail

respectively, however all isolates represented the non-pathogenic biotype 1A. Data are not presented in the tables and figures.

Table YE2. *Yersinia* spp. in non ready-to-eat pig meat and bovine meat, single sample, 2004-2009 (pooled data)

	Meat from pig		Meat from bovine animals	
	N	% pos	N	% pos
Slaughter				
Czech Republic	NS	NS	-	-
Estonia	80	0	-	-
Italy	122	2.5	116	1.7
Spain	217	1.4	NS	NS
Processing				
Belgium	491	0.4	-	-
Germany	NS	NS	26	0
Italy	54	1.9	NS	NS
Portugal	99	1.0	-	-
Spain	NS	NS	NS	NS
Retail				
Austria	102	24.5	112	9.8
Belgium	258	0.4	-	-
Estonia	28	14.3	-	-
Germany	36	0	105	0
Italy	216	6.5	68	5.9
Portugal	100	12.0	-	-
Romania	81	0	-	-
Spain	123	9.8	87	9.2
Sweden	1,455	9.1	-	-
United Kingdom	654	11.5	1,174	15.5
MS total				
Retail	3,053	9.0	1,546	13.3

NS: Not sufficient data, <25 samples reported by the MS or <5 MSs reporting for calculation of totals.

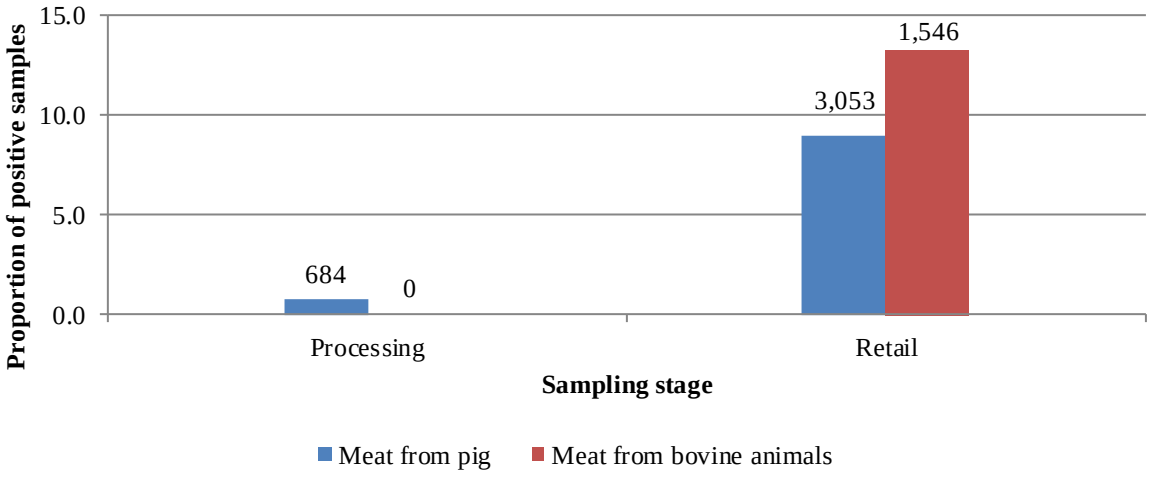

Figure YE1. Proportion of *Yersinia* positive samples in non ready-to-eat pig and bovine animals meat, pooled data, 2004-2009

Note: Minimum five MSs must report sufficient data for a meat category/sampling stage data point to be presented in the figure. For overview of MSs included in the figure see Table YE2. Numbers of samples tested are indicated above the columns.

3.4.2. *Y. enterocolitica* strains

There was almost no information regarding biotype, so the occurrence of strains that are pathogenic for humans cannot be estimated from the reported data. However, in those cases where biotype information was provided, the majority of the isolates are of the biotype A1. This biotype is considered non-pathogenic to humans according to the scientific report on technical specifications for harmonised national surveys on *Y. enterocolitica* in slaughter pigs published by EFSA in 2009[9].

When including all reported data (also HACCP, imports, clinical investigations etc.), the pathogenic biotype 2 (serotype O:9, O:5,27) were reported from pig meat by Germany, Portugal and the United Kingdom and the serotype O:3 were reported from pig meat by Germany. The serotype O:3 might belong to the biotype 4 which is the most common human pathogenic biotype in the EU. The serotype O:5 was reported from raw cow's milk, bovine meat and sheep meat (United Kingdom). This serotype belongs to the non-pathogenic biotype A1.

[9] European Food Safety Authority; Technical specifications for harmonised national surveys of *Yersinia enterocolitica* in slaughter pigs on request of EFSA. EFSA Journal 2009; 7(11):1374.

3.4.3. Discussion

Even though the number of reported human cases of yersiniosis in the EU has been decreasing since 2005, yersiniosis was the third most common zoonoses reported in the EU in 2009[10].

A total of 12,647 single samples and batch based samples were included in the present analysis of *Yersinia* in food from 2004 to 2009. During the period, MSs have reported a total of 26,398 single samples and batch based samples which represent the occurrence of *Yersinia* of domestically produced food, however due to missing information (e.g. sampling stage) a substantial number of data were not included in analysis (see Chapter 1 for more details about the data quality).

The majority of the reported human cases (97%) in 2009 were positive with *Y. enterocolitica*, and it is assumed that raw or undercooked pig meat was the major source of infection. This is supported by the fact that most positive findings were reported in pig meat. However, strains of *Y. enterocolitica* that are human pathogenic have been has been isolated from also other animal species, such as cattle, sheep and goats. In order to evaluate the importance of other animal reservoirs than pigs, more information regarding biotype and serotype is needed.

[10] The European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne outbreaks in 2009; EFSA Journal 2011; 9(3):2090

3.5. VTEC

Verotoxigenic *Escherichia coli* (VTEC) are characterized by the ability to produce toxins that are designated verocytotoxins[11]. VTEC that are pathogenic to humans usually include additional virulence factors important for the development of the disease in man. A large number of serogroups of *E. coli* have been recognised as verocytotoxin (VT) producers, however human VTEC infections are often associated with a subgroup of O:H serogroups. O157:H7 and O157:H- serogroups (VTEC O157) are the ones most frequently reported to be associated with human disease.

Majority of MSs and one non-MS reported data on VTEC in food during the period 2004 to 2009 (Table VT1). Most data were reported on bovine meat followed by milk and dairy products.

Table VT1. Overview of countries reporting data included in the analysis for VTEC, 2004-2009

Food categories	No of reporting MSs		Non-MSs
Meat and meat products			
2004	8	MSs: BE, CZ, DE, GR, IT, PT, SE, SI	Non-MS: NO
2005	5	MSs: BE, CZ, IE, LV, SI	-
2006	7	MSs: AT, BE, EE, ES, IE, LU, SI	-
2007	13	MSs: AT, BE, BG, CZ, DE, EE, ES, FR, HU, IE, LV, NL, SI	-
2008	17	MSs: AT, BE, BG, CZ, DE, EE, ES, FR, HU, IE, IT, LV, NL, PL, RO, SI, UK	-
2009	16	MSs: AT, BE, BG, CZ, DE, EE, ES, FR, HU, IE, LU, NL, PL, PT, RO, SI	-
Milk, cheese and dairy			
2005	2	MSs: BE, FR	-
2006	1	MS: BE	Non-MS: CH
2007	5	MSs: AT, BE, CZ, FR, LV	Non-MS: CH
2008	6	MSs: BE, CZ, DE, HU, IT, LV	Non-MS: CH
2009	7	MSs: AT, CZ, DE, FR, IE, PT, SK	-
Fruit and vegetables			
2005	2	MSs: BE, LV	-
2007	2	MSs: IE, NL	-
2008	1	MS: RO	-
Other food			
2005	1	MS: IE	-
2006	1	MS: IE	-
2007	2	MSs: IE, SI	-
2008	2	MSs: AT, CZ	-
2009	3	MSs: HU, IE, PT	-

Note: MSs reporting >24 samples per food category per sampling unit were included.

[11] Verocytotoxin producing *E. coli* (VTEC) is also known as shiga toxin producing *E. coli* (STEC).

3.5.1. VTEC in food

3.5.1.1. Bovine meat and product thereof

VTEC and VTEC O157 were reported in 0.8% and 0.4% respectively in 35,886 single samples of meat of bovine origin (Table VT2). Additionally, VTEC was reported in 0.4% of 9,993 batch based samples of bovine meat. The data for fresh and minced meat from bovine animals (single samples) are presented in detail in Table VT3. There was no evident difference in the occurrence of VTEC between different years or in samples taken at different stages of production. The highest proportion of positive VTEC O157 samples in fresh meat was 14.9% reported by Spain in fresh bovine meat sampled at slaughter.

The data for VTEC in fresh and minced meat from bovine animals are presented as pooled data in Table VT4. VTEC was reported in 1.2%, 0.5%, and 0.8% in fresh non-RTE bovine meat from slaughter, processing, and retail and VTEC O157 was reported from 1.1%, 0.2% and 0.1% of the samples taken at slaughter, processing, and retail.

Belgium reported data for the prevalence of VTEC O157 on bovine carcass swab samples (1,600 cm^2) from 2004 to 2009. The samples were taken at slaughterhouses. The number of investigated carcasses ranged from 995 to 2,554 per year, and the VTEC O157 prevalence ranged from 0.4% to 1.4%. Data are not presented in tables and figures.

In 2007, France reported an investigation of 3,605 samples of minced meat investigated at processing plants. The samples were investigated for O26, O103, O111, O145 and O157 using a PCR based approach. VTEC was isolated from 11 (0.3%) samples and the isolated serogroups were VTEC O157 (5 isolates), VTEC O103 (3 isolates), VTEC O26 (2 isolates), and VTEC O101 (1 isolates). Data are not presented in tables and figures.

France reported similar data on trimmings used to produce minced meat in 2008. A total of 3,992 samples were investigated and VTEC was detected in 0.3% of the samples. Two samples were VTEC O157 positive and five and three samples were positive for VTEC O103 and VTEC O111 respectively. Data are not presented in tables and figures.

The UK provided data on the occurrence of VTEC O157 on carcass swab samples taken at the retail level. In a national survey from 2008 a total of 3,249 samples were investigated. One sample was VTEC O157 positive. Data are not presented in tables and figures.

Table VT2. VTEC in different types of foodstuffs, single samples, 2004-2009 (pooled data)

	N	VTEC % pos	VTEC O157 % pos
Single			
Meat from broilers (Gallus gallus)	309	0	0
Meat from pig	7,094	0.7	<0.1
Meat from bovine animals	35,886	0.8	0.4
Meat from sheep	2,057	1.1	<0.1
Meat from poultry, unspecified	335	13.1	0
Meat from wild game - land mammals	507	8.5	0.2
Vegetables	1,938	0	0
Cheeses made from sheep's milk	541	0.4	0
Cheeses, made from unspecified milk	194	0	0
Cheeses made from cows' milk	3,481	1.4	0.1
Cheeses made from goats' milk	689	1.3	0.3
Dairy products (excluding cheeses)	825	0	0
Milk from other animal species or unspecified	321	0	0
Milk, cows'	1,936	1.3	0.1
Batch			
Meat from broilers (Gallus gallus)	105	0	0
Meat from pig	4,252	0	0
Meat from bovine animals	9,933	0.4	<0.1
Meat from sheep	109	0	0
Meat from poultry, unspecified	75	1.3	1.3
Vegetables	64	0	0
Seeds, sprouted	29	0	0
Dairy products (excluding cheeses)	102	0	0
Milk, cows'	55	0	0

Table VT3. VTEC in fresh and minced meat from bovine animals, single samples, 2004-2006

	2004			2005			2006		
	N	VTEC % pos	VTEC O157 % pos	N	VTEC % pos	VTEC O157 % pos	N	VTEC % pos	VTEC O157 % pos
Slaughter									
Belgium	1,319	1.4	1.4	2,554	1.1	1.1	1,214	0.9	0.9
Bulgaria	-	-	-	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	-	-	-
Ireland	-	-	-	-	-	-	-	-	-
Italy	80	0	0	-	-	-	-	-	-
Slovenia	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	-	-	NS	NS	NS
Norway	1,252	0	0	-	-	-	-	-	-
Processing	-	-	-	-	-	-	-	-	-
Belgium	-	-	-	588	0.5	0.3	-	-	-
Bulgaria	-	-	-	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	-	-	-
France	-	-	-	-	-	-	-	-	-
Germany	28	0	0	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	-	-	-
Italy	57	0	0	-	-	-	-	-	-
Slovenia	-	-	-	-	-	-	153	0	0
Spain	-	-	-	-	-	-	131	4.6	1.5
Retail	-	-	-	-	-	-	-	-	-
Belgium	-	-	-	171	0.6	0.6	125	1.6	1.6
France	-	-	-	-	-	-	-	-	-
Germany	102	2.9	0	-	-	-	-	-	-
Hungary	-	-	-	-	-	-	-	-	-
Ireland	-	-	-	160	0.6	0.6	NS	NS	NS
Italy	467	0	0	-	-	-	-	-	-
Latvia	-	-	-	-	-	-	-	-	-
Luxembourg	-	-	-	-	-	-	-	-	-
Netherlands	-	-	-	-	-	-	-	-	-
Poland	-	-	-	-	-	-	-	-	-
Romania	-	-	-	-	-	-	-	-	-
Slovenia	-	-	-	-	-	-	-	-	-
Spain	-	-	-	-	-	-	NS	NS	NS
Sweden	54	0	0	-	-	-	-	-	-
United Kingdom	-	-	-	-	-	-	-	-	-
MS total									
Slaughter	NS	NS	NS	NS	NS	NS	NS	NS	NS
Processing	NS	NS	NS	NS	NS	NS	NS	NS	NS
Retail	NS	NS	NS	NS	NS	NS	NS	NS	NS

(continue next page)

Table VT3 (contd.). VTEC in fresh and minced meat from bovine animals, single samples, 2007-2009

	2007			2008			2009		
	N	VTEC % pos	VTEC O157 % pos	N	VTEC % pos	VTEC O157 % pos	N	VTEC % pos	VTEC O157 % pos
Slaughter									
Belgium	1,611	0.4	0.2	1,353	0.9	0.9	995	1.0	1.0
Bulgaria	148	0	0	-	-	-	-	-	-
Hungary	144	0	0	219	0.5	0.5	-	-	-
Ireland	-	-	-	-	-	-	109	3.7	3.7
Italy	-	-	-	-	-	-	-	-	-
Slovenia	164	0	0	-	-	-	-	-	-
Spain	57	1.8	1.8	NS	NS	NS	303	14.9	14.9
Norway	-	-	-	-	-	-	-	-	-
Processing	-	-	-	-	-	-	-	-	-
Belgium	286	0	0	766	0	0	294	0	0
Bulgaria	1,529	0.3	0	-	-	-	-	-	-
Estonia	-	-	-	-	-	-	75	0	0
France	3,605	0.3	0.1	-	-	-	-	-	-
Germany	38	2.6	0	98	2.0	0	116	3.4	0
Hungary	-	-	-	-	-	-	298	0	0
Italy	-	-	-	-	-	-	-	-	-
Slovenia	-	-	-	265	0.4	0.4	-	-	-
Spain	144	0	0	83	0	0	NS	NS	NS
Retail	-	-	-	-	-	-	-	-	-
Belgium	152	0	0	138	0	0	-	-	-
France	-	-	-	-	-	-	1,527	0.1	0.1
Germany	458	2.4	0	480	2.3	0	847	4.7	0
Hungary	-	-	-	81	0	0	128	0	0
Ireland	46	0	0	NS	NS	NS	NS	NS	NS
Italy	-	-	-	45	0	0	-	-	-
Latvia	-	-	-	131	0	0	-	-	-
Luxembourg	-	-	-	-	-	-	307	0.3	0.3
Netherlands	1,532	<0.1	<0.1	784	0.1	0.1	1,786	<0.1	<0.1
Poland	-	-	-	-	-	-	162	2.5	0
Romania	-	-	-	-	-	-	220	0	0
Slovenia	385	1.0	0	-	-	-	-	-	-
Spain	69	1.4	0	138	5.8	0	35	0	0
Sweden	-	-	-	-	-	-	-	-	-
United Kingdom	-	-	-	3,249	<0.1	<0.1	-	-	-
MS total									
Slaughter	2,124	0.3	0.2	NS	NS	NS	NS	NS	NS
Processing	5,602	0.3	<0.1	NS	NS	NS	NS	NS	NS
Retail	2,642	0.6	<0.1	5,046	0.4	<0.1	5,012	1.0	<0.1

NS: Not sufficient data, <25 samples reported by the MS or less than five reporting MSs for the calculation of MS totals.

Table VT4. VTEC in fresh and minced meat from bovine animals, single samples, 2004-2009 (pooled data)

	Non-RTE Fresh			Non-RTE Processed meat(a)			RTE Minced meat		
	N	VTEC % pos	VTEC O157 % pos	N	VTEC % pos	VTEC O157 % pos	N	VTEC % pos	VTEC O157 % pos
Slaughter									
Belgium	7,727	<0.1	<0.1	-	-	-	-	-	-
Bulgaria	148	0	0	-	-	-	-	-	-
Hungary	363	<0.1	<0.1	-	-	-	-	-	-
Ireland	86	<0.1	<0.1	NS	NS	NS	-	-	-
Italy	80	0	0	-	-	-	-	-	-
Poland	NS	NS	NS	-	-	-	-	-	-
Slovenia	164	0	0	-	-	-	-	-	-
Spain	395	<0.1	<0.1	-	-	-	-	-	-
Norway	1,252	0	0	-	-	-	-	-	-
Processing[(a)]									
Belgium	1,653	<0.1	<0.1	281	0	0	-	-	-
Bulgaria	-	-	-	-	-	-	1,529	<0.1	0
Estonia	75	0	0	-	-	-	-	-	-
France	-	-	-	-	-	-	3,605	<0.1	<0.1
Germany	157	<0.1	0	-	-	-	123	<0.1	0
Hungary	264	0	0	34	0	0	-	-	-
Italy	57	0	0	-	-	-	-	-	-
Portugal	NS	NS	NS	NS	NS	NS	-	-	-
Slovenia	418	<0.1	<0.1	-	-	-	-	-	-
Spain	363	<0.1	<0.1	-	-	-	-	-	-
Retail									
Austria	NS	NS	NS	NS	NS	NS	-	-	-
Belgium	94	<0.1	<0.1	-	-	-	492	<0.1	<0.1
Estonia	27	0	0	NS	NS	NS	-	-	-
France	-	-	-	-	-	-	1,527	<0.1	<0.1
Germany	887	<0.1	0	-	-	-	1,000	<0.1	0
Hungary	71	0	0	138	0	0	-	-	-
Ireland	NS	NS	NS	199	<0.1	0	-	-	-
Italy	512	0	0	-	-	-	-	-	-
Latvia	95	0	0	36	0	0	-	-	-
Luxembourg	307	<0.1	<0.1	-	-	-	-	-	-
Netherlands	820	<0.1	<0.1	1,073	<0.1	<0.1	2,209	<0.1	<0.1
Poland	162	<0.1	0	-	-	-	-	-	-
Portugal	NS	NS	NS	-	-	-	-	-	-
Romania	220	0	0	-	-	-	-	-	-
Slovenia	385	<0.1	0	-	-	-	-	-	-
Spain	264	<0.1	0	-	-	-	-	-	-
Sweden	54	0	0	-	-	-	-	-	-
United Kingdom	3,249	<0.1	<0.1	-	-	-	-	-	-
Total									
Slaughter	10,215	1.2	1.1	NS	NS	NS	NS	NS	NS
Processing	2,987	0.5	0.2	NS	NS	NS	NS	NS	NS
Retail	7,147	0.8	<0.1	1,468	0.2	<0.1	5,228	0.7	<0.1

NS: Not sufficient data, <25 samples reported by the MS or less than five reporting MSs for the calculation of MS totals.
(a): Processed meat include minced meat, meat preparations and meat products.

3.5.1.2. Pig meat and products thereof

The overall occurrence of VTEC and VTEC O157 in single samples of pig meat was 0.7% and 0.1% respectively (Table VT2). More detailed data about VTEC in fresh and processed pig meat, single samples for the period 2004-2009 are reported in Table VT5. The highest prevalence, 2.0% was reported by Portugal from fresh meat at processing. The United Kingdom and the Netherlands reported no VTEC in two large investigations of fresh meat from retail, whereas VTEC (but not VTEC O157) was reported in fresh meat from retail by Germany. VTEC O157 in single samples of fresh and processed meat was reported in smaller investigations (<126 single samples) by Ireland, Italy, Portugal, and Spain (all sampling stages).

Additionally, a total of 4,252 pig meat batches were reported negative for VTEC; the Czech Republic investigated 910 batches of fresh pig meat at slaughter and Poland investigated 3,308 batches of RTE meat products and 27 batches of non-RTE minced meat at processing. Data are not presented in tables and figures.

Table VT5. VTEC in fresh and processed[(a)] pig meat, single samples, 2004-2009 (pooled data)

	Fresh			Processed meat(a)			Processed meat(a)		
	N	VTEC % pos	VTEC O157 % pos	N	VTEC % pos	VTEC O157 % pos	N	VTEC % pos	VTEC O157 % pos
Slaughter									
Czech Republic	149	6.7	0	-	-	-	-	-	-
Spain	46	4.3	0	-	-	-	-	-	-
Processing									
Estonia	80	0	0	-	-	-	-	-	-
Italy	NS	NS	NS	91	0	0	-	-	-
Portugal	25	16.0	0	51	2.0	2.0	NS	NS	NS
Spain	101	0	0	85	1.2	1.2	-	-	-
Retail									
Austria	NS	NS	NS	NS	NS	NS	NS	NS	NS
Estonia	NS	NS	NS	29	0	0	NS	NS	NS
Germany	407	1.7	0	440	1.1	0	240	0.8	0
Greece	NS	NS	NS	73	0	0	-	-	-
Ireland	NS	NS	NS	29	3.4	3.4	92	0	0
Italy	125	0.8	0.8	234	0	0	-	-	-
Netherlands	1,055	0	0	212	0	0	666	0	0
Portugal	74	5.4	0	-	-	-	-	-	-
Spain	86	14.0	0	85	1.2	1.2	-	-	-
United Kingdom	1,693	0	0	-	-	-	1,096	0	0
MS total									
Retail	3,440	0.7	<0.1	1,102	0.6	0.2	NS	NS	NS

NS: Not sufficient data, <25 samples reported by the MS or less than five reporting MSs for the calculation of MS totals.
(a): Processed meat includes minced meat, meat preparations and meat products.

3.5.1.3. Sheep meat and products thereof

VTEC was isolated from 1.1% of single samples of sheep meat, but none of these belonged to serogroup O157 (Table VT2). The data on fresh sheep meat from single samples reported by the MSs and non-MSs are presented in Table VT6. The occurrence of VTEC in sheep ranged from 0% to 13.8%. The Netherlands was the only MS to report data on processed meat from sheep; 37 single samples of meat preparations, of which none were VTEC positive;

Poland was the only MS to report batch based data on sheep meat and 107 batches were all reported negative for VTEC. The United Kingdom provided data from a survey on the occurrence of VTEC

O157 on carcass swab samples taken at the retail level in 2008, and all 1,056 samples were negative for VTEC O157. Data are not presented in tables and figures.

Table VT6. VTEC in fresh sheep meat, single samples, 2004-2009 (pooled data)

	N	VTEC % pos	VTEC O157 % pos
Slaughter			
Ireland	31	0	0
Spain	160	0.6	0
Norway	243	0	0
Processing			
Spain	29	13.8	0
Retail			
Austria	59	6.8	0
Germany	148	8.1	0
Netherlands	219	0	0
Spain	29	0	0
United Kingdom	1,056	0	0

3.5.1.4. Other animals and products thereof

VTEC was not isolated from a total of 309 single samples and 105 batch based samples of broilers. However, VTEC was reported in 13.1% of single samples of unspecified poultry meat by the Czech Republic (31/82). VTEC O157 was found in one batch based sample from retail of unspecified poultry meat by Latvia in 2005.

VTEC was detected in 8.5% of single samples of meat from wild game. All positive findings were reported by Germany (41/422) in an investigation conducted in 2008; one sample was positive for VTEC O157.

3.5.1.5. Milk and dairy

VTEC was reported in 1.3% of single samples of cow's milk and VTEC O157 was found in 0.1% of the samples (Table VT2). More detailed data about VTEC in single samples of milk and cheese products are presented in Table VT7 as pooled data due to the limited amount of data reported by MSs. The highest prevalence of 4.7% of single samples of cow's milk positive for VTEC was reported by Germany. VTEC was also detected in cow's milk from Italy and Slovakia; each MS reported one positive sample in investigations of 128 and 269 samples, respectively.

In total, VTEC was reported in single samples of cheeses made from cow, sheep and goat's milk at levels of 1.4%, 0.4%, and 1.3%, and VTEC O157 was isolated from cheeses made from cow and goat's milk at levels of 0.1% and 0.3% (Table VT2).

At MS level, the proportion of positive single samples of VTEC in cheese made from cow's milk ranged from 0% to 1.1% (and 2.4% reported from Switzerland) (Table VT7). Belgium was the only MS to report VTEC O157 in cheeses made from cow's milk collected at the farm, the proportion of positive VTEC O157 samples was 1.3%

France provided data on one batch based survey on cheeses made from goat's milk with no positive batches out of 871 batches analysed. Data are not presented in tables and figures

Table VT7. VTEC in milk and cheese, single samples, 2004-2009 (pooled data)

	N	VTEC % pos	VTEC O157 % pos
Milk, cows			
Farm			
Austria	101	0	0
Belgium	123	0	0
Germany	122	4.9	0
Hungary	38	0	0
Italy	128	0.8	0.8
Slovakia	269	0.4	0.4
Processing			
Germany	1,039	1.6	0
Retail			
Latvia	79	0	0
Cheeses made from cows' milk			
Farm			
Belgium	375	1.3	1.3
Processing			
Belgium	66	0	0
France	1,442	0.8	0
Italy	45	0	0
Switzerland	1,344	2.4	0
Retail			
Belgium	93	0	0
Germany	87	1.1	0

3.5.1.6. Fruits and vegetables

The amount of data on VTEC in fruits and vegetables reported from 2004 to 2009 were limited to 1,938 single samples and 64 batches in which no VTEC was detected. The Netherlands reported one investigation of non-RTE pre-cut vegetables analysed for VTEC O157 and Belgium reported an investigation of 56 non-RTE non pre-cut vegetables. Batch based data were reported by Latvia and Romania. Latvia analysed 29 batches of RTE sprouted seeds and Romania analysed 46 batches of

unspecified vegetables. Ireland was the only MS to report data on different types of juices. In total, 181 single samples were investigated.

In the EFSA database was reported a few findings of VTEC in fruits and vegetables were reported, however, as information regarding sampling stage or total number of tested units was not reported, these data were not included in the detailed analyses of VTEC in Chapter 3. In 2008, the Netherlands reported findings of VTEC O157 in lettuce in two studies (1.3% out of 298 single samples and 0.6% out of 172 samples), Spain reported findings of unspecified VTEC in vegetables (8.7% out of 23 single samples), and Portugal reported that one sample of pre-cut ready-to-eat fruit and vegetables contained VTEC non-O157 (number of tested samples not reported). In 2009, Sweden reported VTEC O157 in vegetables (5.3% out of 57 single samples).

These findings indicate that vegetables might be a significant source of human VTEC O157 infections.

3.5.2. Serotypes

The distribution of VTEC serotypes isolated from different food categories is presented in Table VT8. The serotype list was compiled using all available data regardless of sample size, sampling stage, sampling unit etc. In total, 453 isolates were reported by MSs from 2004 to 2009.

VTEC O157 or O157:H7 were reported by 16 MSs, Austria, Belgium, France, Germany, Hungary, Ireland, Italy, Latvia, Luxembourg, the Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, and the United Kingdom. VTEC O157 and VTEC O157:H7 were by far the most frequently reported serogroup and a total of 311 (69%) VTEC O157 isolates were reported.

VTEC non-O157 serotypes were reported by Austria, France, Germany, Ireland, Spain, and Switzerland. In total, 141 isolates of non-O157 VTEC serogroups were reported. The majority, 87%, of the non-O157 serotype data were reported by Austria and Germany. The most frequently reported serogroup was O146 followed by O103, O26 and O91. O146 was isolated from 11 samples of unspecified meat products. VTEC O103 was isolated from bovine and sheep meat and VTEC O26 was isolated from bovine and unspecified meat. One isolate of O104 was isolated from unspecified meat products.

Table VT8. Distribution of VTEC serotypes in different food categories, 2004-2009 (pooled data)

Serotype[a,b]	Meat from Bovine animals	Meat from sheep	Meat from pig	Unspecified meat	Bovine dairy products	Non-bovine dairy products	Vegetables	Other food
O157	94	6	19	16	7	9	8	5
O157:H7	123	-	9	5	6	2	-	2
O146	1	1	-	11	-	-	-	-
O146:H21	-	-	-	1	-	-	-	-
O103	6	4	-	1	-	-	-	-
O103:H2	1	-	-	-	-	-	-	-
O26	7	-	-	2	-	-	-	-
O91	2	-	-	6	1	-	-	-
O113	1	-	-	6	-	1	-	-
O22	1	-	-	2	5	-	-	-
O22:H40	-	-	-	1	-	-	-	-
O8	-	-	-	6	2	-	-	-
O174	-	-	-	7	-	-	-	-
O2	-	-	-	5	1	-	-	-
O21	-	-	-	4	1	-	-	-
O179	-	-	-	4	-	-	-	-
O36	-	-	-	4	-	-	-	-
O100:H-	1	-	-	2	-	-	-	-
O136	-	-	-	-	2	-	-	1
O111	2	-	-	-	-	-	-	-
O113:H4	1	-	-	1	-	-	-	-
O153	-	-	-	2	-	-	-	-
O22:H8	-	-	-	1	1	-	-	-
O4	1	-	-	1	-	-	-	-
O59	-	-	-	1	-	-	-	1
O74	-	-	-	2	-	-	-	-

Note: All data with information on serotype were included, this include data with insufficient information on sampling stage and sampling unit.
(a): Additionally, the following serotypes were reported O1:H10, O2:H6, O5, O6:H-, O6:H10, O12, O15, O27, O46, O75:H-, O76, O79, O84, O88, O91:H21, O100, O102, O104, O110, O128, O128:H-, O128abc:H2, O135:H4, O150, O157:H19, O166, O166:H28. All types were reported with only one finding.
(b): 87% of the non-O157 serotype data were reported by Austria and Germany.

3.5.3. Discussion

A total of 70,837 single samples and batch based samples were included in the present analyses of VTEC in food from 2004 to 2009. During this period, MSs have reported a total of 189,372 single samples and batch based samples which represent the occurrence of VTEC of domestically produced food, however due to missing information (e.g. sampling stage) a substantial number of data was not included in the analysis (see Chapter 1 (Material and Methods) for more details about the data quality).

VTEC can be found in many different types of foods, but generally the occurrence of VTEC, and in particular VTEC O157, was low. It was neither possible identify any trends in the occurrence of VTEC over the years 2004-2009 and nor was it possible to spot any differences between the occurrence in different countries.

Most data received on VTEC in food and animals were concentrated on the VTEC O157 serogroup. For the other VTEC serogroups, the data provided by reporting countries were sparse. Austria and Germany were providing 87% of the VTEC serotype data, and this should be taken into account when these data were interpreted.

It was difficult to assess the potential human health risk of the presence of VTEC in animals and food, since the pathogenicity to humans seems to be linked to certain VTEC serogroups. According to the scientific opinion[12] from EFSA's Biological Hazards panel on the monitoring of VTEC, the serogroups that are currently to be considered as the most important regarding pathogenicity to humans are O26, O91, O103, O111, O157 and O145. These serotypes, with the exception of O145, were reported from food by MSs during the period.

[12] Scientific opinion of the panel on Biological Hazards on request from EFSA on monitoring of verotoxigenic *Escherichia coli* (VTEC) and identification of human pathogenic VTEC types. The EFSA journal (2007) 579, 1-61.

3.6. *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 wild boars and hares, *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.

Only few MSs reported data on *Brucella* in food during the period 2004-2009 (Table BR1) and majority of data were from milk.

3.6.1. *Brucella* in food

Only Belgium, Poland and Portugal provided information on *Brucella* in food during the period 2004 to 2009. All data were reported in 2008. Belgium reported 65,572 batches of raw cow's milk collected at processing, Poland reported 340 samples of raw cow's milk collected at the farm and Portugal reported 29 single samples from ready-to-eat cheeses made from raw or pasteurised milk from cows, goats or sheep. All samples were negative for *Brucella*.

3.6.2. Discussion

A total of 67,303 single samples and batch based samples were included in the present analyses of *Brucella* in food from 2004 to 2009. During the period, MSs have reported a total of 440,850 single samples and batch based samples which represent the occurrence of *Brucella* of domestically produced food, however due to missing information (e.g. sampling stage) a substantial number of data were omitted before analysis (see Chapter 1 for more details about the data quality).

Data from three MSs were included in the analyses and Belgium reported 97% of all data. There were no findings of *Brucella* in the reported data.

3.7. Histamine

Histamine is a biogenic amine, produced by bacterial breakdown of histidine. Histamine formation is mainly associated with spoiled fish, often as a result of improper handling and inadequate storage temperatures. Certain species of fish have a natural high level of histidine in the flesh e.g. tuna, mackerel, sardine, bluefish and herring, which can be converted into histamine and thereby cause poisoning.

Symptoms of histamine poisoning are seen shortly after consumption of spoiled fish, usually after two minutes to two hours and can include rash, facial flushing, sweating, abdominal cramps, diarrhoea and headache. These symptoms will often resolve within a few hours, however more severe but rare symptoms as respiratory problems, swelling of the tongue and hypotension will require medical treatment.

Reporting of data on histamine were included in the reporting system in 2006 and between 9 and 15 MSs reported data on histamine in food during the period 2006 to 2009 (Table HI1). Majority of data were from fish and fishery products.

Table HI1. Overview of countries reporting data included in the analysis for histamine, 2004-2009

Food categories	No of reporting MSs		Non-MSs
Fish and fishery products			
2006	9	**MSs:** AT, BE, CZ, EE, HU, PO, PT, SK, SI	
2007	14	**MSs:** AT, BE, CZ, EE, GR, HU, IT, MT, NL, PO, PT, RO, SK, SI	**Non-MS:** NO
2008	10	**MSs:** AT, BE, CZ, EE, HU, PO, PT, RO, SK, SI	**Non-MS:** NO
2009	15	**MSs:** AT, BE, BG, CZ, EE, FR, GR, HU, IE, LT, MT, PO, PT, RO, SK	**Non-MS:** NO
Other food[(a)]			
2006	4	**MSs:** DK, EE, LT, PT	
2007	2	**MSs:** IE, PO	
2008	3	**MSs:** AT, IE, IT	
2009	4	**MSs:** AT, EE, HU, IT	

(a): Other food include molluscan shellfish, crustaceans, species and herbs, red meat, cheeses made form cow's milk and chocolate

3.7.1. Compliance with histamine food safety criteria

The EU Regulation (EC) No 2073/2005 as amended lays down food safety criteria for histamine in certain fish and fish products from fish species associated with a high amount of histidine; particularly fish species of the families: *Scombridae* (e.g. mackerel, tuna, bonito), *Clupeidae* (e.g. herring, sardine), *Engraulidae* (e.g. anchovy), *Coryfenidae* (e.g. dorado), *Pomatomidae* (e.g. blue fish) and *Scombresosidae* (e.g. talang queenfish).

The histamine criteria laid down by Regulation (EC) No 2073/2005 on fishery products from fish species which are especially rich in histidine require that:

The mean value must not exceed 100 mg/kg

Two of nine samples may have a value of more than 100 mg/kg but less than 200 mg/kg

No sample may have a value exceeding 200 mg/kg

The histamine criteria laid down by Regulation (EC) No 2073/2005 for fishery products which have undergone enzyme ripening treatment in brine require that:

The mean value must not exceed 200 mg/kg

Two of nine samples may have a value of more than 200 mg/kg but less than 400 mg/kg

No sample may have a value exceeding 400 mg/kg

Both criteria are applied to products placed on the marked during the shelf-life. The regulation came into force on January 2006 and MSs had the possibility to report data on histamine from 2006. Every year some countries have provided data. Due to the limited dataset, data from investigations with less than 25 samples have been included as well as data based on suspect sampling and surveys, and data with no information on sampling stage (e.g. slaughterhouse or retail) or programme context (e.g. monitoring, surveillance). As the majority of fish species covered by the Regulation (EC) No 2073/2005 is imported to the EU, data on imported fish products were included in the analysis. Whereas data based on HACCP and own-check sampling or with no information on sampling unit (single/batch) were excluded.

3.7.2. Histamine in food

In total, 19 MSs and one non-MS reported data on histamine in foodstuffs from 2006 to 2009. For all foodstuffs, no trends were observed during the period and data were pooled for all years in the analyses and presentation.

The food safety criteria on histamine are set at batch level except for fish species which are especially rich in histidine, where sampling at retail may be based on single samples. However, more than half of the investigations did not include information on sampling stage. Most of the investigations with information on sampling context were reported as part of surveillance or monitoring programmes.

Unfortunately, it was only possible to evaluate whether the investigations were in compliance with all the requirements set out in the Regulation, as the reporting system does not provide the possibility of reporting singles sample results for batches. For data reported on batch level, only compliance with the criteria regarding the maximum mean mg/kg fish could be evaluated (assuming mean mg/kg was reported). In addition, results reported as single samples could be evaluated regarding compliance with the criteria requiring a maximum amount of mg histamine per kg fish per sample.

In total, 11 MSs and one non-MS reported single sample data from fishery products from fish species associated with a high amount of histidine, but not enzyme maturated (Table HI2). Austria, France, Hungary, Italy, Malta, Portugal, Romania and Slovenia reported between 0.7% and 16.7% of single samples with more than 100 mg histamine/kg. Hungary reported the highest proportion of positive samples followed by Malta. Austria, Belgium, France and Hungary reported data from retail which was covered by the food safety criteria. All countries except for Belgium reported samples in non-compliance with the criteria (>200 mg histamine/kg), ranging 0.3% to 33.3% of samples tested.

Twelve MSs reported batch based data of fishery products from fish species associated with a high amount of histidine, but not enzyme maturated (Table HI3). Belgium, Hungary, Poland, Portugal and Slovakia reported between 0.2% and 13.3% of batches with more than 100 mg histamine/kg. Belgium reported the highest proportion of positive batches followed by Portugal. Most batches sampled at retail were in compliance with the criteria of a mean value of less than 100 mg histamine/kg, only Belgium (9.7%) and Portugal (8.8) reported batches in non-compliance with the criteria. Please note that batches from Hungary and Slovakia, where sampling stage was unspecified, also report mean values above 100 mg histamine/kg.

Single sample data for fishery products which have undergone enzyme maturation treatment in brine were reported by Austria, Estonia, Italy, Malta and Portugal, and only Austria and Italy reported

positive findings ranging from 1.3% to 15.8% (Table HI4). Majority of data were reported without sampling stage.

Batches of fishery products containing more than a mean of 200 mg histamine/kg were reported by Portugal (5 of 12 batches), Romania (3 of 56 batches) and Slovakia (1 of 11 batches) (Table HI4).

Unspecified fishery products were reported by eight MSs and one non-MS (Table HI5). Austria, Denmark, Norway, Ireland and Italy reported between 2.5% and 33.3% single samples with more than 100 mg histamine/kg; Denmark reported the highest proportion of positive samples. Italy reported 2.7% and 11.5% of batch based samples positive.

Belgium, France, Greece, Hungary, Poland, Romania and Slovakia provided information on the country of origin and there were no difference between domestic and imported fish products, however majority of data did not have information on the country of origin (Table HI2-HI5).

Only very few samples of meat and meat products, fruit and vegetables, milk, dairy and cheeses, and other food types were tested for histamine. In total, 270 single samples and 212 samples with unspecified sampling unit were reported from 2006 to 2009 and two out of five single samples of cheese made from cow milk were positive. Data are not presented in tables and figures.

Table HI2. Histamine in fishery products from fish species associated with a high amount of histidine - not enzyme maturated, single samples, 2004-2009 (pooled data)

	Origin	N	>100 - ≤ 200 mg/kg % pos	>200 - ≤400 mg/kg % pos	> 400 mg/kg % pos	Non-compliance Samples >200 mg/kg [(c)] % pos
Processing[(a)]						
France	Domestic	31	0	0	0	-
France	Imported	17	0	5.9	0	-
Portugal	Unspecified	53	0	1.9	0	-
Slovenia	Unspecified	20	0	5.0	0	-
Norway	Unspecified	10	0	0	0	-
Retail[(b)]						
Austria	Unspecified	118	2.5	0	1.7	1.7
Belgium	Unspecified	7	0	0	0	0
France	Domestic	287	0	0.7	0.3	1.0
France	Imported	232	0.9	0	1.3	1.3
Hungary	Imported	72	0	1.4	0	1.4
Hungary	Unspecified	6	16.7	0	33.3	33.3
Unspecified						
Austria	Unspecified	193	3.1	1.6	3.1	-
Belgium	Unspecified	7	0	0	0	-
Estonia	Unspecified	1	0	0	0	-
Greece	Imported	24	0	0	0	-
Greece	Unspecified	10	0	0	0	-
Hungary	Unspecified	12	0.0	0	0	-
Italy	Unspecified	1,240	0.8	0.3	1.2	-
Malta	Unspecified	49	2.0	10.2	2.0	-
Portugal	Unspecified	5	0	0	0	-
Romania	Unspecified	276	0.7	0	0	-
Norway	Unspecified	113	0	0	0	-

(a): Processing include data from cutting plant.
(b): Retail include catering, whole sale and border control.
(c): Please note that in order for a batch to comply with the histamine criteria laid down by Regulation (EC) No 2073/2005 on fishery products from fish species which are especially rich in histidine, no sample may have a value exceeding 200 mg/kg, two of nine samples may have a value of more than 100 mg/kg but less than 200 mg/kg and the mean value must not exceed 100 mg/kg. The criteria only apply for sampling at the retail level.

Table HI3. Histamine in fishery products from fish species associated with a high amount of histidine - not enzyme maturated, batch based data, 2004-2009 (pooled data)

	Origin	N	>100 - ≤ 200 mg/kg % pos	>200 - ≤ 400 mg/kg % pos	> 400 mg/kg % pos	Non-compliance mean >100 mg/kg [c] % pos
Processing[a]						
Poland	Domestic	442	0.7	0	0	-
Poland	Unspecified	9	0	0	0	-
Slovakia	Domestic	29	0	0	0	-
Retail[b]						
Belgium	Imported	48	0	0	0	0
Belgium	Unspecified	31	0	6.5	3.2	9.7
Czech Republic	Unspecified	29	0	0	0	0
Portugal	Unspecified	114	2.6	0.9	5.3	8.8
Romania	Domestic	17	0	0	0	0
Slovakia	Domestic	6	0	0	0	0
Slovakia	Imported	10	0	0	0	0
Unspecified						
Belgium	Unspecified	128	0	13.3	0	-
Czech Republic	Unspecified	34	0	0	0	-
Hungary	Unspecified	76	0	1.3	0	-
Italy	Unspecified	477	0	0	0	-
Lithuania	Unspecified	105	0	0	0	-
Netherlands	Unspecified	1,792	0	0	0	-
Poland	Unspecified	332	0.9	0	0	-
Portugal	Unspecified	186	0	0.5	0	-
Romania	Imported	7	0	0	0	-
Slovakia	Unspecified	509	0.2	0.2	0.4	-
Slovenia	Unspecified	10	0	0	0	-
Bulgaria	Unspecified	183	0	0	0	-

(a): Processing include cutting plant.
(b): Retail include catering, whole sale and border control.
(c): Please note that in order for a batch to comply with the histamine criteria laid down by Regulation (EC) No 2073/2005 on fishery products from fish species which are especially rich in histidine, no sample may have a value exceeding 200 mg/kg, two of nine samples may have a value of more than 100 mg/kg but less than 200 mg/kg and the mean value must not exceed 100 mg/kg. The criteria only apply for sampling at the retail level. It is assumed that mean mg/kg is reported for batch data.

Table HI4. Histamine in fishery products which have undergone enzyme maturation treatment in brine, 2004-2009 (pooled data)

	Origin	N	>100 - ≤ 200 mg/kg % pos	>200 - ≤ 400 mg/kg % pos	> 400 mg/kg % pos	Non-compliance sample >400 mg/kg % pos	Non-compliance mean >200 mg/kg[(c)] % pos
Single							
Processing[(a)]							
Portugal	Unspecified	16	0	0	0	-	-
Retail[(b)]							
Austria	Unspecified	169	0.6	2.4	3.0	3.0	-
Unspecified							
Austria	Unspecified	19	0	0	15.8	-	-
Estonia	Unspecified	3	0	0	0	-	-
Italy	Unspecified	79	0	1.3	0	-	-
Malta	Unspecified	1	0	0	0	-	-
Portugal	Unspecified	1	0	0	0	-	-
Batch							
Processing							
Poland	Imported	98	4.1	0	0	-	-
Retail							
Romania	Domestic	18	0	0	0	-	0
Unspecified							
Bulgaria	Unspecified	76	0	0	0	-	-
Estonia	Imported	7	0	0	0	-	-
Poland	Unspecified	45	40.0	0	0	-	-
Portugal	Unspecified	12	0	41.8	0	-	-
Romania	Imported	56	0	5.4	0	-	-
Slovakia	Unspecified	11	0	0	9.1	-	-
Slovenia	Unspecified	10	0	0	0	-	-

(a): Processing include cutting plant.
(b): Retail include catering, whole sale and border control.
(c): Please note that in order for a batch to comply with the histamine criteria laid down by Regulation (EC) No 2073/2005 for fishery products which have undergone enzyme ripening treatment in brine, in addition to the requirement that the mean value must not exceed 200 mg/kg, two of nine samples may have a value of more than 200 mg/kg but less than 400 mg/kg and no sample may have a value exceeding 400 mg/kg. The criteria only apply for sampling at the retail level. It is assumed that mean mg/kg is reported for batch data.

Table HI5. Histamine in fishery products not covered by the Regulation (EC) No 2073/2005, 2004-2009 (pooled data)

	Origin	Type of product	N	>100 - ≤ 200 mg/kg % pos	>200 - ≤ 400 mg/kg % pos	> 400 mg/kg % pos
Single						
Processing[(a)]						
Ireland	Unspecified	Unspecified	407	0.7	0.2	1.5
Italy	Domestic	Unspecified	225	0	0	0
Retail[(b)]						
Austria	Domestic	Raw	5	0	0	0
Austria	Imported	Unspecified	29	0	0	0
Austria	Unspecified	Raw	6	0	16.7	0
Austria	Unspecified	Unspecified	74	0	2.7	1.4
Estonia	Unspecified	Unspecified	21	0	0	0
Hungary	Unspecified	Unspecified	2	0	0	0
Italy	Domestic	Unspecified	354	0	0	0
Italy	Imported	Unspecified	245	0	0	0
Italy	Unspecified	Unspecified	3	0	0	0
Unspecified						
Denmark	Unspecified	Unspecified	57	3.5	12.3	17.5
Italy	Imported	Unspecified	426	0	0	0
Italy	Unspecified	Unspecified	887	2.4	0.3	0.5
Norway	Unspecified	smoked	35	5.7	8.6	0
Batch						
Processing						
Italy	Domestic	Unspecified	37	0	0	2.7
Poland	Domestic	Unspecified	3	0	0	0
Retail						
Italy	Domestic	Unspecified	26	0	0	11.5
Lithuania	Imported	Raw	10	0	0	0
Slovenia	Unspecified	Raw	10	0	0	0
Unspecified						
Estonia	Unspecified	non-RTE	9	0	0	0
Estonia	Unspecified	Raw	1	0	0	0
Estonia	Unspecified	RTE	17	0	0	0
Italy	Imported	Unspecified	4	0	0	0
Italy	Unspecified	Unspecified	22	0	0	0
Poland	Unspecified	Unspecified	93	0	0	0
Portugal	Unspecified	Unspecified	19	0	0	0

(a): Processing include cutting plant.
(b): Retail include catering, whole sale and border control.

3.7.3. Discussion

Only limited data were available for the analysis and for a substantial number of samples information of sampling stage was missing. In total, MSs have reported 10,118 single samples and batch based samples on histamine in food stuffs from 2006-2009.

Samples with high levels of histamine were only reported by few MSs. No difference in the proportion of positive samples along the food chain and between years was observed.

Unfortunately, it was not possible to fully evaluate if results from fishery products were in compliance with the food safety criteria for histamine as information on the number of single samples collected and analysed per batch was not reported making it impossible to evaluate two of the three criteria set out in the Regulation (EC) No 2073/2005. Further, as a substantial number of samples had no information on sampling stages, it was impossible to know if the criteria applied to this data.

Generally more information on the levels of histamine in fish and fishery products could prove important knowledge.

3.8. *Enterobacter sakazakii*

Enterobacter sakazakii, now part of the genus *Cronobacter*, is a pathogen, widely distributed in the environment. *E. sakazakii* is mainly associated with dried infant formula, milk powder and formula ingredients. In most cases, infections are caused by post processing contamination of the implicated foodstuffs. *E. sakazakii* has also been isolated from a wide range of foods such as rice, cured meat, sausages and minced meat, acidic sobia, soured tea, lettuce, and other vegetables, but only powdered infant formula has been linked to outbreaks of disease.

Clinical symptoms are rare, but can cause life-threatening neonatal meningitis and necrotizing enterocolitis in infants, and septicemia and catheter-associated infections in elderly and immunocompromised people. The symptoms include poor feeding response, irritability, grunting respirations and unstable body temperature and in a large number of neonatal cases the infection progresses into meningitis. The mortality is high and death has been reported in up to 50% of neonatal patients. Furthermore, severe neurological complications have been reported for survivors of meningitis.

Reporting of data on *E. sakazakii* were included in the reporting system in 2006 and 14 MSs reported data on *E. sakazakii* in food during the period 2006 to 2009 (Table ES1). Majority of data were from infant formula and foodstuffs intended for special nutritional use.

Table ES1. Overview of countries reporting data included in the analysis for *Enterobacter sakazakii*, 2006-2009

Food categories	No of reporting MSs	
Foodstuffs intended for special nutritional uses		
2006	5	**MSs:** AT, BE, DE, HU, IE
2007	3	**MSs:** DE, EE, SK
2008	4	**MSs:** BE, DE, HU, PT
2009	5	**MSs:** BE, DE, HU, RO, SK
Infant formulae		
2006	7	**MSs:** AT, BE, CZ, DE, EE, IE, SI
2007	8	**MSs:** AT, CZ, DE, IE, IT, LU, SI, SK,
2008	8	**MSs:** DE, EE, HU, IE, IT, MT, SI, SK
2009	11	**MSs:** AT, BE, CZ, DE, EE, HU, IE, LU, PT, SI, SK
Other food		
2006	1	**MS:** IE
2008	1	**MS:** IT
2009	1	**MS:** CZ

3.8.1. Compliance with the *Enterobacter sakazakii* food safety criteria

The EU Regulation (EC) No 2073/2005 as amended lays down food safety criteria for *Enterobacter sakazakii* in dried infant formulae and dried dietary foods for special medical purpose intended for infants below six months of age. The *Enterobacter* criterion requires:

Absence of *E. sakazakii* in 10g for products placed on the market during their shelf-life

The regulation came into force on January 2006 and MSs had the possibility to report data on *Enterobacter* from 2006. Every year, three to eight MSs have reported data. Due to the limited dataset, data from investigations with less than 25 samples has been included as well as data based on suspect sampling and surveys, and data with no information on sampling stage (e.g. slaughterhouse or retail) or programme context (e.g. monitoring, surveillance). Whereas data based on HACCP and own-check sampling or with no information on sampling unit (single/batch) were excluded. The data were analysed and reported for the first time in the present report.

3.8.2. *Enterobacter sakazakii* in food

In total, 14 MSs reported data on *E. sakazakii* in food from 2006 to 2009. Due to the limited dataset, no differences between years were observed and data from all years were pooled for the analysis. Five MSs reported data on foodstuffs intended for special nutritional use and stated it as dried dietary foods for special medical purposes intended for infants below 6 months except for Ireland that only reported data as foodstuffs intended for special nutritional use (Table ES2). In total, 1.1% of all single samples collected at retail were positive. The positive samples were reported by Slovakia and Germany. Findings of positive samples were in non-compliance with the criterion.

From 2006 to 2009, five out of 11 MSs reported positive findings of *E. Sakazakii* in infant formulae, ranging from 0.4% to 5.0% at retail (Table ES2). These findings were in non-compliance with the criterion.

The Czech Republic, Ireland and Italy reported single sample data on milk and dairy products other than cheeses and none were found positive. Ireland and Italy reported batch based data on meat and meat products and on milk, cheeses and other dairy products and none were positive. Data are note presented in tables and figures.

Table ES2. *Enterobacter sakazakii* in food for infants at different sampling stages, 2006-2009 (pooled data)

	Foodstuffs intended for special nutritional uses[(a)]		Infant formula	
	N	% pos	N	% pos
Single				
Processing				
Estonia	-	-	2	50.0
Ireland	-	-	260	0
Retail				
Austria	-	-	139	5.0
Belgium	65	0	1	0
Ireland	593	0	209	0
Luxembourg	-	-	40	0
Portugal	11	0	-	-
Romania	3	0	-	-
Slovakia	233	4.3	263	0.4
Slovenia	-	-	10	0
Unspecified				
Austria	2	0	10	10.0
Belgium	1	0	-	-
Czech Republic	-	-	2	0
Germany	261	2.3	2,409	0.7
Hungary	250	0	-	-
Italy	-	-	20	0
Luxembourg	-	-	49	0
Slovakia	244	0	570	0
Slovenia	-	-	20	5.0
Batch				
Processing				
Estonia	3	0	2	0
Ireland	-	-	314	0
Retail				
Hungary	53	0	59	0
Malta	-	-	28	0
Unspecified				
Belgium	66	0	5	0
Czech Republic	-	-	42	2.4
Hungary	19	0	132	0
Portugal	-	-	170	1.8
Slovakia	-	-	1,022	0
Slovenia	-	-	10	0
MS Total				
Single				
Retail	905	1.1	662	1.2
Unspecified	758	0.8	3,080	0.6
Batch				
Unspecified	NS	-	1,381	0.3

NS: Not sufficient data, <25 samples reported by the MS or less than five reporting MSs for the calculation of MS totals.
(a): All MSs reported as dried dietary foods for special medical purposes intended for infants below 6 months except for Ireland.

3.8.3. Discussion

The amount of data on *E. sakazakii* reported by MSs during the period 2006 to 2009 was limited. Therefore, all data with information on sampling unit (single/batch) except HACCP and own-check sampling were included in the analysis. In total, MSs have reported 9,103 single samples and batch based samples on *E. sakazakii* in food stuffs from 2006-2009 (see Chapter 1 for more details about the data quality). The majority of data were reported on dried infant formulae and dried dietary foods for special medical purpose intended for infants below six months of age. The microbiological food safety criteria apply for these products and the total proportion of samples in non-compliance was highest at retail. Unfortunately it was not possible to fully evaluate the compliance with the food safety criteria for *E. sakazakii* as information on the sampling stage was missing for a substantial amount of reporting's, hence it was impossible to know if the criterion applied to this data.

Generally more information on *E. sakazakii* in dried infant formulae and dried dietary foods for special medical purpose intended for infants below six months of age could prove important knowledge.

3.9. Staphylococcal enterotoxons

Staphylococcal enterotoxins are produced by certain strains of *Staphylococcus*, most commonly *Staphylococcus aureus*, however, *S. intermedius*, *S. hyicus* and *S. epidemidis* are also known to produce enterotoxins. The staphylococcal enterotoxins are heat stable and thus cannot be destroyed by cooking.

Staphylococcal food poisoning is mainly caused by food contaminated by food handlers or due to insufficient cooking and storage temperatures, which enables the bacteria to grow and subsequently produce toxin. Foods commonly associated with staphylococcal food poisoning include sliced meat, poultry, filled pastries, sandwiches, salads and milk and dairy products.

Symptoms of staphylococcal food poisoning are acute salivation, nausea, vomiting, abdominal cramps and diarrhoea and they typically occur one to six hours after ingestion of the toxin. Staphylococcal enterotoxicosis is not lethal, however, death can occur due to complications in acute cases. Elderly are more susceptible to morbidity and mortality from food borne gastroenteritis. Around 20% of people are persistent carriers of *S. aureus* in their nasal mucosa.

Reporting of data on staphylococcal enterotoxins were included in the reporting system in 2006 15 MSs reported data on *E. sakazakii* in food during the period 2006 to 2009 (Table ST1). Data were mainly from milk cheese and other dairy products. Majority of data were from infant formula and foodstuffs intended for special nutritional use.

Table ST1. Overview of countries reporting data included in the analysis for staphylococcal enterotoxins, 2006-2009

Food categories	No of reporting MSs		Non-MSs
Meat and meat products			
2007	3	**MSs:** AT, CZ, HU	
2008	5	**MSs:** AT, DE, IE, IT, SK	**non-MS:** NO
2009	3	**MSs:** AT, DE, IE	
Milk, cheese and dairy			
2006	8	**MSs:** AT, BE, DE, HU, IE, PO, PT, SK	
2007	10	**MSs:** AT, CZ, DE, HU, IE, IT, PO, PT, RO, SK	
2008	11	**MSs:** AT, CZ, DE, HU, IE, IT, PO, PT, RO, SK, SI	**non-MS:** NO
2009	13	**MSs:** AT, BE, BG, CZ, DE, HU, IE, IT, LU, PO, PT, RO, SK	
Other food[(a)]			
2006	2	**MSs:** AT, DE	
2007	5	**MSs:** AT, CZ, IE, IT, SK	
2008	5	**MSs:** AT, CZ, IE, SK, SI	**non-MS:** NO
2009	5	**MSs:** AT, CZ, IT, LU, SK	

(a): Other food include: Fish and fishery products, fruit and vegetables, eggs and egg products, special food and other foods.

3.9.1. Compliance with the staphylococcal enterotoxin food safety criteria

The EU Regulation (EC) No 2073/2005 as amended lays down food safety criteria for staphylococcal enterotoxins in cheeses, milk powder and whey powder. The criterion requires:

Staphylococcal enterotoxins must not be detected in 25g for products placed on the market during their shelf-life

Compliance with the food safety criteria for staphylococcus enterotoxins have to be investigated if levels of coagulase-positive staphylococci exceed 10^5 cfu/g in samples collected during the manufacturing process. The samples shall be collected at the point during production when the number of staphylococci is expected to be highest.

The regulation came into force on January 2006 and MSs had the possibility to report presence of staphylococcal enterotoxins from 2006. Every year, eight to 13 MSs have reported data. Due to the limited dataset, data from investigations with less than 25 samples have been included as well as data based on suspect sampling and surveys, and data with no information on sampling stage (e.g. slaughterhouse or retail) or programme context (e.g. monitoring, surveillance). Whereas data based on HACCP and own-check sampling or with no information on sampling unit (single/batch) were excluded. The data were analysed and reported for the first time in the present report.

3.9.2. Staphylococcal enterotoxins in food

In total, 14 MSs and one non-MS reported data on staphylococcal enterotoxins from 2006 to 2009. For all food categories except milk, cheese and other dairy products, data were mainly reported as single samples. For all foodstuffs, no trends were observed during the period and data were pooled for all years in the analyses and presentation.

Information on milk, cheese and other dairy products was reported by 12 MSs from 2006 to 2009 (Table ST2 to ST4). Data were collected at different sampling stages with a range of findings from 0% to 100%, however investigations with very high proportion of positive samples were generally quite small (<25 samples).

Most data reported on cheeses were from cows' milk; Belgium, Ireland, Italy and Portugal were the only MSs to report positive findings from cheeses made from cow's milk from single samples (from 1.1% to 100% positive) or batch based samples (from 0.8% to 3.7%). Ireland, Italy and Slovakia reported positive findings in cheeses made from goats, sheep and unspecified milk, ranging from 0.5% to 19.2% (Table ST2 to T4). Detections of staphylococcal enterotoxins in cheese are in non-compliance with the food safety criterion.

Belgium, Italy, Poland and Romania reported data on dairy products other than cheeses. Only Italy reported positive findings; 14 out of 28 batches of milk powder and whey powder were positive. Detections of staphylococcal enterotoxins in milk powder and whey powder are in non-compliance with the food safety criterion.

Only Germany, Italy and Poland reported data on milk. Poland did not find staphylococcal enterotoxins in 139 batches of milk from cows collected at processing. Italy reported 9.8% to 76.0% positive samples from milk from cows, sheep and goats at unspecified sampling stages.

Except for the positive findings in milk, cheese and other dairy product, positive findings in ready-to-eat (RTE) products were only reported by Luxembourg and Slovakia. Luxembourg reported four out of 28 samples positive of chocolate and Slovakia reported two out of 157 samples of infant formula positive and five out of 28 samples of confectionery products and pastes positive. In addition, Slovakia analysed 100 samples of ice-cream and similar frozen desserts, none were positive.

Most data on meat and meat products were only reported by Germany and Norway. Data were only reported from 2007 to 2009 (Table ST5) and all data were from non ready-to-eat (non-RTE) meat and meat products. Norway reported data from one investigation on bovine meat at an unspecified sampling stage with 22.0% samples positive for staphylococcal enterotoxins.

Table ST2. Staphylococcal enterotoxins in cheeses and other dairy products from milk of different origin, single samples, 2006-2009 (pooled data)

	Cheese (cow milk)		Cheese (goat milk)		Cheese (sheep milk)		Cheese (unspecified milk)[(a)]		Other dairy products	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
At farm	-	-	-	-	-	-	-	-	-	-
Belgium	16	25.0	-	-	1	100	-	-	-	-
Italy	-	-	-	-	1	0	-	-	-	-
Processing										
Austria	17	0	-	-	-	-	40	0	-	-
Ireland	-	-	-	-	-	-	42	9.5	-	-
Italy	69	0	1	0	7	0	14	0	1	0
Poland	77	0	-	-	-	-	-	-	-	-
Portugal	12	8.3	3	0	7	0	4	0	2	0
Slovenia	47	0	12	0	14	0	-	-	10	0
Retail										
Austria	-	-	-	-	-	-	10	0	1	0
Ireland	1	100	-	-	-	-	-	-	-	-
Italy	13	0	-	-	-	-	3	0	1	0
Slovakia	-	-	-	-	-	-	-	-	2	0
Slovenia	96	0	2	0	2	0	-	-	-	-
Unspecified	-	-	-	-	-	-	-	-	-	-
Austria	19	0	2	0	2	0	7	0	4	0
Czech Republic	222	0	4	0	-	-	-	-	6	0
Germany	61	0	6	0	3	0	-	-	12	0
Hungary	1	0	-	-	2	0	-	-	1	0
Italy	907	1.1	174	1.7	209	0.5	1,111	0.8	273	4.8
Luxembourg	-	-	-	-	-	-	-	-	10	30.0
Portugal	47	0	18	0	45	0	16	0	11	27.3
Slovakia	11	0	-	-	15	6.7	26	19.2	7	0
Hungary	1	0	-	-	2	0	-	-	1	0
MS Total										
Processing	222	0.5	-	-	-	-	-	-	-	-
Unspecified	1,268	0.8	204	1.5	276	0.7	-	-	324	5.9

(a): Unspecified milk include: Cheeses made from mixed milk from cows, sheep and goats, and made from unspecified milk or other animals.

Table ST3. Staphylococcal enterotoxins in cheeses and other dairy products from milk of different origin, batch based data, 2006-2009 (pooled data)

	Cheese (cow milk)		Cheese (goat milk)		Cheese (sheep milk)		Cheese (unspecified milk)[(a)]		Other dairy products	
	N	% pos	N	% pos	N	% pos	N	% pos	N	% pos
Processing										
Czech Republic	43	0	-	-	-	-	-	-	3	0
Ireland	6	0	-	-	-	-	79	0	-	-
Poland	155	0	-	-	-	-	-	-	-	-
Romania	54	0	-	-	16	0	-	-	8	0
Slovakia	-	-	-	-	14	14.3	2	0	-	-
Retail										
Czech Republic	16	0	-	-	-	-	-	-	7	0
Romania	29	0	-	-	-	-	-	-	-	-
Slovakia	-	-	-	-	3	0	1	0	-	-
Unspecified										
Belgium	127	0.8	-	-	-	-	-	-	102	0
Bulgaria	3,643	0	380	0	3,789	0	-	-	-	-
Czech Republic	482	0	-	-	-	-	-	-	14	0
Hungary	4	0	-	-	-	-	-	-	-	-
Italy	67	0	-	-	15	0	-	-	33	42.4
Poland	893	0	5	0	1	0	-	-	182	0
Portugal	27	3.7	18	0	11	0	11	0	-	-
Romania	2,739	0	57	0	237	0	-	-	262	0
Slovakia	10	0	40	7.5	151	5.3	-	-	-	-
MS total										
Unspecified	7,992	<0.1	500	0.6	4,204	0.2	-	-	593	2.4

(a): Unspecified milk include: Cheeses made from mixed milk from cows, sheep and goats, and made from unspecified milk or other animals.

Table ST4. Staphylococcal enterotoxins in different foodstuffs, single samples, 2006-2009 (pooled data)

	Meat and meat products		Milk, cheese and dairy		Other food[(a)]	
	N	% pos	N	% pos	N	% pos
At farm						
Belgium	-	-	17	29.4	-	-
Germany						
Italy	-	-	9	0	-	-
Slaughter	-	-	-	-	-	-
Germany	381	61.7	-	-	-	-
Processing	-	-	-	-	-	-
Austria	-	-	57	0	17	0
Germany	18	5.6	-	-	-	-
Ireland	-	-	42	9.5	-	-
Italy	-	-	102	0	-	-
Poland	-	-	77	0	-	-
Portugal	-	-	28	3.6	-	-
Slovenia	-	-	83	0	-	-
Retail						
Austria	7	0	19	0	53	0
Germany	2,916	21.6	-	-	-	-
Ireland	6	100	1	100	5	80.0
Luxembourg	-	-	-	-	28	14.3
Italy	-	-	24	0	-	-
Slovakia	-	-	2	0	21	19.0
Slovenia	-	-	100	0	240	0
Unspecified						
Austria	6	0	34	0	20	0
Czech Republic	-	-	232	0	-	-
Germany	-	-	83	1.2	31	0
Hungary	5	0	4	0	-	-
Italy	1	0	3,143	4.5	6	16.7
Luxembourg	-	-	10	30.0	-	-
Portugal	-	-	137	2.2	-	-
Slovakia	1	0	59	10.2	203	6.9
Norway	50	22.0	3	0	57	7.0
MS total						
Processing	NS	-	389	1.3	NS	-
Retail	NS	-	146	0.7	347	3.5
Unspecified	NS	-	3,702	4.2	260	5.8

NS: Not sufficient data, <25 samples reported by the MS or less than five reporting MSs for the calculation of MS totals.
(a): Other food include: Fish and fishery products, fruit and vegetables, eggs and egg products, special food and other foods.

Table ST5. Staphylococcal enterotoxins in different foodstuffs, batch based data, 2006-2009 (pooled data)

	Meat and meat products		Milk, cheese and dairy		Other food[(a)]	
	N	Pos	N	Pos	N	Pos
Processing						
Czech Republic	-	-	46	0	-	-
Ireland	-	-	85	0	-	-
Poland	-	-	294	0	-	-
Romania	-	-	78	0	-	-
Slovakia	-	-	16	12.5	-	-
Retail						
Czech Republic	2	0	23	0	33	0
Romania	-	-	29	0	-	-
Slovakia	-	-	4	0	-	-
Unspecified						
Belgium	-	-	229	0.4	-	-
Bulgaria	-	-	7,812	0	-	-
Czech Republic	-	-	496	0	-	-
Hungary	-	-	4	0	-	-
Italy	-	-	115	12.2	-	-
Poland	-	-	1,081	0	-	-
Portugal	-	-	67	1.5	-	-
Romania	-	-	3,295	0	-	-
Slovakia	1	0	201	5.5	4	25.0

(a): Other food include: Fish and fishery products, fruit and vegetables, eggs and egg products, special food and other foods.

3.9.3. Discussion

The amount of data on staphylococcal enterotoxins reported by MSs during the period 2006 to 2009 was limited. Therefore, all data with information on sampling unit (single/batch) except HACCP and own-check sampling were included in the analysis. In total, MSs have reported 22,466 single samples and batch based samples on staphylococcal enterotoxins in food stuffs from 2006-2009. No difference in the proportion of positive samples along the food chain and between years was observed. Staphylococcal enterotoxins were reported from cheeses and meat from all reported animals species although at very different proportions.

Generally more information on the levels of staphylococcal enterotoxins in meat, meat products and dairy products, e.g. more information on heated RTE products could prove important knowledge.

Conclusions and Recommendations

CONCLUSIONS

EFSA's database on zoonoses contains the most comprehensive collection of data on zoonotic agents, antimicrobial resistance and other microbiological contaminants in food and animals in the European Union. Since 2004, MSs have allocated substantial resources for reporting information from an extensive number of samples, detailed descriptions of monitoring systems and general evaluations of the national situation into the database. During the years, the quality of information submitted by MSs on specific zoonoses in food has improved and the database is, and will continue to be, an important source of information regarding the European situation concerning contaminants in food.

The purpose of this report was to provide an in-depth analysis of occurrence of the microbiological contaminants in specific types of foods at different stages of the food chain as a supplement to the information on occurrence of these contaminants already presented in the annual EU Summary Reports on zoonoses. Generally, the total amount of samples reported by MSs was large, but when data were broken down to the fine level of categorization required in this report, data were often too sporadic for calculation of EU totals. The available data did not meet the criteria required for statistical analysis of temporal trends, and conclusions regarding temporal trends were therefore made based on the interpretation of descriptive tables and figures.

From 2004-2009, MSs reported tests results from more than 5.5 million samples and non-MSs from more than 200,000 samples from different foodstuffs. Data reported as HACCP, own-check and outbreak/clinical investigations or described as import, selective or suspect sampling were difficult to interpret with regard to the overall occurrence of microbiological contaminants in domestically produced foodstuffs and were therefore not included. However, the data can be of great value in relation to outbreak investigations and input data for risk assessments.

Specific information on sampling stage and sampling unit is essential if MS data were to be comparable, and data without such information have therefore been excluded from the detailed analyses of the microbiological contaminants in Chapter 3. Initially, 86% of the reported samples were assumed to be representative of the occurrence of microbiological contaminants in domestically produced food. After data validation, only 44% of all data reported for 2004 to 2009 could be considered for in-depth analyses. Fortunately, since 2007 the overall data quality has improved. The improvement was probably the result of several contributing factors; i.e. optimisation of the reporting templates in the database, adjustment of data collection procedures in the MSs, as well as the national reporting officers becoming more experienced in using the system. However, some of the missing information might be available in the MSs, and continued update of the historical data would further improve the data quality for future analyses. The increased use of submitting data as XML-files will hopefully also improve data quality.

Some investigations were reported without specific indication of e.g. animal species, type of vegetable or cheese. These data were difficult to interpret and were generally excluded from the analyses and discussions. Lack of information on the biotypes and serotypes of isolated contaminants such as *Yersinia* and VTEC made it difficult to use data for any assessment of potential human health risk of these findings in different food vehicles.

Broiler meat and products thereof were tested for *Salmonella*, *Campylobacter* or *L. monocytogenes.* The three microbiological contaminants were reported from all sampling stages, but *Campylobacter* was by far most often reported. VTEC were reported from a few investigations of poultry meat products.

Most samples from pig meat and products thereof were tested for *Salmonella* and low levels of positive samples were reported. Fewer samples were tested for *Yersinia*, VTEC or *L. monocytogenes*.

Yersinia and VTEC were reported in non-RTE meat. In RTE meat product, high levels of *L. monocytogenes* were reported.

Bovine meat and products thereof were mainly tested for *Salmonella* with few positive findings. Some samples were tested for *L. monocytogenes, Campylobacter,* VTEC or *Yersinia. L. monocytogenes* was reported more frequently in RTE meat compared to non-RTE. *Campylobacter* and *Yersinia* were reported at very low levels.

Table eggs were tested for *Salmonella* and findings were generally very low. Few investigations on other types of egg products were examined for *Salmonella* or *L. monocytogenes* with no or very low level of positive findings.

Milk and cheese, mainly from cow's milk, were primarily tested for *Salmonella* or *L. monocytogenes* with low levels of positive findings. A higher occurrence of *Campylobacter* or staphylococcal enterotoxins was reported, but this was based on fewer data.

Fish and fishery products were primarily tested for the presence of *Salmonella*, *L. monocytogenes* or histamine. *L. monocytogenes* was reported in smoked fish products (RTE) and histamine in fish and fishery product associated with high levels of histidine and fishery products that have undergone enzyme ripening.

Most of the samples of fruits and vegetables were tested for the presence of *Salmonella*, *L. monocytogenes*, VTEC and *Campylobacter,* with very few positive findings (primarily from spices and herbs, sprouted seed, nuts but also unspecified fruits and vegetables).

In foodstuffs intended for special nutritional uses and in infant formula, very few positive findings of *Enterobacter sakazakii* were reported, whereas none of the samples tested for *Salmonella* or *L. monocytogenes* were positive.

Over the last decade, the MSs have implemented several measures to reduce the occurrence of *Salmonella* in the food production system, and as a consequence of the increased effort and the implementation of harmonized control programmes, a large proportion of the data reported to the database concerns *Salmonella*. Despite the large amount of data, very few clear temporal trends could be demonstrated. In 2008 and 2009, the proportion of *Salmonella* positive samples in meat tested at retail seemed to stabilize at a relatively low level of approximately 1% compared to previous years. This may have been a consequence of the microbiological criteria that came into force in 2006. However, since meat from poultry, pigs, bovine animals and eggs is widely eaten throughout the EU, the continued presence of *Salmonella* in these foodstuffs is likely to contribute considerably to consumer exposure to *Salmonella*.

For some foodstuffs, the increased occurrence of microbiological contaminants along the food production chain indicates cross-contamination during production. For other foodstuffs, the occurrence of microbiological contaminants decreased along the food production chain. This could be due to reducing steps such as heat treatment, and may for example be demonstrated by the fact that RTE food in most cases was less frequently contaminated with *Salmonella* than non-RTE food.

In this report, as well as in the EU zoonoses Summary Reports, the levels of compliance with the *Salmonella* and *L. monocytogenes* food safety criteria have been evaluated. Furthermore, the compliances with the histamine, *Enterobacter sakazakii* and staphylococcal enterotoxins food safety criteria were evaluated for the first time. It was not possible to fully evaluate the criteria set up for histamine, as the reporting templates do not allow entry of the sample based data for investigated batches.

Overall most of the investigations were in compliance with the food safety criteria for *Salmonella* and *Listeria*. The proportions of non-compliance varied considerably between food categories, years and

MSs. It must be noted that the level of non-compliance in a single year, in some cases, was highly influenced by results from a few MSs, and the results must be considered in this perspective.

The highest level of non-compliance to the *Salmonella* food safety criteria was reported for minced meat and meat preparations made from poultry meat intended to be eaten cooked. During the period 2006 to 2009, the number of investigations in non-compliance decreased for minced meat, meat preparations and meat products from poultry meat intended to be eaten cooked (batched based data). No obvious trends were observed for the other food categories during this period.

Fishery products, soft cheeses and meat products were the food categories most frequently found to be in non-compliance with the *L. monocytogenes* food safety criteria. Relative high levels of non-compliance were also found among samples reported as 'other RTE products' tested at processing. In fish and fishery products, the proportion of batches in non-compliance decreased over the years. For soft cheeses tested at processing, the proportion of batches in non-compliance also decreased from 2007 to 2009, whereas a corresponding decrease was not reported for batches tested at retail.

The majority of data reported on histamine, *Enterobacter sakazakii* and staphylococcal enterotoxins was in compliance with the criteria set for each microbiological contaminant. For *Enterobacter sakazakii*, the criteria apply for foodstuffs intended for special nutritional use and for infant formula, non-compliance with the criteria was reported for both foodstuffs. Findings of staphylococcal enterotoxins in cheeses, which are in non-compliance with the criteria, were reported.

RECOMMENDATIONS

Generally, the quality of data reported into the EFSA Database on Zoonoses has improved over the years, but further improvements are essential for the quality of future analysis especially if data are to be used for EU source accounts and risk assessments. When MSs adjust their reporting and data collection systems it is recommended to take into account the level of information to be reported to the EU. A prerequisi

te for allowing data to be included in in-depth analyses, is a proper description of data, including information such as the sampling context (indicating if data can be assumed to represent occurrences in domestically produced food or if data are collected in other contexts) as well as the sampling unit, the sampling stage and the origin of the animal species.

It should be noted that even though the Directive 99/2003/EC allows for reporting of aggregated data (summarised for any of the above mentioned variables), valuable information may be lost in such a process; For example, reporting of data as mixed animal species makes data impossible to interpret.

In order to fully evaluate the level of compliance with the histamine food safety criteria, the reporting template for histamine should be adapted to reporting of results for single samples per batch.

Abbreviations

MEMBER STATES IN THE EUROPEAN UNION 2004-2009

Member State	ISO Country Abbreviations
Austria	AT
Belgium	BE
Bulgaria[(a)]	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[(a)]	RO
Sweden	SE
United Kingdom	UK

(a): Bulgaria and Romania joined the European Union in 2007

OTHER REPORTING COUNTRIES 2004-2009

Country	ISO Country Abbreviations
Norway	NO
Switzerland	CH

LIST OF ABBREVIATIONS

Abbreviation	Definition
CFU	Colonies forming Unit
EC	European Commission
EFSA	European Food Safety Authority
EU	European Union
HACCP	Hazard Analysis and Critical Control Points
MS	Member State
Non-MS	Reporting country not member of the European Union
Non-RTE	Non ready-to-eat
NS	Not sufficient data, <25 samples reported by the MS or less than five reporting MSs for the calculation of MS totals
RTE	Ready-to-eat
Spp.	Subspecies
VT	Verocytotoxin
VTEC	Verocytotoxin producing *Escherichia coli*
STEC	Shiga toxin producing *Escherichia coli*

Appendix

Table DA3 and DA4 present all data reported by MSs and reporting non-MSs during the years 2004-2009. Table DA5-DA45 present data assumed to be representative of the occurrence of an agent in a food source including data reported with no information on sampling stage.

Table DA3. Total number of investigations per country in the food section of the EFSA database, listed as HACCP, baseline, biased, import, non-food and data included for further analysis, 2004-2009 (pooled data)

	HACCP	Baseline	Biased[a]	Import	Non-food[b]	Included in analysis
Austria	-	2	2	25	5	1,365
Belgium	-	3	2	2	17	639
Bulgaria[c]	-	-	-	-	-	225
Cyprus	-	-	-	-	1	98
Czech Republic	1	1	-	4	-	815
Denmark	-	-	41	-	1	86
Estonia	-	2	4	28	3	1,015
Finland	-	2	6	-	-	68
France	-	2	-	4	-	50
Germany	-	-	-	-	1	891
Greece	-	-	5	1	3	408
Hungary	-	2	9	1	1	537
Ireland	66	-	-	2	2	2,171
Italy	785	2	112	58	14	2,923
Latvia	232	2	1	3	10	360
Lithuania	-	2	34	1	6	164
Luxembourg	-	-	5	1	-	283
Malta	-	2	-	1	-	11
Netherlands	-	2	14	1	-	353
Poland	117	2	8	1	1	553
Portugal	128	2	16	4	2	541
Romania[c]	338	2	35	26	-	643
Slovakia	1	-	5	33	1	738
Slovenia	-	-	-	-	-	335
Spain	-	-	-	-	-	716
Sweden	-	-	-	5	-	128
United Kingdom	-	-	-	4	-	116
Bulgaria[c]	-	-	-	-	-	1
Norway	2	2	-	6	6	76
Romania[c]	-	-	-	1	6	104
Switzerland	24	2	-	1	-	63
MS total	1,668	30	299	205	68	16,232
Non-MS total	26	4	-	8	12	244

(a): Biased: Clinical investigations, suspect sampling, selective sampling.
(b): Non-food: Samples that refers to animal status not food (caecum, faeces, lymph nodes) and environmental samples.
(c): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA4. Total number of samples (single samples and batches) per country in the food section of the EFSA database, listed as HACCP, baseline, biased, import, non-food and data included for further analysis, 2004-2009 (pooled data)

	HACCP	Baseline	Biased[a]	Import	Non-food[b]	Included in analysis
Austria	-	816	5	426	767	76,984
Belgium	-	1,175	19	216	30,235	438,092
Bulgaria[c]	-	-	-	-	-	239,872
Cyprus	-	-	-	-	184	10,307
Czech Republic	3	659	-	121	-	265,003
Denmark	-	-	3,048	-	603	246,440
Estonia	-	204	47	2,524	66	35,107
Finland	-	738	542	-	-	95,723
France	-	850	-	225	-	19,430
Germany	-	-	-	-	11,776	466,937
Greece	-	-	1,503	24	25	33,305
Hungary	-	642	30	72	155	138,375
Ireland	227,979	-	-	20,507	2,729	603,496
Italy	250,166	1,179	2,394	1,379	2,328	425,994
Latvia	16,691	244	24	636	12	23,614
Lithuania	-	756	195	10	735	7,498
Luxembourg	-	-	1,931	184	-	12,600
Malta	-	734	-	28	-	2,052
Netherlands	-	908	470	410	-	99,537
Poland	96,274	840	648	98	516	510,145
Portugal	2,478	840	27	209	93	32,806
Romania[c]	56,785	816	271	695	-	284,271
Slovakia	1	-	25	354	1,261	143,054
Slovenia	-	-	-	-	-	32,637
Spain	-	-	-	-	-	248,179
Sweden	-	-	-	370	-	101,557
United Kingdom	-	-	-	4,965	-	95,006
Bulgaria[c]	-	-	-	-	-	46
Norway	2,354	792	-	18,041	2,855	78,103
Romania[c]	-	-	-	111	3,686	82,204
Switzerland	4,774	798	-	148	-	13,906
MS total	650,377	11,401	11,179	33,453	51,485	4,688,021
Non-MS total	7,128	1,590	-	18,300	6,541	174,259

(a): Biased: Clinical investigations, suspect sampling, selective sampling.
(b): Non-food: Samples that refers to animal status not food (caecum, faeces, lymph nodes) and environmental samples.
(c): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA5. Overview of countries reporting data for *Salmonella* in meat, 2004-2009

Food type	No of MSs reporting[(a)]		non-MSs
Meat from broilers			
2004	24	All MSs except FR	-
2005	20	All MSs except ES, FR, HU, MT, NL	Non-MS: CH
2006	21	All MSs except CY, ES, MT, NL	Non-MSs: CH, RO
2007	21	All MSs except BG, CY, FR, LT, MT, UK	Non-MS: CH
2008	24	All MSs except CY, MT, UK	Non-MS: CH
2009	23	All MSs except CY, MT, SE, UK	Non-MS: CH
Meat from turkey			
2004	14	MSs: AT, DE, DK, EE, FI, GR, IE, IT, LT, LU, LV, PL, PT, SI	-
2005	15	MSs: AT, CY, CZ, DE, DK, EE, FI, GR, IE, IT, LU, PL, PT, SI, SK	Non-MS: CH
2006	17	MSs: AT, CZ, DE, DK, EE, FI, FR, GR, HU, IE, IT, LU, LV, PL, PT, SI, SK	Non-MS: RO
2007	16	MSs: AT, CZ, DE, EE, FI, GR, HU, IE, IT, LU, NL, PL, PT, RO, SI, SK	-
2008	17	MSs: AT, CZ, DE, EE, ES, FI, GR, HU, IE, IT, LU, MT, PL, PT, RO, SI, SK	-
2009	17	MSs: AT, BE, BG, CZ, DE, EE, FI, HU, IE, IT, LT, LU, PL, PT, RO, SI, SK	Non-MS: CH
Meat from pig			
2004	22	All MSs except FR, SE, UK	Non-MS: NO
2005	20	All MSs except FR, HU, LT, MT, UK	Non-MS: NO
2006	19	MSs: AT, BE, CZ, DE, DK, EE, ES, FI, GR, HU, IE, IT, LU, LV, NL, PL, PT, SI, SK	Non-MSs: NO, RO
2007	22	All MSs except BG, CY, FR, MT, UK	Non-MS: NO
2008	23	All MSs except CY, LT, MT, SE	Non-MSs: CH, NO
2009	23	All MSs except CY, FR, MT, UK	Non-MS: NO
Meat from bovine animals			
2004	21	All MSs except FR, MT, SI, UK	Non-MS: NO
2005	19	MSs: AT, BE, CY, CZ, DE, DK, EE, ES, FI, GR, IE, IT, LU, LV, NL, PL, PT, SI, SK	Non-MS: NO
2006	19	MSs: AT, BE, CZ, DE, DK, EE, ES, FI, GR, HU, IE, IT, LU, LV, NL, PL, PT, SI, SK	Non-MSs: NO, RO
2007	21	All MSs except BG, CY, FR, LT, MT, UK	Non-MS: NO
2008	22	All MSs except CY, FR, LT, MT, PL	Non-MS: NO
2009	22	All MSs except BE, CY, FR, MT, UK	Non-MS: NO
Meat from other or unspecified animal species			
2004	18	MSs: AT, BE, CY, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LU, LV, NL, SE, SI, SK	Non-MS: NO
2005	18	MSs: AT, BE, CZ, DE, EE, ES, FI, GR, IE, IT, LT, LU, LV, NL, PL, SE, SI, SK	Non-MS: NO
2006	18	MSs: AT, BE, DE, EE, ES, FR, GR, HU, IE, IT, LU, LV, NL, PL, PT, SE, SI, SK	Non-MSs: NO, RO
2007	19	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LU, LV, NL, PL, RO, SE, SI, SK	Non-MS: NO
2008	21	All MSs except CY, DK, FI, FR, MT, SE	Non-MS: NO
2009	21	All MSs except CY, FI, FR, LT, MT, UK	Non-MS: NO

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA6. Overview of countries reporting data for *Salmonella* in other food categories, 2004-2009

Food type	No of MSs reporting[(a)]		non-MSs
Eggs and egg products			
2004	16	MSs: AT, CY, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, PL, PT, SI, SK	-
2005	18	MSs: AT, BE, CY, CZ, DE, EE, ES, GR, IE, IT, LT, LU, LV, PL, PT, SE, SI, SK	-
2006	16	MSs: AT, BE, DE, EE, ES, GR, HU, IE, IT, LT, NL, PL, PT, SE, SI, SK	Non-MS: RO
2007	17	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, LU, NL, PL, PT, RO, SI, SK	-
2008	19	MSs: AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LU, LV, PL, PT, RO, SE, SK	-
2009	19	MSs: AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SK	-
Milk, cheese and dairy			
2004	21	All MSs except FR, LU, MT, NL	Non-MS: NO
2005	19	MSs: AT, BE, CY, CZ, DE, EE, ES, FI, GR, IE, IT, LT, LV, NL, PL, PT, SE, SI, SK	Non-MS: NO
2006	17	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, NL, PL, PT, SI, SK	Non-MSs: CH, RO
2007	19	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SE, SI, SK	Non-MS: CH
2008	18	MSs: AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, PL, PT, RO, SI, SK	Non-MS: CH
2009	19	MSs: AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SI, SK	Non-MS: CH
Fish and fishery products			
2004	17	MSs: AT, BE, CY, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, PL, SE, SI, SK	-
2005	18	MSs: AT, BE, CY, CZ, DE, EE, ES, GR, IE, IT, LT, LU, LV, PL, PT, SE, SI, SK	-
2006	18	MSs: AT, BE, DE, EE, ES, GR, HU, IE, IT, LT, LU, LV, NL, PL, PT, SE, SI, SK	Non-MSs: NO, RO
2007	17	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, LV, NL, PL, PT, RO, SE, SK	Non-MS: NO
2008	18	MSs: AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LV, PT, RO, SE, SK, UK	Non-MS: NO
2009	20	All MSs except CY, DK, FI, FR, MT, SE, UK	Non-MS: NO
Fruit and vegetables			
2004	6	MSs: AT, CZ, EE, ES, IE, SI	-
2005	10	MSs: AT, BE, CZ, DE, EE, GR, IE, LT, SE, SI	-
2006	15	MSs: AT, BE, CZ, EE, ES, GR, HU, IE, IT, LT, NL, PL, SE, SI, SK	-
2007	14	MSs: AT, BE, CZ, DE, EE, ES, HU, IE, NL, PL, PT, RO, SK, UK	-
2008	13	MSs: AT, BE, CZ, DE, EE, ES, HU, IE, IT, NL, PT, RO, SK	-
2009	14	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, NL, RO, SI, SK	-
Other food			
2004	13	MSs: AT, CZ, EE, ES, GR, HU, IE, IT, LT, PT, SE, SI, SK	-
2005	16	MSs: AT, BE, CY, CZ, DE, EE, ES, GR, IE, IT, LT, PL, PT, SE, SI, SK	-
2006	18	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, LT, LU, NL, PL, PT, SE, SI, SK	Non-MS: RO
2007	19	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, LV, NL, PL, PT, RO, SE, SI, SK, UK	-
2008	19	MSs: AT, BE, BG, CZ, DE, EE, ES, GR, HU, IE, IT, LT, PL, PT, RO, SE, SI, SK, UK	-
2009	20	All MSs except CY, DK, FI, FR, MT, PL, SE	-
Special food			
2004	1	MS: EE	-
2005	7	MSs: AT, BE, CZ, DE, EE, IE, SI	-
2006	7	MSs: BE, CZ, DE, EE, IE, IT, SI	-
2007	9	MSs: AT, CZ, DE, EE, IE, IT, LU, NL, SI	-
2008	10	MSs: AT, CZ, DE, EE, ES, HU, IE, IT, PT, SI	-
2009	9	MSs: AT, BE, CZ, EE, ES, HU, IE, SI, SK	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA7. Number of meat samples from different animal species tested for *Salmonella*, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Meat from broilers						
Slaughter	2,087	3,734	3,438	8,478	955	1,437
Processing	22,119	5,483	15,775	10,992	4,509	2,932
Retail	6,096	2,894	2,351	8,413	5,279	6,181
Unspecified	3,326	7,043	5,787	3,412	25	900
Meat from turkey						
Slaughter	453	-	-	348	71	483
Processing	442	688	1,717	1,939	908	1,216
Retail	914	287	193	1,854	1,257	2,015
Unspecified	1,171	1,356	1,055	190	27	212
Meat from pig						
Slaughter	51,734	38,861	35,365	50,608	42,739	44,203
Processing	15,152	4,947	15,813	20,513	5,778	7,502
Retail	4,039	2,417	1,719	8,940	14,259	11,737
Unspecified	3,508	18,289	19,756	116,882	1,704	3,721
Meat from bovine animals						
Slaughter	27,116	3,949	3,965	26,183	23,238	24,514
Processing	3,891	3,135	38,281	39,455	4,887	4,028
Retail	10,392	705	1,150	4,856	10,895	5,638
Unspecified	1,739	17,111	18,463	18,644	1,016	838
Meat from other animal species						
Farm	-	-	-	-	38	-
Slaughter	154	36	472	758	1,144	5,958
Processing	6,024	6,837	10,697	11,697	1,246	6,066
Retail	3,244	988	1,726	3,203	8,001	2,557
Unspecified	17,050	10,549	20,417	12,142	3,860	10,322

(Continue next page)

Table DA7 (Contd.). Number of meat samples from different animal species tested for *Salmonella*, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
Non-MS[(a)]						
Meat from broilers						
Slaughter	-	-	-	1,753	-	-
Processing	-	-	-	1,346	-	5
Retail	-	-	-	415	179	-
Unspecified	-	-	11,174	-	-	-
Meat from turkey						
Unspecified	-	172	228	-	-	-
Meat from pig	-	-	-	-	-	-
Slaughter	2,456	3,157	3,122	3,472	2,151	2,029
Retail	-	-	-	-	16	-
Unspecified	-	-	22,171	-	-	-
Meat from bovine animals						
Slaughter	2,136	2,076	2,035	2,096	1,588	2,097
Unspecified	-	-	6,021	-	-	-
Meat from other animal species						
Slaughter	2,264	2,692	2,538	2,496	1,498	1,742
Processing	1,791	-	1,411	1,466	-	-
Retail	699	-	-	-	-	-
Unspecified	-	-	173	-	-	-
MS total						
Slaughter	81,544	46,580	43,240	86,375	68,147	76,595
Processing	47,628	21,090	82,283	84,596	17,328	21,744
Retail	24,685	7,291	7,139	27,266	39,691	28,128
Unspecified	26,794	54,348	65,478	151,270	6,632	15,993

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA8. Number of meat samples from different animal species tested for *Salmonella*, batch based data, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Meat from broilers						
Slaughter	1,542	1,269	1,958	3,929	8,905	11,375
Processing	212	100	40	6,111	5,969	5,587
Retail	463	162	-	1,469	13,050	19,734
Unspecified	-	3,026	10,897	6,042	1,637	927
Meat from turkey						
Slaughter	16	22	-	1,301	210	293
Processing	-	-	-	1,934	627	4,234
Retail	3	-	-	24	147	638
Unspecified	-	1,286	5,435	2,747	1,372	472
Meat from pig						
Slaughter	185	35	-	7,459	41,780	26,998
Processing	518	10	-	28,319	15,356	33,349
Retail	242	87	-	1,836	31,786	29,110
Unspecified	-	24,038	36,989	23,465	8,351	885
Meat from bovine animals						
Slaughter	5	-	-	4,856	6,569	13,177
Processing	6,715	1	5	4,266	3,848	8,230
Retail	380	66	-	232	6,015	4,576
Unspecified	-	5,586	10,579	5,512	1,936	64
Meat from other animal species						
Slaughter	-	341	-	12,159	909	650
Processing	161	471	-	2,906	10,107	5,240
Retail	203	586	-	61	6,588	3,855
Unspecified	-	27	3,634	7,312	555	386
Non-MS[(a)]						
Meat from broilers						
Slaughter	-	-	-	-	-	288
Processing	-	-	-	-	-	2,123
Unspecified	-	550	440	-	-	261
Meat from turkey						
Slaughter	-	-	-	-	-	33
Processing	-	-	-	-	-	159
Unspecified	-	-	-	-	-	3
Meat from other animal species						
Slaughter	-	6,056	5,420	-	-	-
Processing	-	-	-	-	-	1,184
MS total						
Slaughter	1,748	1,667	1,958	29,704	58,373	52,493
Processing	7,606	582	45	43,536	35,907	56,640
Retail	1,291	901	-	3,622	57,586	57,913
Unspecified	-	33,963	67,534	45,078	13,851	2,734

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA9. Number of meat samples from different animal species tested for *Salmonella*, unknown sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Meat from broilers						
Slaughter	4,323	-	-	-	-	-
Processing	14,287	9,132	-	-	-	-
Retail	3,655	-	-	229	1,623	-
Unspecified	-	963	-	-	-	-
Meat from turkey						
Slaughter	-	-	-	-	-	-
Processing	1,303	1,053	-	748	-	-
Retail	258	-	-	26	-	-
Unspecified	-	-	-	-	-	-
Meat from pig						
Slaughter	9,989	263	-	-	-	-
Processing	31,967	11,290	-	-	-	-
Retail	2,239	719	899	-	-	-
Unspecified	-	403	-	2,610	-	-
Meat from bovine animals						
Slaughter	1,250	64	-	-	-	-
Processing	19,728	27,719	-	-	-	-
Retail	1,922	218	-	-	-	-
Unspecified	95	978	-	-	-	-
Meat from other animal species						
Slaughter	64	362	-	-	-	-
Processing	9,154	8,127	-	-	2	-
Retail	8,212	1,079	-	-	7	430
Unspecified	2,590	1,704	-	-	2	-
Non-MS[(a)]						
Meat from other animal species						
Processing	7,239	-	-	-	-	-
MS total						
Slaughter	15,626	689	-	-	-	-
Processing	76,439	57,321	-	748	2	-
Retail	16,286	2,016	899	255	1,630	430
Unspecified	2,685	4,048	-	2,610	2	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA10. Number of samples in different food categories tested for *Salmonella*, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Eggs and egg products						
Feed mill	-	-	-	-	62	-
Farm	-	-	-	-	175	-
Packing centre	594	1,525	5,380	4,216	3,007	2,633
Processing	-	268	1,371	1,538	972	52
Retail	8,933	7,963	9,431	10,199	18,807	6,129
Unspecified	21,845	5,438	16,391	7,490	149	381
Milk, cheese and dairy						
Farm	-	480	419	-	4,654	19
Processing	140	14,252	12,356	16,599	11,474	6,413
Retail	171	2,170	1,193	13,882	14,697	10,544
Unspecified	22,886	39,875	33,481	23,549	2,743	11,913
Fish and fishery products						
Farm	-	-	-	12	-	-
Processing	90	318	132	703	1,236	1,146
Retail	179	700	691	5,409	11,169	5,676
Unspecified	10,521	12,494	16,243	4,259	2,573	6,650
Fruit and vegetables						
Farm	-	-	-	-	3	-
Processing	7	48	157	126	726	65
Retail	19	738	1,433	8,154	2,400	604
Unspecified	2,284	546	1,581	2,033	2,180	1,104
Other food						
Processing	68	18,167	21,711	23,655	432	357
Retail	2,000	7,861	5,752	8,357	9,548	14,770
Unspecified	9,391	11,982	20,373	17,054	13,844	16,650
Special food						
Processing	-	-	2	-	2	441
Retail	28	29	231	183	47	111
Unspecified	-	379	748	741	1,239	159

(Continue next page)

Table DA10 (Contd.). Number of samples in different food categories tested for *Salmonella*, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
Non-MS[(a)]						
Meat and meat products						
Slaughter	6,856	7,925	7,695	9,817	5,237	5,868
Processing	1,791	-	1,411	2,812	-	5
Retail	699	-	-	415	195	-
Unspecified	-	172	39,767	-	-	-
Eggs and egg products						
Packing centre	-	-	1,295	-	-	-
Retail	-	-	204	-	-	-
Unspecified	-	-	528	-	-	-
Milk, cheese and dairy						
Processing	-	-	-	48	94	450
Retail	-	-	-	-	-	91
Unspecified	400	1,490	16,066	-	-	-
Fish and fishery products						
Processing	-	-	-	27	72	-
Retail	-	-	-	-	50	-
Unspecified	-	-	2,186	398	-	245
Other food	-	-	-	-	-	-
Unspecified	-	-	177	-	-	-
MS total						
Farm	-	480	419	12	4,832	19
Processing	305	33,053	35,729	42,621	14,842	8,474
Retail	11,330	19,461	18,731	46,211	56,740	37,834
Unspecified	66,927	70,714	88,817	55,126	22,778	36,857

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA11. Number of samples in different food categories tested for *Salmonella*, batch based data, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Eggs and egg products						
Farm	-	-	-	-	92	94
Packing centre	617	1,641	1,453	1,283	573	4,171
Processing	-	-	-	6,289	3,291	3,194
Retail	-	504	4,285	1,716	6,383	3,962
Unspecified	973	2,774	777	380	401	1,686
Milk, cheese and dairy						
Farm	-	-	-	-	87	19
Packing centre	-	-	-	-	86	245
Processing	188	361	311	11,545	15,247	19,324
Retail	204	-	-	805	10,566	15,475
Unspecified	1,925	5,696	16,626	4,459	6,089	105
Fish and fishery products						
Packing centre	-	-	-	-	53	4
Processing	-	-	-	1,456	535	150
Retail	46	49	-	310	815	1,717
Unspecified	519	399	2,496	3,774	2,871	299
Fruit and vegetables						
Processing	-	-	-	-	1,146	414
Retail	177	-	-	-	374	254
Unspecified	-	74	266	611	161	4
Other food						
Packing centre	-	-	-	-	-	491
Processing	-	-	-	411	835	800
Retail	3,699	2,069	86	140	3,884	9,271
Unspecified	-	7,710	3,582	5,945	5,158	565
Special food						
Processing	-	-	-	64	565	-
Retail	-	-	-	19	-	496
Unspecified	-	63	4,344	10	46	177
Non-MS[(a)]						
Meat and meat products						
Slaughter	-	6,056	5,420	-	-	321
Processing	-	-	-	-	-	3,466
Unspecified	-	550	440	-	-	264
MS total						
Farm	-	-	-	-	179	113
Packing centre	617	1,641	1,453	1,283	712	4,911
Processing	188	361	311	19,765	21,619	23,882
Retail	4,126	2,622	4,371	2,990	22,022	31,175
Unspecified	3,417	16,716	28,091	15,179	14,726	2,836

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA12. Number of samples in different food categories tested for *Salmonella*, unknown sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Eggs and egg products						
Packing centre	2,228	3,089	-	-	-	-
Processing	529	-	-	-	-	-
Retail	1,087	1	-	-	-	-
Unspecified	3,836	521	-	-	-	-
Milk, cheese and dairy						
Farm	-	-	-	-	11	-
Processing	15,715	-	-	-	-	-
Retail	1,601	-	-	-	-	-
Unspecified	41,423	3,830	-	-	-	-
Fish and fishery products						
Processing	1,763	-	-	-	3	-
Retail	555	-	-	-	-	-
Unspecified	6,178	1,269	-	-	-	-
Fruit and vegetables						
Retail	798	-	-	-	-	-
Unspecified	191	-	-	-	-	-
Other food						
Processing	16,304	775	-	-	-	-
Retail	4,310	-	-	-	-	-
Unspecified	10,034	11,563	-	357	-	-
Non-MS[(a)]						
Meat and meat products						
Processing	7,239	-	-	-	-	-
MS total						
Processing	34,311	775	-	-	3	-
Retail	7,553	1	-	-	-	-
Unspecified	61,471	17,183	-	357	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA13. Number of ready-to-eat samples from different food categories tested for *Salmonella*, 2004-2009

	2004	2005	2006	2007	2008	2009
Single						
MS[(a)]						
Meat and meat products	40,395	16,412	31,339	42,822	17,437	11,028
Eggs and egg products	-	-	-	-	12	-
Milk, cheese and dairy	21,955	50,207	43,350	43,303	26,215	19,769
Fish and fishery products	90	982	2,853	532	4,068	570
Fruit and vegetables	25	159	307	1,262	192	507
Other food	7,661	15,156	13,156	10,802	14,918	17,957
Special food	28	408	981	924	1,288	711
Non-MS[(a)]						
Meat and meat products	-	-	11,308	-	-	-
Milk, cheese and dairy	400	1,490	10,059	48	94	541
Fish and fishery products	-	-	34	-	50	7
Other food	-	-	93	-	-	-
Batch						
MS						
Meat and meat products	687	14,472	12,832	22,216	14,861	27,924
Milk, cheese and dairy	2,317	5,202	14,924	16,143	29,408	24,031
Fish and fishery products	309	29	180	487	150	563
Fruit and vegetables	13	-	173	242	192	232
Other food	3,608	4,558	2,048	3,388	7,865	9,066
Special food	-	63	4,344	93	611	673
Non-MS						
Meat and meat products	-	-	-	-	-	341
Unspecified sampling unit						
MS						
Meat and meat products	38,909	10,322	69	2,839	104	-
Milk, cheese and dairy	50,892	3,789	-	-	11	-
Fish and fishery products	24	-	-	-	-	-
Fruit and vegetables	5	-	-	-	-	-
Other food	9,089	1,331	-	-	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA14. Number of samples from fresh, minced and meat preparations tested for *Salmonella* at retail, 2004-2009

	2004	2005	2006	2007	2008	2009
Single						
MS[(a)]						
Meat from broilers						
Fresh	3,656	1,053	1,030	3,563	2,337	3,176
Minced meat	345	-	3	288	6	36
Meat preparation	-	13	16	1,064	391	955
Meat from pig						
Fresh	1,592	28	359	4,137	4,252	3,260
Minced meat	492	201	15	923	855	1,836
Meat preparation	-	25	14	511	969	1,722
Meat from bovine animals						
Fresh	879	3	272	1,413	5,995	1,424
Minced meat	2,310	183	41	2,192	1,134	1,273
Meat preparation	-	122	236	271	1,325	1,921
Meat from other or unspecified animal species						
Fresh	2,316	57	409	1,643	3,223	1,325
Minced meat	526	141	238	603	756	517
Meat preparation	42	104	142	620	756	582
Non-MS[(a)]						
Meat from broilers						
Fresh	-	-	-	415	-	-
Meat preparation	-	-	-	-	179	-
Meat from pig						
Minced meat	-	-	-	-	16	-
Unspeficied meat						
Fresh	699	-	-	-	-	-

(Continue next page)

Table DA14 (Contd.). Number of samples from fresh, minced and meat preparations tested for *Salmonella* at retail, 2004-2009

	2004	2005	2006	2007	2008	2009
Batch						
MS[(a)]						
Meat from broilers						
Fresh	345	96	-	40	4,348	8,414
Minced meat	1	-	-	343	738	1,181
Meat preparation	-	-	-	820	6,210	6,773
Meat from pig						
Fresh	30	47	-	-	4,691	3,986
Minced meat	-	1	-	462	6,601	8,118
Meat preparation	-	-	-	265	11,453	10,680
Meat from bovine animals						
Fresh	-	4	-	-	1,678	951
Minced meat	328	54	-	232	841	736
Meat preparation	-	-	-	-	2,751	2,474
Meat from other or unspecified animal species						
Fresh	1	12	-	12	274	92
Minced meat	10	-	-	37	155	625
Meat preparation	-	-	-	10	956	2,269
MS total						
Single						
Fresh	8,443	1,141	2,070	10,756	15,807	9,185
Minced meat	3,673	525	297	4,006	2,751	3,662
Meat preparation	42	264	408	2,466	3,441	5,180
Batch						
Fresh	406	206	-	52	15,682	17,429
Minced meat	339	56	-	1,536	14,936	18,778
Meat preparation	-	-	-	1,360	32,823	32,876

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA15. Overview of countries reporting data for *Campylobacter* in meat, 2004-2009

Food type	No of MSs reporting[(a)]		non-MSs
Meat from broilers			
2004	8	MSs: AT, BE, CZ, DE, IE, IT, SI, UK	-
2005	17	MSs: AT, BE, CZ, DE, DK, EE, FR, GR, IE, IT, LU, NL, PT, SE, SI, SK, UK	Non-MS: NO
2006	17	MSs: AT, BE, DE, DK, EE, HU, IE, IT, LT, LU, LV, NL, PL, PT, SI, SK, UK	Non-MSs: NO, RO
2007	19	MSs: AT, BE, CZ, DE, DK, EE, ES, FR, HU, IE, IT, LU, LV, NL, PT, RO, SE, SI, SK	Non-MSs: CH, NO
2008	15	MSs: AT, BE, CZ, DE, DK, EE, ES, IE, IT, LU, LV, NL, SE, SI, SK	-
2009	19	MSs: AT, BE, CZ, DE, DK, EE, ES, FR, HU, IE, IT, LT, LU, NL, PL, PT, RO, SI, SK	Non-MS: CH
Meat from turkey			
2004	4	MSs: DK, IE, SI, UK	-
2005	12	MSs: AT, BE, CZ, DE, DK, EE, IE, IT, LU, NL, PT, SI	Non-MS: CH
2006	10	MSs: AT, DE, DK, EE, HU, IE, IT, LU, SI, SK	-
2007	9	MSs: AT, BE, CZ, DE, HU, IE, IT, NL, SI	Non-MS: NO
2008	10	MSs: BE, CZ, DE, EE, HU, IE, IT, MT, SI, SK	-
2009	13	MSs: AT, BE, CZ, DE, EE, HU, IE, LT, LU, PL, PT, SI, SK	Non-MS: CH
Meat from pig			
2004	12	MSs: AT, BE, CZ, DE, ES, FR, IE, IT, LT, NL, PT, SK	-
2005	12	MSs: AT, BE, CZ, DE, EE, ES, IE, IT, LU, NL, PT, SI	-
2006	12	MSs: AT, BE, DE, EE, ES, HU, IE, IT, LU, PL, SI, SK	Non-MS: RO
2007	11	MSs: AT, BE, CZ, DE, EE, ES, HU, IE, IT, NL, SI	-
2008	12	MSs: AT, BE, CZ, DE, ES, HU, IE, IT, LV, SI, SK, UK	-
2009	12	MSs: AT, BE, CZ, DE, EE, ES, HU, IE, IT, LU, NL, PT	-
Meat from bovine animals			
2004	10	MSs: AT, CZ, DE, DK, ES, IE, IT, LT, NL, PT	-
2005	10	MSs: AT, CZ, DE, ES, IE, IT, LU, NL, PT, SI	-
2006	12	MSs: AT, DE, EE, ES, HU, IE, IT, LU, NL, PL, SI, SK	Non-MS: RO
2007	10	MSs: AT, DE, EE, ES, HU, IE, IT, LU, NL, SI	-
2008	11	MSs: AT, DE, ES, HU, IE, IT, NL, RO, SI, SK, UK	-
2009	10	MSs: BE, DE, ES, HU, IE, IT, LU, NL, PL, PT	-
Meat from other or unspecified			
2004	20	All MSs except GR, HU, LU, PL, SI	Non-MS: NO
2005	14	MSs: AT, BE, CZ, DE, EE, ES, IE, IT, LT, LU, LV, NL, SI, SK	-
2006	12	MSs: AT, BE, DE, EE, ES, HU, IE, IT, LU, PL, PT, SK	-
2007	11	MSs: AT, BE, CZ, DE, EE, ES, HU, IE, IT, LU, NL	Non-MS: NO
2008	14	MSs: AT, BE, CZ, DE, EE, ES, HU, IE, IT, LT, NL, RO, SE, UK	-
2009	13	MSs: AT, CZ, DE, EE, ES, HU, IE, IT, LU, NL, PL, PT, SI	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA16. Overview of countries reporting data for *Campylobacter* in other food categories, 2004-2009

Food type	No of MSs reporting[(a)]		non-MSs
Eggs and egg products			
2004	2	MSs: IE, LT	-
2005	4	MSs: AT, ES, IE, IT	-
2006	3	MSs: ES, IT, SK	-
2007	4	MSs: AT, ES, IE, SK	-
2008	2	MSs: IE, IT	-
2009	2	MSs: ES, IE	-
Milk, cheese and dairy			
2004	16	MSs: AT, BE, CY, CZ, DE, DK, EE, ES, FI, HU, IE, IT, LT, PT, SI, SK	-
2005	10	MSs: AT, BE, CZ, DE, EE, ES, IE, IT, NL, SK	-
2006	11	MSs: AT, BE, DE, EE, ES, HU, IE, IT, PL, SI, SK	-
2007	8	MSs: AT, BE, DE, ES, HU, IE, IT, SK	-
2008	7	MSs: AT, DE, ES, HU, IE, IT, SK	-
2009	7	MSs: AT, DE, ES, HU, IE, IT, SK	-
Fish and fishery products			
2004	9	MSs: AT, BE, CZ, DE, ES, IE, IT, LT, PT	-
2005	7	MSs: AT, BE, CZ, DE, ES, IE, IT	-
2006	6	MSs: AT, BE, EE, ES, IE, IT	-
2007	6	MSs: AT, BE, EE, ES, IE, IT	-
2008	5	MSs: AT, CZ, IE, IT, UK	-
2009	6	MSs: AT, BE, CZ, ES, IE, IT	-
Fruit and vegetables			
2004	1	MS: IE	-
2005	1	MS: IE	-
2006	2	MSs: IE, NL	-
2007	2	MSs: AT, CZ	-
2008	3	MSs: AT, IE, NL	-
2009	2	MSs: CZ, IE	-
Other food			
2004	7	MSs: AT, CZ, ES, IE, IT, LT, SE	-
2005	8	MSs: AT, CZ, EE, ES, IE, IT, NL, SE	-
2006	6	MSs: AT, EE, ES, IE, IT, NL	-
2007	6	MSs: AT, EE, ES, IE, IT, SI	-
2008	7	MSs: AT, EE, IE, IT, SI, SK, UK	-
2009	5	MSs: AT, ES, IE, NL, SI	-
Special food			
2006	1	MS: IE	-
2007	2	MSs: AT, IE	-
2009	1	MS: IE	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA17. Number of meat samples from different animal species tested for *Campylobacter*, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Meat from broilers						
Slaughter	103	505	315	1,053	1,132	1,476
Processing	111	1,189	836	607	766	1,838
Retail	668	801	3,074	6,545	5,240	5,791
Unspecified	3,494	6,989	4,811	2,863	44	857
Meat from turkey						
Slaughter	12	29	-	318	385	278
Processing	-	128	84	70	77	364
Retail	12	141	60	1,339	597	1,352
Unspecified	14	363	671	50	8	364
Meat from pig						
Slaughter	590	694	15	391	757	80
Processing	419	389	183	76	448	422
Retail	1,030	391	443	769	3,958	2,003
Unspecified	751	1,208	1,136	1,091	184	398
Meat from bovine animals						
Slaughter	97	-	-	144	258	2
Processing	50	109	166	25	316	339
Retail	602	119	316	847	4,489	1,784
Unspecified	204	701	2,514	601	46	320
Meat from other animals species						
Slaughter	294	64	917	268	257	290
Farm	-	-	-	-	4	-
Processing	371	335	166	28	99	54
Retail	3,920	300	640	1,020	3,649	707
Unspecified	3,482	798	1,940	226	249	292

(Continue next page)

Table DA17 (Contd.). Number of meat samples from different animal species tested for *Campylobacter*, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
Non-MS[(a)]						
Meat from broilers						
Processing	-	-	-	305	-	9
Unspecified	-	938	1,152	414	-	-
Meat from turkey						
Slaughter	-	-	-	-	-	22
Processing	-	-	-	121	-	131
Retail	-	-	-	-	-	18
Unspecified	-	172	-	-	-	-
Meat from pig						
Unspecified	-	-	147	-	-	-
Meat from bovine animals						
Unspecified	-	-	78	-	-	-
Meat from other animals species						
Processing	-	-	-	70	-	-
Retail	1,067	-	-	-	-	-
MS total						
Slaughter	1,096	1,228	330	1,762	2,278	1,834
Processing	824	1,770	2,020	1,021	1,548	2,914
Retail	2,081	1,668	3,743	8,681	9,894	9,200
Unspecified	8,179	8,860	7,258	5,024	3,885	2,326

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA18. Number of meat samples from different animal species tested for *Campylobacter*, batch based data, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Meat from broilers						
Slaughter	-	-	-	238	23	327
Processing	-	-	-	79	34	68
Retail	-	-	-	70	5	191
Unspecified	-	135	41	109	95	59
Meat from turkey						
Slaughter	-	-	-	-	2	31
Processing	-	-	-	-	-	29
Retail	-	-	-	12	1	5
Unspecified	-	12	2	10	10	-
Meat from pig						
Processing	-	-	-	-	-	17
Retail	20	-	-	12	2	9
Unspecified	-	27	-	33	187	-
Meat from bovine animals	-	-	-	-	-	-
Slaughter						
Processing	18	-	-	-	335	-
Retail	-	-	-	-	2	27
Unspecified	-	1	-	23	153	79
Meat from other animals species						
Slaughter	252	25	-	-	5	-
Retail	396	125	-	36	9	-
Unspecified	-	24	1	2	1	132
Non-MS[(a)]						
Meat from broilers						
Slaughter	-	-	-	-	-	175
Processing	-	-	-	-	-	1,203
MS total						
Slaughter	270	24	1	240	26	507
Processing	18	125	-	127	45	106
Retail	416	27	-	115	193	196
Unspecified	-	147	43	119	105	59

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA19. Number of meat samples from different animal species tested for *Campylobacter* in MSs[(a)], unspecified sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
Meat from broilers						
Slaughter	5	-	-	-	-	-
Processing	4,064	-	-	-	-	-
Retail	2,081	-	-	-	-	-
Unspecified	48	1,751	-	-	-	-
Meat from turkey						
Processing	712	-	-	-	-	-
Retail	254	-	-	-	-	-
Unspecified	-	911	-	-	-	-
Meat from pig						
Slaughter	60	46	-	-	-	-
Processing	241	66	-	-	-	-
Retail	2,542	246	-	-	-	-
Unspecified	-	430	-	-	-	-
Meat from bovine animals						
Slaughter	46	20	-	-	-	-
Processing	312	14	-	-	-	-
Retail	1,040	101	-	-	-	-
Unspecified	-	936	-	-	-	-
Meat from other animals species						
Slaughter	265	180	-	-	-	-
Processing	689	135	-	-	-	-
Retail	2,600	640	-	-	-	-
Unspecified	-	342	-	-	-	-
MS total						
Slaughter	376	246	-	-	-	-
Processing	6,018	215	-	-	-	-
Retail	8,517	987	-	-	-	-
Unspecified	48	4,370	-	-	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA20. Number of samples in different food categories tested for *Campylobacter*, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Eggs and egg products						
Processing	-	-	-	-	1	-
Retail	-	3	-	18	16	3
Unspecified	1	24	19	3	3	9
Milk, cheese and dairy						
Farm	-	356	75	-	4,490	423
Processing	152	37	-	123	83	330
Retail	144	71	71	124	95	35
Unspecified	3,475	2,425	4,109	4,578	1,649	657
Fish and fishery products						
Processing	-	-	-	32	24	-
Retail	-	31	129	222	99	38
Unspecified	305	256	106	40	22	121
Fruit and vegetables						
Processing	-	-	-	-	939	-
Retail	-	10	9	30	328	36
Unspecified	-	-	48	-	-	-
Other food						
Processing	-	12	-	7	17	-
Retail	-	244	429	758	430	2,940
Unspecified	847	591	1,433	149	159	327
Special food						
Retail	-	-	1	2	-	1
Non-MS[(a)]						
Meat and meat products						
Slaughter	-	-	-	-	-	22
Processing	-	-	-	496	-	140
Retail	1,067	-	-	-	-	18
Unspecified	-	1,110	1,377	414	-	-
MS total						
Slaughter	-	366	84	62	4,842	459
Processing	152	47	9	153	412	366
Retail	144	74	71	142	111	38
Unspecified	3,476	2,461	4,128	4,588	1,669	666

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA21. Number of samples in different food categories tested for *Campylobacter*, batch based data, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Eggs and egg products						
Unspecified	-	-	11	15	-	-
Milk, cheese and dairy						
Farm	-	-	-	-	27	-
Processing	-	-	-	-	37	108
Retail	62	-	-	-	10	-
Unspecified	22	64	120	127	850	6,659
Fish and fishery products						
Retail	-	-	-	-	2	94
Unspecified	-	24	-	-	61	-
Fruit and vegetables						
Retail	-	-	-	12	-	-
Other food	-	-	-	-	-	-
Retail	1	-	-	-	4	-
Unspecified	-	4	-	2	4	-
Non-MS[(a)]						
Meat and meat products						
Slaughter	-	-	-	-	-	175
Processing	-	-	-	-	-	1,203
MS total						
Slaughter	-	-	11	15	-	-
Processing	-	-	-	-	37	108
Retail	63	-	-	12	16	94
Unspecified	22	92	131	144	915	6,659

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA22. Number of samples in different food categories tested for *Campylobacter* in MSs[(a)], unspecified sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
Eggs and egg products						
Processing	47	-	-	-	-	-
Retail	11	-	-	-	-	-
Unspecified	-	1	-	-	-	-
Milk, cheese and dairy						
Processing	21	-	-	-	-	-
Retail	735	-	-	-	-	-
Unspecified	2,173	1,142	-	-	-	-
Fish and fishery products						
Processing	1	-	-	-	-	-
Retail	22	-	-	-	-	-
Unspecified	43	17	-	-	-	-
Fruit and vegetables						
Retail	1	-	-	-	-	-
Other food						
Processing	262	-	-	-	-	-
Retail	182	-	-	-	-	-
Unspecified	340	416	-	-	-	-
MS total						
Processing	331	-	-	-	-	-
Retail	951	-	-	-	-	-
Unspecified	2,556	1,576	-	-	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA23. Overview of countries reporting data for *Listeria monocytogenes* in meat, 2004-2009

Food type	No of MSs reporting[(a)]		non-MSs
Meat from broilers			
2004	2	MSs: BE, SI	-
2005	11	MSs: AT, CZ, DE, EE, GR, IE, IT, LU, NL, PL, PT	-
2006	12	MSs: AT, BE, CZ, EE, FR, HU, IE, IT, LU, PL, PT, SK	Non-MS: RO
2007	14	MSs: AT, BG, CZ, EE, ES, GR, IE, IT, LU, PL, PT, RO, SE, SK	-
2008	16	MSs: AT, BG, CZ, EE, ES, GR, HU, IE, IT, LU, NL, PT, RO, SI, SK, UK	-
2009	17	MSs: BG, CY, CZ, DK, EE, ES, GR, HU, IE, LT, LU, LV, PL, PT, RO, SK, UK	-
Meat from turkey			
2004	1	MS: SI	-
2005	3	MSs: EE, IE, LU	-
2006	7	MSs: AT, EE, IE, IT, LU, PL, SK	-
2007	3	MSs: EE, IE, IT	-
2008	11	MSs: CZ, EE, GR, HU, IE, IT, LU, PL, PT, SI, SK	-
2009	6	MSs: EE, HU, IE, PT, SK, UK	-
Meat from pig			
2004	14	MSs: AT, BE, CY, CZ, DE, EE, ES, GR, IE, IT, LT, LV, PL, PT	-
2005	16	MSs: AT, BE, CZ, DE, EE, ES, FR, GR, IE, IT, LU, LV, NL, PL, PT, SK	-
2006	17	MSs: AT, BE, CZ, DE, EE, ES, FR, GR, HU, IE, IT, LU, LV, NL, PL, PT, SK	Non-MS: RO
2007	16	MSs: AT, BE, BG, CZ, EE, ES, GR, IE, IT, LU, NL, PL, PT, RO, SI, SK	-
2008	17	MSs: AT, BE, BG, CZ, EE, ES, GR, HU, IE, IT, LU, NL, PT, RO, SI, SK, UK	-
2009	19	MSs: AT, BG, CY, CZ, DK, EE, ES, FR, GR, HU, IE, LT, LV, NL, PL, PT, RO, SK, UK	-
Meat from bovine animals			
2004	13	MSs: AT, BE, CZ, DE, EE, ES, GR, IE, IT, LT, LV, PL, PT	-
2005	15	MSs: AT, BE, CZ, DE, EE, ES, GR, IE, IT, LU, LV, NL, PL, PT, SK	-
2006	16	MSs: AT, BE, CZ, DE, EE, ES, FR, GR, IE, IT, LU, LV, NL, PL, PT, SK	Non-MS: RO
2007	15	MSs: AT, BE, BG, CZ, EE, ES, GR, IE, IT, LU, NL, PL, RO, SI, SK	-
2008	18	MSs: AT, BE, BG, CZ, EE, ES, FR, GR, HU, IE, IT, LU, NL, PL, RO, SI, SK, UK	-
2009	16	MSs: AT, BG, CZ, DK, EE, ES, GR, HU, IE, IT, LU, LV, NL, PL, RO, UK	-
Meat from other or unspecified animals species			
2004	18	MSs: AT, BE, CZ, DE, DK, EE, ES, GR, HU, IE, IT, LT, LV, PL, PT, SE, SI, SK	-
2005	16	MSs: AT, BE, CZ, DK, EE, ES, GR, IE, IT, LT, LU, LV, PT, SE, SI, SK	-
2006	18	MSs: AT, BE, CZ, DE, DK, EE, ES, FR, GR, IE, IT, LU, LV, PL, SE, SI, SK, UK	Non-MS: RO
2007	14	MSs: AT, CZ, DK, EE, ES, IE, IT, LU, LV, NL, PL, SI, SK, UK	-
2008	19	MSs: AT, BE, CZ, EE, ES, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SE, SI, SK, UK	-
2009	14	MSs: AT, BE, CZ, DK, EE, ES, IE, IT, LV, NL, RO, SI, SK, UK	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA24. Overview of countries reporting data for *Listeria monocytogenes* in other food categories, 2004-2009

Food type	No of MSs reporting[(a)]		non-MSs
Eggs and egg products			
2004	2	MSs: ES, IE	-
2005	4	MSs: ES, IE, IT, PT	-
2006	3	MSs: DK, ES, IT	-
2007	4	MSs: ES, IE, IT, SK	-
2008	4	MSs: ES, IE, IT, RO	-
2009	2	MSs: ES, IE	-
Milk, cheese and dairy			
2004	20	All MSs except CY, DK, FR, LU, NL	Non-MS: NO
2005	20	All MSs except FR, HU, LU, MT, UK	-
2006	19	MSs: AT, BE, CZ, DE, DK, EE, ES, GR, HU, IE, IT, LT, LV, NL, PL, PT, SI, SK, UK	Non-MSs: CH, RO
2007	19	MSs: AT, BE, BG, CZ, DK, EE, ES, GR, HU, IE, IT, LV, NL, PL, PT, RO, SI, SK, UK	Non-MS: CH
2008	19	MSs: AT, BE, BG, CZ, EE, ES, GR, HU, IE, IT, LT, LV, MT, PL, PT, RO, SI, SK, UK	Non-MS: CH
2009	21	All MSs except DE, FI, FR, LU, MT, SE	Non-MS: CH
Fish and fishery products			
2004	17	MSs: AT, BE, CZ, DE, DK, EE, ES, FI, GR, IE, IT, LT, LV, PT, SE, SI, SK	-
2005	20	All MSs except CY, FI, HU, MT, UK	Non-MS: NO
2006	19	MSs: AT, BE, CZ, DE, DK, EE, ES, GR, HU, IE, IT, LU, LV, NL, PL, PT, SE, SI, SK	Non-MSs: BG, NO, RO
2007	17	MSs: AT, BE, BG, CZ, DK, EE, ES, GR, IE, IT, LV, NL, PL, PT, RO, SE, SK	Non-MS: NO
2008	20	All MSs except CY, DE, DK, FR, LU, MT, SI	Non-MS: NO
2009	22	All MSs except DE, FR, LU, MT, SE	Non-MS: NO
Fruit and vegetables			
2004	5	MSs: ES, HU, IE, PT, SI	-
2005	6	MSs: BE, CZ, IE, LV, PT, SI	-
2006	9	MSs: BE, CZ, EE, ES, FI, IE, SE, SI, SK	-
2007	8	MSs: AT, CZ, DK, EE, ES, IE, NL, PL	-
2008	9	MSs: AT, CZ, EE, ES, HU, IE, IT, PT, SK	-
2009	7	MSs: AT, CZ, EE, ES, HU, IE, SK	-
Other food			
2004	19	MSs: AT, CY, CZ, DE, DK, EE, ES, GR, HU, IE, IT, LT, LV, PL, PT, SE, SI, SK, UK	Non-MS: NO
2005	19	MSs: AT, BE, CZ, DE, DK, EE, ES, FR, GR, IE, IT, LT, LV, PL, PT, SE, SI, SK, UK	-
2006	17	MSs: AT, BE, CZ, DE, DK, EE, ES, GR, HU, IE, IT, PL, PT, SE, SI, SK, UK	Non-MS: RO
2007	16	MSs: AT, BE, BG, CZ, EE, ES, GR, IE, IT, PL, PT, RO, SE, SI, SK, UK	-
2008	16	MSs: AT, BE, CZ, EE, ES, GR, HU, IE, IT, LT, PL, PT, RO, SI, SK, UK	-
2009	15	MSs: AT, CZ, DK, EE, ES, GR, HU, IE, IT, NL, PL, PT, RO, SI, SK	-
Special food			
2005	4	MSs: AT, BE, CZ, IT	-
2006	4	MSs: BE, CZ, EE, IT	Non-MS: RO
2007	5	MSs: CZ, EE, IE, IT, LU	-
2008	6	MSs: CZ, EE, HU, IE, IT, SK	-
2009	9	MSs: BE, CZ, EE, GR, HU, IE, LV, RO, SK	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA25. Number of meat samples from different animal species tested for *Listeria monocytogenes*, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Meat from broilers						
Slaughter	-	2	-	-	-	-
Processing	30	24	453	279	107	323
Retail	-	1,157	731	1,376	1,647	1,514
Unspecified	330	1,989	1,526	6,267	327	382
Meat from turkey						
Processing	14	23	42	61	58	174
Retail	-	203	99	156	228	462
Unspecified	-	14	41	5	86	49
Meat from pig						
Slaughter	-	16	-	-	30	-
Processing	2,102	1,316	461	4,495	422	1,517
Retail	3,203	2,561	972	2,217	7,295	3,211
Unspecified	1,949	6,665	7,447	15,882	1,990	1,648
Meat from bovine animals						
Farm	-	10	-	-	473	-
Slaughter	-	-	-	-	2	-
Processing	1,815	324	89	185	64	79
Retail	3,446	726	588	1,082	6,286	1,735
Unspecified	286	1,871	3,327	2,086	1,068	214
Meat from other animals species						
Farm	-	3	-	-	41	-
Slaughter	-	-	-	-	6	-
Processing	3,367	870	119	142	705	261
Retail	2,111	745	1,345	4,038	6,435	1,250
Unspecified	10,086	1,780	3,542	1,178	3,755	2,346
Non-MS[(a)]						
Meat from broilers						
Unspecified	-	-	1,608	-	-	-
Meat from pig						
Unspecified	-	-	5,002	-	-	-
Meat from bovine animals						
Unspecified	-	-	1,832	-	-	-
MS total						
Farm	-	13	-	-	514	-
Slaughter	-	18	-	-	38	-
Processing	7,328	2,557	1,164	5,162	1,356	2,354
Retail	8,760	5,392	3,735	8,869	21,891	8,172
Unspecified	12,651	12,319	15,883	25,418	7,226	4,639

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA26. Number of meat samples from different animal species tested for *Listeria monocytogenes* in MSs[(a)], batch based data, 2004-2009

	2004	2005	2006	2007	2008	2009
Meat from broilers						
Slaughter	-	-	-	-	920	-
Processing	-	-	-	890	971	2,005
Retail	-	5	-	41	1,112	2,080
Unspecified	-	84	1,808	3,028	702	2,527
Meat from turkey						
Processing	-	-	-	-	89	1
Retail	-	-	-	-	60	10
Unspecified	-	-	24	-	17	-
Meat from pig						
Slaughter	-	-	-	-	1,358	360
Processing	385	2	-	14,398	10,263	18,890
Retail	59	9	-	408	10,291	7,892
Unspecified	-	70	23,194	7,066	4,668	3,556
Meat from bovine animals						
Slaughter	-	-	-	-	894	-
Processing	45	1	-	286	8,192	2,204
Retail	-	44	-	-	395	970
Unspecified	-	23	936	3,448	468	783
Meat from other animals species						
Slaughter	-	-	-	-	28	-
Processing	165	5	10	20	4,826	5,698
Retail	37	63	-	134	490	289
Unspecified	-	24	6,940	1,340	397	157
MS total						
Slaughter	-	-	-	-	3,200	360
Processing	595	8	10	15,594	24,341	28,798
Retail	96	121	-	583	12,348	11,241
Unspecified	-	201	32,902	14,882	6,252	7,023

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA27. Number of meat samples from different animal species tested for *Listeria monocytogenes* in MSs[(a),] unspecified sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
Meat from broilers						
Unspecified	-	459	-	-	-	-
Meat from pig	-	-	-	-	-	-
Processing	8,335	-	-	-	-	-
Retail	3,358	-	-	-	-	-
Unspecified						
Meat from bovine animals						
Processing	677	-	-	-	-	-
Retail	1,255	-	-	-	-	-
Unspecified	82	181	-	-	-	-
Meat from other animals species						
Processing	7,761	-	-	-	-	-
Retail	8,096	-	-	-	-	-
Unspecified	577	1,005	-	15	-	-
MS total						
Processing	16,773	-	-	-	-	-
Retail	12,709	-	-	-	-	-
Unspecified	659	1,645	-	15	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA28. Number of samples in different food categories tested for *Listeria monocytogenes*, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Eggs and egg products						
Farm	-	-	-	-	9	-
Retail	-	1	-	488	433	395
Unspecified	-	5	46	85	421	44
Milk, cheese and dairy						
Farm	-	383	638	173	658	317
Processing	4,252	3,518	1,464	17,313	3,995	5,690
Retail	4,763	2,296	2,206	5,464	4,118	3,212
Unspecified	3,851	25,040	17,953	16,012	11,921	7,506
Fish and fishery products						
Processing	959	350	192	434	504	397
Retail	3,116	445	586	2,011	6,925	2,628
Unspecified	471	5,611	5,827	3,220	1,519	974
Fruit and vegetables						
Processing	-	20	42	-	35	44
Retail	-	375	755	2,925	299	167
Unspecified	202	155	335	105	143	399
Other food						
Processing	7,013	98	82	222	210	121
Retail	7,050	6,651	6,270	13,118	8,082	12,355
Unspecified	2,050	2,570	17,362	7,788	9,365	11,643
Special food						
Processing	-	-	4	4	2	162
Retail	-	-	93	55	2	173
Unspecified	-	104	8	45	70	56
Non-MS[(a)]						
Meat and meat products						
Unspecified	-	-	8,442	-	-	-
Milk, cheese and dairy						
Processing	1,875	-	-	304	578	139
Unspecified	-	-	9,398	-	-	-
Fish and fishery products						
Processing	-	129	-	118	520	-
Retail	-	-	-	106	-	-
Unspecified	-	-	990	26	-	64
Other food						
Processing	190	-	-	-	-	-
Unspecified	-	-	74	-	-	-
Special food						
Unspecified	-	-	6	-	-	-
MS total						
Farm	-	383	638	173	667	317
Processing	12,224	3,986	1,784	17,973	4,746	6,414
Retail	14,929	9,768	9,910	24,061	19,859	18,930
Unspecified	6,574	33,485	41,531	27,255	23,439	20,622

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA29. Number of samples in different food categories tested for *Listeria monocytogenes*, batch based data, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Eggs and egg products						
Processing	-	-	-	-	1	-
Retail	-	-	-	-	12	-
Unspecified	-	-	4	174	21	-
Milk, cheese and dairy						
Farm	-	-	-	-	1,913	2
Processing	105	267	565	14,395	20,512	9,024
Retail	136	242	-	1,822	12,899	18,224
Unspecified	-	1,352	13,650	20,041	6,418	1,260
Fish and fishery products						
Processing	150	15	-	416	1,535	914
Retail	85	21	-	150	1,016	829
Unspecified	-	1,187	994	1,588	528	1
Fruit and vegetables						
Farm	-	-	76	-	-	-
Processing	-	-	-	43	256	40
Retail	-	98	30	43	188	38
Unspecified	-	-	87	-	121	-
Other food						
Processing	1,478	-	-	1,658	1,764	1,996
Retail	85	304	-	449	2,003	2,994
Unspecified	-	11	2,214	238	1,454	-
Special food						
Processing	-	-	-	43	310	72
Retail	-	-	-	16	-	506
Unspecified	-	12	24	100	413	31
Non-MS[(a)]						
Fish and fishery products						
Unspecified	-	-	46	-	-	-
MS total						
Farm	-	-	76	-	1,913	2
Processing	1,733	282	565	16,555	24,378	12,046
Retail	306	665	30	2,480	16,118	22,591
Unspecified	-	2,562	16,973	22,141	8,955	1,292

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA30. Number of samples in different food categories tested for *Listeria monocytogenes* in MSs[(a)], unspecified sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
Eggs and egg products						
Processing	117	-	-	-	-	-
Retail	932	-	-	-	-	-
Unspecified	34	3	-	7	-	-
Milk, cheese and dairy						
Farm	250	-	-	-	-	-
Processing	4,783	-	-	-	-	-
Retail	6,916	-	-	-	-	-
Unspecified	4,521	5,776	-	187	-	-
Fish and fishery products						
Processing	368	-	-	-	-	-
Retail	1,347	-	-	-	-	-
Unspecified	748	1,127	12	-	-	-
Fruit and vegetables						
Retail	11	-	-	-	-	-
Unspecified	191	-	-	-	-	-
Other food						
Processing	19,070	-	-	-	-	-
Retail	16,222	2,686	-	-	-	-
Unspecified	4,404	9,061	-	64	-	-
MS total						
Farm	250	-	-	-	-	-
Processing	24,338	-	-	-	-	-
Retail	25,428	2,686	-	-	-	-
Unspecified	9,898	15,967	12	258	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA31. Number of ready-to-eat samples from different food categories tested for *Listeria monocytogenes*, 2004-2009

	2004	2005	2006	2007	2008	2009
Single						
MS[(a)]						
Meat and meat products	22,213	10,860	10,401	28,320	13,155	7,996
Milk, cheese and dairy	12,845	27,570	19,445	36,795	15,191	11,308
Fish and fishery products	1,772	2,333	2,666	4,440	6,537	2,133
Fruit and vegetables	-	117	107	418	15	269
Other food	16,099	4,669	7,454	11,868	8,548	17,596
Special food	-	104	105	104	74	391
Non-MS[(a)]						
Meat and meat products	-	-	3,314	-	-	-
Milk, cheese and dairy	1,875	-	3,797	304	578	139
Fish and fishery products	-	-	920	176	109	-
Other food	190	-	-	-	-	-
Special food	-	-	6	-	-	-
Batch						
MS[(a)]						
Meat and meat products	691	203	20,572	17,714	32,369	38,844
Eggs and egg products	-	-	-	174	-	-
Milk, cheese and dairy	241	1,860	12,640	23,268	32,783	22,910
Fish and fishery products	235	1,223	750	759	2,114	1,376
Fruit and vegetables	-	69	32	86	155	50
Other food	1,557	228	1,165	2,102	4,528	3,687
Special food	-	12	24	159	723	609
Non-MS[(a)]						
Fish and fishery products	-	-	46	-	-	-
Unspecified sampling unit						
MS[(a)]						
Meat and meat products	29,482	3,029	-	-	-	-
Milk, cheese and dairy	15,920	5,094	-	187	-	-
Fish and fishery products	1,589	715	-	-	-	-
Fruit and vegetables	1	-	-	-	-	-
Other food	28,464	2,776	-	-	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA32. Number of cheese samples tested for *Listeria monocytogenes*, 2004-2009

	2004	2005	2006	2007	2008	2009
Single						
MS[(a)]						
Hard cheese						
Processing	-	972	48	5,411	17	937
Retail	-	32	409	1,489	153	530
Unspecified	653	1,454	2,996	723	7	18
Soft and semi-soft cheese						
Farm	-	141	267	29	11	-
Processing	132	600	141	8,084	62	596
Retail	150	323	318	1,221	1,361	843
Unspecified	-	5,905	4,442	2,207	439	41
Unspecified cheese						
Farm	-	-	19	-	85	-
Processing	4,099	330	744	-	1,561	1,475
Retail	4,613	1,144	665	337	1,032	742
Unspecified	-	6,084	2,152	2,154	3,264	1,306
Non-MS[(a)]						
Hard cheese						
Processing	-	-	-	167	-	-
Unspecified	-	-	1,636	-	-	-
Soft and semi-soft cheese						
Processing	-	-	-	137	578	139
Unspecified	-	-	1,901	-	-	-
Unspecified cheese						
Processing	1,875	-	-	-	-	-
Batch						
MS[(a)]						
Hard cheese						
Processing	-	61	34	415	5,973	1,288
Retail	-	18	-	16	4,774	10,236
Unspecified	-	86	1,893	373	163	-
Soft and semi-soft cheese						
Processing	-	1	40	9,975	5,328	3,922
Retail	98	117	-	1,457	5,652	4,179
Unspecified	-	1,151	4,667	2,334	1,082	-
Unspecified cheese						
Processing	105	17	179	285	1,550	-
Retail	10	37	-	-	51	-
Unspecified	-	-	65	275	1,541	239

(Continue next page)

Table DA32 (Contd.). Number of cheese samples tested for *Listeria monocytogenes*, 2004-2009

	2004	2005	2006	2007	2008	2009
Unspecified sampling unit						
MS[(a)]						
Hard cheese						
Unspecified	-	624	-	-	-	-
Soft and semi-soft cheese						
Unspecified	-	1,049	-	-	-	-
Unspecified cheese						
Processing	4,531	-	-	-	-	-
Retail	6,868	-	-	-	-	-
MS total						
Single						
Farm	-	141	286	29	96	-
Processing	4,231	1,902	933	13,495	1,640	3,008
Retail	4,763	1,499	1,392	3,047	2,546	2,115
Unspecified	653	13,443	9,590	5,084	3,710	1,365
Batch						
Processing	105	79	253	10,675	12,851	5,210
Retail	108	172	-	1,473	10,477	14,415
Unspecified	-	1,237	6,625	2,982	2,786	239
Unspecified sampling unit						
Processing	4,531	-	-	-	-	-
Retail	6,868	-	-	-	-	-
Unspecified	-	1,673	-	-	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA33. Overview of countries reporting data for *Yersinia* in meat, 2004-2009

Food type	No of MSs reporting[(a)]	
Meat from broilers		
2005	1	MS: IT
2007	2	MSs: ES, IT
2008	2	MSs: ES, IT
2009	1	MS: ES
2007	2	MSs: ES, IT
2008	1	MS: IT
Meat from pig		
2004	7	MSs: AT, BE, CZ, DE, ES, IT, SE
2005	6	MSs: AT, BE, DE, ES, IT, SE
2006	7	MSs: AT, DE, DK, EE, ES, IT, SK
2007	6	MSs: DE, EE, ES, IT, SI, SK
2008	8	MSs: AT, DE, ES, IT, PT, RO, SK, UK
2009	8	MSs: DE, EE, ES, IT, PL, PT, RO, SE
Meat from bovine animals		
2004	4	MSs: CZ, DE, ES, IT
2005	3	MSs: AT, ES, IT
2006	4	MSs: AT, DE, ES, IT
2007	5	MSs: DE, ES, IT, PL, SI
2008	4	MSs: DE, ES, IT, UK
2009	3	MSs: DE, ES, IT
Meat from other or unspecified animal species		
2004	7	MSs: AT, CZ, DE, ES, IT, PT, SI
2005	4	MSs: AT, DE, ES, IT
2006	4	MSs: BE, ES, IT, SI
2007	4	MSs: BE, DE, ES, IT
2008	5	MSs: BE, DE, ES, IT, UK
2009	3	MSs: BE, ES, IT

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA34. Overview of countries reporting data for *Yersinia* in other food categories, 2004-2009

Food type	No of MSs reporting[(a)]	
Eggs and egg products		
2006	1	MS: IT
2004	6	MSs: AT, CZ, DE, ES, IT, SI
2005	4	MSs: AT, DE, ES, IT
2006	3	MSs: DE, ES, IT
2007	2	MSs: DE, IT
2008	2	MSs: DE, IT
Milk, cheese and dairy		
2009	2	MSs: DE, IT
2004	4	MSs: CZ, DE, ES, IT
2005	3	MSs: AT, ES, IT
2006	1	MS: IT
2007	1	MS: IT
2008	1	MS: IT
Fish and fishery products		
2009	1	MS: IT
2005	1	MS: FI
2006	2	MSs: FI, IT
2007	1	MS: EE
2009	2	MSs: IT, LT
2004	5	MSs: AT, CZ, ES, IT, SI
Other food		
2005	2	MSs: ES, IT
2006	3	MSs: ES, IT, SI
2007	3	MSs: EE, ES, IT
2008	1	MS: IT
2009	3	MSs: AT, ES, IT

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA35. Number of meat samples from different animal species tested for *Yersinia* in MSs[(a)], single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
Meat from broilers						
Processing	-	-	-	21	1	-
Retail	-	-	-	-	-	14
Unspecified	-	31	-	73	36	-
Meat from turkey						
Retail	-	-	-	41	-	-
Unspecified	-	-	-	20	4	-
Meat from pig						
Farm	-	-	-	-	1	-
Slaughter	95	-	86	48	30	163
Processing	264	293	16	2	4	105
Retail	1,810	155	194	28	797	131
Unspecified	62	758	601	1,262	908	726
Meat from bovine animals						
Slaughter	50	-	4	5	66	-
Processing	38	-	12	-	-	-
Retail	171	-	181	5	1,176	13
Unspecified	12	394	189	565	149	54
Meat from other animal species						
Farm	-	-	-	-	3	-
Slaughter	20	-	16	25	39	10
Processing	2	-	127	-	13	-
Retail	175	-	282	280	850	35
Unspecified	74	230	106	37	221	549
MS total						
Farm	-	-	-	-	4	-
Slaughter	-	165	-	106	78	135
Processing	304	293	155	23	18	105
Retail	2,156	155	657	354	2,823	193
Unspecified	148	1,413	896	1,957	1,318	1,329

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA36. Number of meat samples from different animal species tested for *Yersinia* in MSs[(a)], batch based data and unspecified sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
Batch						
Meat from pig						
Slaughter	-	-	-	-	3,093	457
Processing	-	-	-	-	-	358
Retail	-	-	-	-	28	1
Unspecified	-	-	5	199	17	135
Meat from bovine animals						
Retail	14	-	-	-	-	-
Unspecified	-	-	-	28	41	111
Meat from other animal species						
Retail	7	-	-	-	-	-
Unspecified						
Unspecified sampling unit						
Meat from pig						
Slaughter	43	64	-	-	-	-
Processing	137	108	-	-	-	-
Retail	182	153	342	-	-	-
Meat from bovine animals						
Slaughter	1	25	-	-	-	-
Processing	1	7	-	-	-	-
Retail	46	77	-	-	-	-
Meat from other animal species						
Slaughter	2	92	-	-	-	-
Processing	1	35	-	-	-	-
Retail	157	822	-	-	-	-
Unspecified	34	8	-	-	-	-
MS total						
Batch						
Slaughter	-	-	-	-	3,093	457
Processing	-	-	-	-	-	358
Retail	21	-	-	-	28	1
Unspecified	-	-	5	227	58	246
Unspecified sampling unit						
Slaughter	46	181	-	-	-	-
Processing	139	150	-	-	-	-
Retail	385	1,052	342	-	-	-
Unspecified	34	8	-	-	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA37. Number of samples in different food categories tested for *Yersinia* in MSs[(a)], single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
Eggs and egg products						
Unspecified	-	-	10	-	-	-
Milk, cheese and dairy						
Farm	-	8	-	-	-	1
Processing	-	-	-	-	373	-
Retail	-	-	-	-	7	-
Unspecified	27	527	737	216	137	99
Fish and fishery products						
Retail	-	-	-	-	1	-
Unspecified	43	17	58	18	21	117
Fruit and vegetables						
Processing	-	-	-	27	-	-
Retail	-	36	-	-	-	-
Unspecified	-	-	21	-	-	26
Other food						
Processing	-	-	-	7	1	-
Retail	-	-	-	-	8	1
Unspecified	431	-	508	79	4	55
MS total						
Farm	-	8	-	-	-	1
Processing	-	-	-	34	374	-
Retail	-	36	-	-	16	1
Unspecified	501	544	1,334	313	162	297

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA38. Number of samples in different food categories tested for *Yersinia* in MSs[(a)], batch based data and unspecified sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
Batch						
Milk, cheese and dairy						
Farm	-	-	-	-	36	-
Processing	188	-	-	-	-	-
Unspecified	75	-	-	12	1	-
Fish and fishery products						
Processing	-	-	-	-	1	-
Retail	-	-	-	-	2	-
Unspecified	2	-	-	-	58	-
Fruit and vegetables						
Farm	-	26	52	-	-	-
Retail	-	-	15	-	-	-
Unspecified	-	-	-	-	-	5
Other food						
Retail	2	-	-	-	-	-
Unspecified sampling unit						
Milk, cheese and dairy						
Unspecified	188	322	-	-	-	-
Fish and fishery products						
Unspecified	1	1	-	-	-	-
Other food						
Unspecified	45	218	-	-	-	-
MS total						
Batch						
Farm	-	26	52	-	36	-
Processing	188	-	-	-	1	-
Retail	-	-	15	-	2	-
Unspecified	77	-	-	12	59	5
Unspecified sampling unit						
Unspecified	234	541	-	-	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA39. Overview of countries reporting data for VTEC in meat, 2004-2009

Food type	No of MSs reporting[(a)]		non-MSs
Meat from broilers			
2004	1	MS: IE	-
2005	6	MSs: AT, CZ, IE, IT, LU, PL	-
2006	7	MSs: AT, CZ, DE, IE, IT, LV, PL	Non-MS: RO
2007	8	MSs: BG, CZ, DE, ES, IE, IT, LV, SK	-
2008	8	MSs: BG, CZ, DE, ES, IE, IT, LV, PL	-
2009	6	MSs: BG, CZ, DE, ES, IE, PL	-
Meat from turkey			
2004	1	MS: IE	-
2005	6	MSs: AT, CZ, DE, IE, IT, PL	-
2006	3	MSs: DE, IT, PL	-
2007	2	MSs: DE, IT	-
2008	4	MSs: DE, IE, IT, PL	-
2009	4	MSs: BG, DE, IE, PL	-
Meat from pig			
2004	9	MSs: AT, CZ, DE, ES, GR, IE, IT, PL, PT	-
2005	11	MSs: AT, CZ, DE, ES, GR, IE, IT, LU, NL, PL, SK	-
2006	10	MSs: AT, CZ, DE, EE, ES, GR, IE, IT, NL, PL	Non-MS: RO
2007	11	MSs: AT, BG, CZ, DE, EE, ES, IE, IT, NL, PL, SK	-
2008	11	MSs: AT, BG, CZ, DE, EE, ES, IE, IT, NL, PL, UK	-
2009	12	MSs: AT, BE, BG, CZ, DE, EE, ES, IE, IT, NL, PL, PT	-
Meat from bovine animals			
2004	11	MSs: AT, BE, CZ, DE, ES, IE, IT, PL, PT, SE, SK	Non-MS: NO
2005	16	MSs: AT, BE, CZ, DE, DK, ES, GR, IE, IT, LU, LV, NL, PL, SE, SI, SK	-
2006	17	MSs: AT, BE, CZ, DE, EE, ES, FR, GR, HU, IE, IT, LU, LV, NL, PL, SI, SK	Non-MS: RO
2007	18	MSs: AT, BE, BG, CZ, DE, DK, EE, ES, FR, HU, IE, IT, LV, NL, PL, RO, SI, SK	-
2008	16	MSs: BE, BG, CZ, DE, EE, ES, FR, HU, IE, IT, LV, NL, PL, RO, SI, UK	-
2009	15	MSs: BE, BG, CZ, DE, EE, ES, FR, HU, IE, LU, NL, PL, PT, RO, SE	-
Meat from other or unspecified animal species			
2004	12	MSs: AT, CY, CZ, DE, ES, IE, IT, PL, PT, SE, SI, SK	Non-MS: NO
2005	13	MSs: AT, CZ, DE, ES, GR, IE, IT, LU, LV, NL, PL, SI, SK	-
2006	11	MSs: AT, CZ, DE, EE, ES, GR, IE, IT, LU, PL, SI	-
2007	8	MSs: AT, DE, EE, ES, IE, IT, LV, NL	-
2008	10	MSs: AT, DE, EE, ES, IE, IT, LV, NL, RO, UK	-
2009	10	MSs: AT, CZ, DE, ES, IE, IT, NL, PL, SI, UK	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA40. Overview of countries reporting data for VTEC in other food categories, 2004-2009

Food type	No of MSs reporting[(a)]		non-MSs
Eggs and egg products			
2004	3	MSs: ES, IE, SK	-
2005	3	MSs: ES, IE, IT	-
2006	2	MSs: ES, IT	-
2007	1	MS: IE	-
2008	3	MSs: CZ, ES, IE	-
2009	2	MSs: CZ, IE	-
Milk, cheese and dairy			
2004	14	MSs: AT, BE, CY, CZ, DE, ES, FI, GR, IE, IT, PL, PT, SE, SK	-
2005	13	MSs: AT, BE, CZ, DE, ES, FR, GR, IE, IT, LV, PL, PT, SK	Non-MS: NO
2006	13	MSs: AT, BE, CZ, DE, EE, ES, GR, HU, IE, IT, LV, PL, SK	Non-MSs: CH, RO
2007	13	MSs: AT, BE, BG, CZ, DE, EE, ES, FR, IE, IT, LV, PL, SK	Non-MS: CH
2008	11	MSs: AT, BE, BG, CZ, DE, EE, ES, HU, IE, IT, LV	Non-MS: CH
2009	11	MSs: AT, BG, CZ, DE, ES, FR, HU, IE, IT, PT, SK	-
Fish and fishery products			
2004	8	MSs: CZ, DE, ES, GR, IE, IT, PT, SE	-
2005	5	MSs: AT, ES, GR, IE, IT	-
2006	6	MSs: ES, GR, IE, IT, PL, SI	-
2007	4	MSs: CZ, ES, IE, IT	-
2008	4	MSs: CZ, ES, IE, IT	-
2009	3	MSs: ES, IE, IT	-
Fruit and vegetables			
2004	3	MSs: ES, PT, SI	-
2005	7	MSs: AT, BE, ES, IE, LV, SE, SI	-
2006	8	MSs: AT, CZ, DE, ES, IE, IT, NL, SI	-
2007	6	MSs: AT, ES, IE, IT, NL, SI	-
2008	6	MSs: CZ, ES, IE, IT, NL, RO	-
2009	6	MSs: AT, CZ, ES, IE, RO, SE	-
Other food			
2004	7	MSs: AT, ES, IE, IT, PT, SE, SI	-
2005	9	MSs: AT, BE, DE, ES, GR, IE, IT, PT, SK	-
2006	8	MSs: AT, EE, ES, GR, IE, IT, PL, SK	-
2007	7	MSs: AT, CZ, EE, ES, IE, SI, SK	-
2008	5	MSs: AT, CZ, ES, IE, IT	-
2009	5	MSs: AT, ES, HU, IE, PT	-
Special food			
2007	1	MS: AT	-
2009	1	MS: IE	-

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA41. Number of meat samples from different animal species tested for VTEC, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Meat from broilers						
Slaughter	-	-	-	5	-	-
Processing	-	-	-	11	-	-
Retail	-	19	16	22	205	31
Unspecified	-	553	634	1,188	33	46
Meat from turkey						
Retail	-	3	-	-	13	1
Unspecified	-	79	33	20	-	37
Meat from pig						
Slaughter	164	-	25	21	-	-
Processing	137	-	74	55	4	192
Retail	511	13	193	121	4,007	1,577
Unspecified	645	1,811	1,714	4,304	268	675
Meat from bovine animals						
Slaughter	1,459	2,554	1,235	2,134	1,587	1,407
Processing	359	689	297	5,604	1,212	837
Retail	732	470	442	2,898	6,775	5,566
Unspecified	1,146	2,473	4,330	3,045	172	242
Meat from other animal species						
Slaughter	90	-	78	95	9	36
Processing	24	-	34	13	5	9
Retail	328	71	163	495	2,188	598
Unspecified	1,614	2,657	3,242	1,107	532	2,496
Non-MS[(a)]						
Meat from broilers						
Unspecified	-	-	135	-	-	-
Meat from pig						
Unspecified	-	-	248	-	-	-
Meat from bovine animals						
Slaughter	1,252	-	-	-	-	-
Unspecified	-	-	2,081	-	-	-
Meat from other animal species						
Slaughter	282	-	-	-	-	-
MS total						
Slaughter	1,713	2,554	1,338	2,255	1,596	1,443
Processing	520	689	405	5,683	1,221	1,038
Retail	1,571	576	814	3,536	13,188	7,773
Unspecified	3,405	7,573	9,953	9,664	1,005	3,496

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA42. Number of meat samples from different animal species tested for VTEC in MSs[(a)], batch based data and unspecified sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
Batch						
Meat from broilers						
Slaughter	-	-	-	-	20	15
Processing	-	-	-	-	30	-
Retail	-	-	-	40	-	-
Unspecified	-	22	74	7	351	568
Meat from turkey						
Slaughter	-	-	-	-	16	-
Unspecified	-	17	29	-	-	215
Meat from pig						
Slaughter	-	-	-	-	648	262
Processing	-	-	-	7	3,335	-
Unspecified	-	132	1,302	724	304	592
Meat from bovine animals						
Slaughter	-	100	-	536	1,691	1,091
Processing	-	-	-	-	4,830	577
Retail	28	280	-	40	692	96
Unspecified	-	102	1,026	308	38	20
Meat from other animal species						
Slaughter	-	25	-	-	2	107
Processing	-	-	-	-	155	132
Retail	-	56	-	23	-	-
Unspecified	4	12	46	-	36	1

(Continue next page)

Table DA42 (Contd.). Number of meat samples from different animal species tested for VTEC in MSs[(a)], batch based data and unknown sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
Unspecified sampling unit						
Meat from turkey						
Processing	27	-	-	-	-	-
Retail	1	-	-	-	-	-
Unspecified	-	-	-	-	-	-
Meat from pig						
Slaughter	298	105	-	-	-	-
Processing	1,157	180	-	-	-	-
Retail	526	309	-	-	-	-
Unspecified	-	401	-	-	-	-
Meat from bovine animals						
Slaughter	203	550	-	-	-	-
Processing	7,484	158	-	-	-	-
Retail	164	261	-	264	-	-
Unspecified	-	964	-	-	-	-
Meat from other animal species						
Slaughter	110	172	-	-	-	-
Processing	1,729	169	-	-	-	-
Retail	537	438	-	-	-	-
Unspecified	2,347	1,021	-	-	-	-
MS total						
Batch						
Slaughter	-	125	-	536	2,377	1,475
Processing	-	-	-	7	8,350	709
Retail	28	336	-	103	692	96
Unspecified	4	285	2,477	1,039	729	1,396
Unspecified sampling unit						
Slaughter	501	655	-	-	-	-
Processing	10,397	507	-	-	-	-
Retail	1,256	1,344	-	367	692	96
Unspecified	2,347	2,386	-	-	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA43. Number of samples in different food categories tested for tested for VTEC, single samples, 2004-2009

	2004	2005	2006	2007	2008	2009
MS[(a)]						
Meat and meat products						
Slaughter	1,713	2,554	1,338	2,255	1,596	1,443
Processing	520	689	405	5,683	1,221	1,038
Retail	1,571	576	814	3,536	13,188	7,773
Unspecified	3,405	7,573	9,953	9,664	1,005	3,496
Eggs and egg products						
Retail	-	2	-	3	3	4
Unspecified	-	1	206	-	48	-
Milk, cheese and dairy						
Farm	-	324	563	101	706	368
Processing	-	39	187	392	1,155	1,966
Retail	-	13	62	190	263	200
Unspecified	3,055	6,586	3,179	1,528	478	2,734
Fish and fishery products						
Retail	-	6	2	2	6	3
Unspecified	529	906	523	355	36	207
Fruit and vegetables						
Processing	-	20	-	-	-	-
Retail	-	66	5	2,025	5	5
Unspecified	20	138	1,276	231	971	61
Other food						
Farm	-	-	-	-	-	4
Processing	-	-	-	24	-	-
Retail	-	33	36	356	120	166
Unspecified	710	785	3,418	987	55	48
Special food						
Retail	-	-	-	6	-	3
Non-MS[(a)]						
Meat and meat products						
Slaughter	1,534	-	-	-	-	-
Unspecified	-	-	2,464	-	-	-
Milk, cheese and dairy						
Processing	-	-	411	352	697	-
Unspecified	-	59	1,205	-	-	-
MS total						
Farm	-	324	563	101	706	372
Slaughter	1,713	2,554	1,338	2,255	1,596	1,443
Processing	520	748	592	6,099	2,376	3,004
Retail	1,571	694	919	6,115	13,582	8,150
Unspecified	7,719	15,989	18,555	12,765	2,593	6,546

(a): Bulgaria and Romania joined the European Union in 2007, hence data from 2004-2006 are included in the analysis for Non-MSs and data from 2007-2009 are included in the analysis for MSs.

Table DA44. Number of samples in different food categories tested for VTEC in MSs[(a)], batch based data, 2004-2009

	2004	2005	2006	2007	2008	2009
Meat and meat products						
Slaughter	-	125	-	536	2,377	1,475
Processing	-	-	-	7	8,350	709
Retail	28	336	-	103	692	96
Unspecified	4	285	2,477	1,039	729	1,396
Eggs and egg products						
Processing	-	-	-	-	1	1
Milk, cheese and dairy						
Farm	-	-	-	-	20	-
Processing	-	871	-	39	29	47
Retail	-	-	-	25	-	-
Unspecified	2,304	233	3,906	938	700	3,798
Fish and fishery products						
Processing	-	-	-	9	5	-
Unspecified	-	-	67	-	-	-
Fruit and vegetables						
Processing	-	-	-	-	11	5
Retail	-	29	-	-	49	-
Unspecified	-	-	12	-	-	37
Other food						
Processing	-	-	-	-	103	-
Unspecified	-	-	1,570	-	-	-
MS total						
Slaughter	-	125	-	536	2,377	1,475
Processing	-	871	-	55	8,498	761
Retail	28	365	-	128	741	96
Unspecified	2,308	518	8,032	1,977	1,429	5,231

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.

Table DA45. Number of samples in different food categories tested for VTEC in MSs[(a)], unspecified sampling unit, 2004-2009

	2004	2005	2006	2007	2008	2009
Meat and meat products						
Slaughter	611	827	-	-	-	-
Processing	10,427	507	-	-	-	-
Retail	1,242	1,008	-	264	-	-
Unspecified	2,347	2,386	-	-	-	-
Eggs and egg products						
Processing	2	-	-	-	-	-
Retail	3	-	-	-	-	-
Unspecified	1,274	53	-	-	-	-
Milk, cheese and dairy						
Processing	74	-	-	-	-	-
Retail	186	-	-	-	-	-
Unspecified	4,827	1,299	-	-	-	-
Fish and fishery products						
Processing	1	-	-	-	-	-
Retail	3	-	-	-	-	-
Unspecified	535	304	-	-	-	-
Fruit and vegetables						
Unspecified	120	50	-	-	-	-
Other food						
Processing	1,021	-	-	-	-	-
Retail	29	-	-	-	-	-
Unspecified	710	2,175	-	-	-	-
MS total						
Slaughter	611	827	-	-	-	-
Processing	11,525	507	-	-	-	-
Retail	1,463	1,008	-	264	-	-
Unspecified	9,813	6,267	-	-	-	-

(a): Bulgaria and Romania joined the European Union in 2007, hence only data from 2007-2009 are included in the analysis.