# Porovnání počtu onemocnění Salmonellou typhimurium v letním a zimním období v ČR za období 2007/2012

## Comparison of the number of Salmonella typhimurium deseases in the Czech republic in summer and winter seasons during the period of 2007/2012

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Bakalářská práce

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Univerzita Tomáše Bati ve Zlíně
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1. **B. Rosický, W. Sixl a spol.: Salmonelózy. Scientica medica,Praha, 199 s. (1994).**
2. **J. Šimůnek, J. Smola: Antimikrobiální léčiva ve veterinární medicíně. Prion, Hradec Králové, 251 s. (2007). ISBN 80-903188-8-6.**
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Vedoucí bakalářské práce: **prof. Ing. Lubomír Lapčík, Ph.D.**
Ústav technologie potravin

Datum zadání bakalářské práce: **11. února 2013**

Termín odevzdání bakalářské práce: **17. května 2013**

Ve Zlíně dne 11. února 2013

L.S.

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**ABSTRAKT**

Abstrakt česky

Práce je zaměřena na problematiku výskytu *Salmonelly Typhimurium* ve Zlínském Kraji v rozmezí let 2007 - 2012 a salmonel v České republice. V těchto letech je porovnáván počet onemocnění u různých věkových kategorií obyvatel, podle pohlaví, věku apod. ve Zlínském kraji. Data uvedená v mé práci byla poskytnuta Krajskou Hygienickou stanicí ve Zlíně. Obsah práce je rozdělen na dvě části. Část teoretickou a praktickou. V první části práce jsou zpracovány informace týkající se jednotlivých druhů salmonel, *Salmonelly typhimurium* , způsobu nákazy, původu, a také léčby onemocnění. V druhé části práce jsou zpracována data z Krajské hygienické stanice Zlín do jednotlivých grafů a tabulek rozdělených dle různých kritérií. Jsou zde porovnána i data ze zemí Evropské unie. Cílem práce je ukázat, že výskyt *Salmonelly typhimurium* je závažným celosvětovým problémem, který je třeba nadále monitorovat a snažit se snížit jejich počet na minimum.

Klíčová slova: *Salmonella typhimurium,* KHS Zlín, druhy salmonel, kritéria, monitoring.

## ABSTRACT

Abstrakt ve světovém jazyce

The work is focused on the prevalence of Salmonella Typhimurium in the Zlin region between the years of 2007 - 2012 and salmonella in the Czech Republic. In these years it is compared to the number of diseases in various age groups of the population, by gender, age, etc. in the Zlín Region. Data referred to in my work were provided by the Regional Hygiene Station in Zlin. The work is divided into two parts. Theoretical part and practical part. The first part of the thesis contains information about different types of salmonella, Salmonella typhimurium, method of infection, origin, and treatment of disease. In the second part of the Bc. thesis processed data from the regional health monitoring authority in Zlín in various graphs and tables are divided according to different criteria. There are also compared data from the European Union. The aim of this thesis was to show that the incidence of Salmonella typhimurium is a serious global problem that must be continually monitored and seek to reduce them to a minimum in human population.

Keywords: *Salmonella typhimurium*, KHS Zlín, Salmonella species, criteria, monitoring.

Rád bych poděkoval vedoucímu své bakalářské práce panu prof. Ing. Lubomíru Lapčíkovi, Ph.D. za odbornou pomoc a poskytnutí vhodných materiálů, dále pak paní MUDr. Haně Tkadlecové z Krajské hygienické stanice Zlín za vstřícný přístup a informace ohledně výskytu *Salmonelly typhimurium* ve Zlínském kraji.

## OBSAH

# ÚVOD

Salmonelózy patří mezi alimentární nákazy. Vyskytují se celosvětově a mají větší význam ve vyspělých zemích, což pravděpodobně souvisí s hromadnou živočišnou výrobou, skladováním potravin a přechodem na rychlý způsob stravování. Zdrojem infekce bývají nejčastěji hospodářská zvířata, jako skot, drůbež, ale i hlodavci, ptáci a plazi. Člověk se jako zdroj uplatňuje jen vyjímečně při hrubém nedodržení hygienických zásad.

*Salmonella typhimurium* zaujímala desetiletí první místo mezi salmonelózami. Kolem roku 1987 náhle převážila *Salmonella enteritidis* ve velmi virulentní formě. Díky šetřením, která nastala, bylo prokázáno, že bakterie se dostala do potraviny, jež byla považována za bezpečnou - do slepičích vajec.

Ve své práci se snažím poskytnout statistický obraz onemocnění *Salmonellou typhimurium* v průběhu let 2007-2012. Údaje jsou rozděleny do jednotlivých měst ve Zlínském kraji, podle pohlaví obyvatel, věku a hustoty osídlení Zlínského kraje. Jsou zde zpracovány také údaje o výskytu všech druhů salmonel v krajích České republiky.

Cílem práce je mimo jiné ukázat, jak důležité je dbát na hygienu stravování a dostatečnou tepelnou úpravu zejména masných a jiných živočišných produktů. Je lépe onemocnění salmonelou předcházet, protože jak je známo, zejména *Salmonella typhimurium* je vůči léčbě antibiotiky vysoce odolná a navíc vylučování salmonel může vyjímečně přesáhnout i rok.

Ve své práci se snažím rovněž poukázat na to, že salmonelózy jsou opravdu velmi rozšířeným infekčním onemocněním, a to i přes neustálá varování a upozorňování ze strany odborníků před konzumací tepelně neopracovaných či nedostatečně tepelně opracovaných produktů živočišné výroby. I přes kontroly veterinárních orgánů a systému HACCP, který dohlíží na správné hygienické postupy při výrobě a distribuci potravin, dochází k šíření této alimentární nákazy.

# I. TEORETICKÁ ČÁST

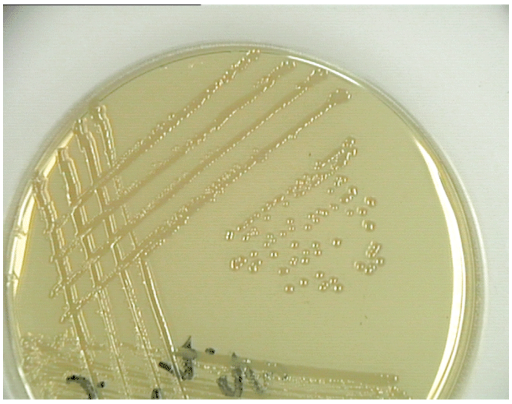
# 1 SALMONELÓZY

Jde o nejrozšířenější alimentární nákazu. V ČR je ročně nahlášeno několik desítek tisíc onemocnění. Rod *Salmonella* obsahuje podle nejnovějších taxonomických studií pouze 4 druhy, z nichž některé byly dříve označovány jako podrody. Tyto druhy zahrnují přes 2500 sérotypů (čili sérovarů) a všechny jsou patogenní. Nejčastějšími původci jsou sérovary *S. enteritidis, S. typhimurium,* vzácneji *S. infantis* a další. Zdrojem nákazy jsou zvířata (drůbež, dobytek, hlodavci). K nákaze dochází požitím kontaminované potraviny, která nebyla dostatečně tepelně upravena. Nejčastěji jde o jídla připravená z vajec (majonézy, pomazánky), cukrářské a masné výrobky (krémy, zmrzlina, salámy a sekaná). K přenosu je nutná vysoká infekční dávka mikrobů, k mezilidskému přenosu kontaktem proto dochází jen vzácně. Může se však uplatnit u kojenců či u oslabených osob vyššího věku. Inkubační doba je 6 - 48 hodin [ 1 ].

Salmonelóza se obvykle u člověka projevuje jako akutní gastroenteritida nebo enterokolitida z potravin, má krátkou inkubační dobu, kdy po požití potraviny dochází k horečce, nevolnosti, vodnatým průjmům, mnohdy i vrhnutí, bolestem hlavy, někdy i k rozsevu bakterií do krve a lymfatického systému. Infekce může začít také jako enterokolitida s enterickou horečkou se septikemií a fokální infekcí. Vylučování stolicí přetrvává v akutní fázi po několik dnů až týdnů. Samo onemocnění trvá podle závažnosti příznaků 5 - 10 dnů [2].

Malá infekční dávka může vést pouze k asymptomatickému vylučování agens stolicí. Intenzita příznaků nejběžnější gastroenteritické formy kolísá od lehkého průjmu až k těžkému horečnatému průběhu s hrozbou dehydratace. Zánětem je postiženo především tenké střevo, ale byly popsány i kolitidy s nálezem abscesů v kryptách a ulcerací mukózy tlustého střeva. Ve stolici pak bývá přítomna příměs krve a hlenu [3].

Diagnostika salmonelových infekcí je založena na průkazu původce, tj. bakterií rodu *Salmonella*, v materiálu odebraném od postiženého pacienta či zvířete. Vyšetření se provádí z výtěrů z konečníku (rekta), či kloaky u ptáků, trusu, orgánů uhynulých zvířat, vajec. U lidí se průkaz provádí ze stolice, rektálních výtěrů, hemokultury a hnisavých ložisek a punktátů. Materiál určený k vyšetření je vhodné odebrat do transpotrního média, které zaručí přežití bakterií v době trasportu. Průkaz salmonel se provádí kultivací na selektivních diagnostických médiích. Typizace salmonel probíhá biochemicky a aglutinačně. Pro epidemioologické účely se využívá fagotypizace [9].



*Obr. 1* **Kultivace *Salmonelly typhimurium* .** Tvoří lesklé, vypouklé kolonie s celými okraji

Převzato s laskavým svolením z

**http://academic.pgcc.edu/~kroberts/web/colony/colony.htm**

Průkaz bakterií rodu *Salmonella* v potravinách plotnovou metodou se provádí dle ČSN EN ISO 6579 (2003) a zahrnuje 4 po sobě jdoucí stupně: pomnožení v neselektivní tekuté půdě – pufrovaná peptonová voda (PPV), pomnožení ve 2 tekutých selektivních půdách – Rappaport Vassiliadis sója médium (RVS médium) a Mueller-Kauffman tetrationát novobiocin médium (MKTTn médium), vyočkování a konfirmaci. Vyočkování se provádí na dvě pevné selektivní půdy – agar s xylózou, lyzinem a deoxycholátem (XLD agar) a kteroukoli jinou selektivní půdu např. agar s fenolovou červení a brilantovou zelení (BR agar) nebo chromogenní agar pro stanovení salmonel (např. Rambach agar, IRIS *Salmonella* agar [13].

Léčba gastroenterické formy salmonelózy spočívá v dostatečném příjmu tekutin a dietě. Antibiotika se při této formě neužívají, naopak jejich podání může celý proces eliminace salmonel z organismu zpomalit. Léčba formy tyfoidní a septické je především antibiotická [9].

## 1.1 Druhy Salmonel

V současnosti je popsáno více než 2200 sérotypů *Salmonella enterica*. V ČR se nejčastěji uplatňuje *Salmonella enterica* sérotyp *enteritidis*, která vyvolává více než 98% všech onemocnění [4].

Rod *Salmonella* je pojmenován po D. E. Salmonovi, americkém veterinárním lékaři, který objevil *S. choleraesuis* v roce 1884. Do roku 1914 bylo popsáno jen 12 sérotypů. Až po roce 1930 se začíná počet objevovaných salmonel nesmírně rozrůstat. Jména Salmonella bylo poprvé použito roku 1900 pro původce onemocnění prasat a roku 1933 kodifikováno Světovým salmonelovým komitétem. Podle moderní taxonomické studie Le Minora a spol. (1982) má rod *Salmonella* jen jeden druh se sedmi poddruhy (subspeciemi), které se dají rozlišit pomocí DNA-DNA hybridizace, biochemických a sérologických charakteristik. Každá ze sedmi subspecií se dělí na sérovary podle složení tělových a bičíkových antigenů. Nejjednodušší se jeví rozdělení na tyfózní salmonelózy tvořené původci *S. typhi*, *S. paratyphi A*, *B*, *C*, jež jsou patogenní pro člověka, který je (až na určité vyjímky) jejich rezervoárem, mají dlouhou inkubační dobu a dlouhé trvání onemocnění cyklického systémového charakteru, a na enteritické salmonelózy, které jsou převážně zoonotického původu, ale z nichž velká část je patogenní i pro člověka, s krátkou inkubační dobou a většinou s místním zánětem střeva vyvolaným původcem nebo jeho toxinem [2].

Tabulka č. 1 - Rozdělení salmonel
(http://fvl.vfu.cz/sekce_ustavy/mikrobiologie/mikrobiologie/praktikum11/2.jpg)

| **Sérologická skupina** | **Sérovar** | **O-antigeny** | **H-antigen** | |
|---|---|---|---|---|
| | | | **fáze 1** | **fáze 2** |
| **Skupina A** | | | | |
| | *S. Paratyphi A* | 1, 2, 12 | a | (1,5) |
| **Skupina B** | | | | |
| | *S. Abortusequi* | 4, 12 | . | e,n,x |
| | *S. Paratyphi B* | 1,4,(5),12 | b | 1,2 |
| | *S. Abony* | 1,4,12,27 | b | e,n,x |
| | *S. Abortusovis* | 4,12 | c | 1,6 |
| | *S. Saintpaul* | 1,4,(5),12 | e,h | 1,2 |
| | *S. Reading* | 1,4,(5),12 | e,h | 1,5 |

| | | | | |
|---|---|---|---|---|
| | *S. Agona* | 1,4,12 | f,g,s | - |
| | *S. Typhimurium* | 1,4,(5),12 | i | 1,2 |
| | *S. Lagos* | 1,4,12 | i | 1,5 |
| | *S. Agama* | 4,12 | i | 1,6 |
| | *S. Bredeney* | 1,4,12,27 | l,v | 1,7 |
| | *S. Heidelberg* | 1,4,(5),12 | y | 1,2 |
| **Skupina $C_1$** | | | | |
| | *S. Paratyphi C* | 6,7(Vi) | c | 1,5 |
| | *S. Choleraesuis* | 6,7 | (c) | 1,5 |
| | *S. Typhisuis* | 6,7 | C | 1,5 |
| | *S. Montevideo* | 6,7 | g,m(p),s | - |
| | *S. Infantis* | 6,7,14 | y | 1,5 |
| | *S. Bareilly* | 6,7,14 | y | 1,5 |
| **Skupina $C_2$** | | | | |
| | *S. Mienchen* | 6,8 | d | 1,2 |
| | *S. Newport* | 6,8 | e,h | 1,2 |
| **Skupina $D_1$** | | | | |
| | *S. Typhi* | 9,12(Vi) | d | - |
| | *S. Enteritidis* | 1,9,12 | g,m | (1,7) |
| | *S. Dublin* | 1,9,12(Vi) | g,p | - |
| | *S. Panama* | 1,9,12 | l,v | 1,5 |
| | *S. Gallinarum* | 1,9,12 | - | - |
| **Skupina E1** | | | | |
| | *S. Anatum* | 3,10 | e,h | 1,6 |
| | *S. Meleagridis* | 3,10 | e,h | l,w |
| | *S. Give* | 3,10 | l,v | 1,7 |

*Zdroj*: [14]

## 1.2 Původ onemocnění salmonelou

Základní podmínkou pro vznik epidemického procesu je přítomnost zdroje původce nákazy. Bývá jím, až na nepatrné vyjímky, infikovaný lidský nebo zvířecí organismus [4].

Původce nemoci může být izolován ze stolice a krve v průběhu akutní fáze na citlivých bakteriologických médiích [2].

Zdrojem salmonel může být člověk nebo zvíře. U člověka jde o případy dočasného (u *Salmonella enteritidis*) nosičství, kdy jsou baktérie vylučovány stolicí. Význam má především takové znečištění potravy, které může být následováno pomnožením bakterií - zde je nejvýraznější rozdíl oproti tyfu, paratyfům, ale i úplavici (*dysenterii*) nebo třeba i choleře, kde stačí jen dotknutí se hotového pokrmu znečištěnou rukou.

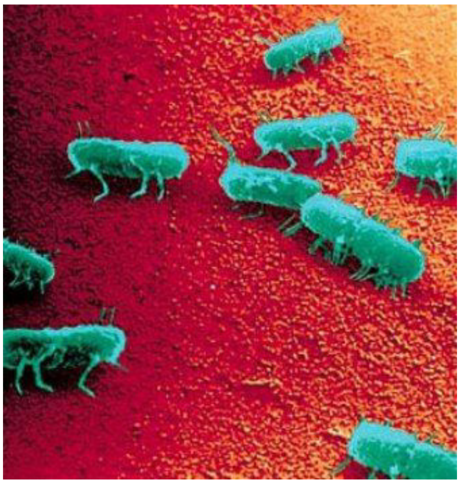
V případě zvířete se jedná nejen o zamezení přístupu nežádoucím zvířatům do prostor, kde se skladují potraviny se surovinami a připravují hotové pokrmy, ale počítat i s kontaminací potravin živočišného původu, které neprošly tepelnou úpravou.

Bezpečné je standardní (v obchodě kupované) mléko, které v mlékárně prochází pasterizací, spolehlivě ničící salmonely, a výrobky z nepasterizovaného mléka u nás není dovoleno prodávat. Rizikové je především maso (popř. krev), vejce a polotovary z nich (např. syrová sekaná), které neprošly tepelnou úpravou (uvažuje se o zavedení pasterizovaných vajec, ale dosud v běžném prodeji nejsou, byly by však stejně především pro účely velkovýroby). Riziková jsou i sušená vejce, protože životaschopné salmonely mohou skrze sušičku projít.

Maso a vejce je tedy nutno považovat za rizikové, pokud neprošly tepelnou úpravou. Uvedená tepelná úprava musí být důkladná, celý objem výrobku se musí na několik minut dostat nad teplotu 80 $^{o}$C. U vajec to znamená dokonalou koagulaci nejen bílku, ale i žloutku v celém objemu (ještě vejce "na hniličku" tedy není bezpečné) [15].

### *1.2.1 Salmonella typhimurium*

Tento druh salmonely byl poprvé izolován v červenci 1889 a v říjnu 1890 v Hygienickém ústavu University v Greifswaldu z uhynulých bílých myší [2]. Byla původcem tyfu myší (*Mus* = myš) [6]. Izolace byla zachycena Löfflerem roku 1892. V roce 1896 popsal Kaensche epidemii u lidí, která proběhla po konzumu z nucené porážky jedné krávy ve Vratislavi v roce 1893. Označení *Salmonella typhimurium var. copenhagen* dal Kauffmann v roce 1934 kulturám, jimž chyběl O-antigen 5. První kmeny byly izolovány začátkem května 1934 z případů gastroenteritidy onemocnělé pacientky z Kodaně [2].



*Obr. 2* ***Salmonella Typhimurium***

Převzato s laskavým svolením z

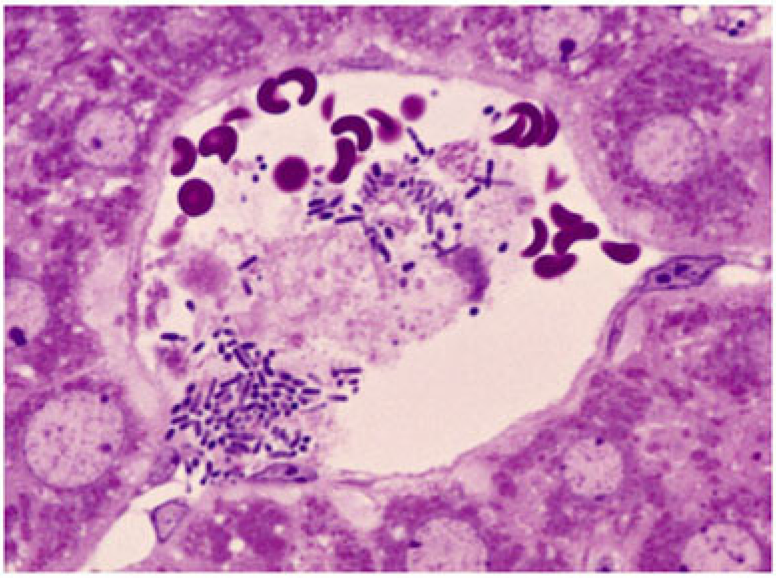
**http://interesnee.net/2008/03/11/nashi-malenkie-druzja-20-foto.html**

Jedná se o gramnegativní fakultativně anaerobní pohyblivé tyčinky z čeledi *Enterobacteriaceae* [4]. Buňky tvoří tyčinky se zaoblenými konci o rozměrech 2-3 µm x 0,5-1 µm. Množí se dělením [8]. Jsou značně odolné na zevní podmínky, mohou růst v prostředí s kyslíkem i bez něho, odolávají vyschnutí, ve vlhkém prostředí vydrží týdny, ve zmrazeném měsíce. Spolehlivě je ničí kyselé prostředí, teploty nad 70 °C i běžné dezinfekční prostředky [4]. Optimální teplota pro jejich růst je 37 °C. Z cukrů nerozkládají sacharózu a laktózu. Vytvářejí termostabilní endotoxiny [6].

Představu o nebezpečnosti tohoto druhu salmonely si učiníme, když uvedeme v jakých potravinách byly na pracovišti Státní veterinární správy nalezeny: sušená vejce, pasterovaná vaječná melanž, prešovská mozaika, drůbeží křídla s játry, žaludky, kuřecí játra - polotovar, kuřecí krky, slepičí pasta, kachní stehna, maso pro psy, slepičí vejce, hamburger, jatečně opracovaná kuřata [2].

Druh *Salmonella typhimurium* způsobuje velmi vážné, často i smrtelné onemocnění lidí – břišní tyf, které se projevuje silnými bolestmi hlavy a břicha, malátností a vysokými teplotami spojenými s blouzněním. Během inkubační doby, trvající 1-3 týdny, se bakterie ve střevním traktu pomnoží. Během nemoci jsou bakterie vylučovány výkaly nemocného, tak-že při nedostatečných hygienických podmínkách může dojít k epidemii. Někteří lidé jsou k tomuto onemocnění odolní, i když se v jejich střevním traktu původci břišního tyfu pomnoží. Tito lidé pak působí jako „bacilonosiči“, neboť vylučují s fekáliemi virulentní bakterie. Z hygienických důvodů nesmějí být bacilonosiči zaměstnáni v potravinářském průmyslu, potravinářské distribuční síti, ani v zařízeních hromadného stravování. *Salmonella typhimurium*, která je v přírodě velmi rozšířená a dostává se do organismu také potravinami, je patogenní i pro hlodavce [7].

Déletrvající rekonvalescentní vylučování (do 6 -ti měsíců) bývá častěji u kojenců a osob starších 60 let. Vznik chronického nosičství salmonel je však vyjímkou (1-5‰). Déle trvající vylučování salmonel stolicí byly pozorovány též u osob s AIDS [10].



*Obr. 3* ***Salmonella typhimurium*** v krevním řečišti

Převzato s laskavým svolením z

**http://www.nrc-cnrc.gc.ca/eng/education/biology/gallery/salmonella.html**

*Obr. 4* **Bakteriální infekce hostitelských buněk**: Patogeny typu ***Salmonella typhimurium*** (oranžová) navazují kontakt s lidskými hostitelskými buňkami (modrá). Převzato s laskavým svolením Christian Goosmann, Diane Schad, Rashmi Gupta a Michael Kolbe z **http://www.spacemart.com/reports/Zooming_in_on_bacterial_weapons_in_3D_999.htm**

# 2 ANTIBIOTIKA

Antibiotika jsou léky přírodního či syntetického původu užívané k léčbě infekčních onemocnění způsobených mikroorganismy - nejčastěji bakteriemi a v menší míře také některými druhy hub a parazitů. Antibiotika ale nejsou vůbec účinná při virových onemocněních [16].

Jsou to látky vznikající v látkovém metabolismu mikrobů, plísní, rostlin i živočišných tkání. Působí bakteriostaticky nebo baktericidně, vzácněji fungistaticky či fungicidně. V medicíně se používají jen antibiotika s význačným účinkem proti patogenním mikrobům, popř. plísním, některá i proti protozoím či helmintům, ale nejedovatá pro organismus zvířat či člověka [11].

Objev prvního antibiotika je připisován skotskému vědci, Alexandru Flemingovi, který si v roce 1928 všiml, že bakterie nemohou přežít v misce, která obsahuje i plíseň vyskytující se běžně na chlebu a tento jev vysvětlil přítomností rozpustné látky, kterou plíseň uvolňuje. Látka dostala název penicilin, ale na své široké využití si musela počkat do začátku 40. let, kdy vědci našli cestu, jak vyrábět velká množství čistého penicilinu [16].

Do medicínské praxe byla v širokém měřítku uvedena po 2. světové válce. Zavedení antibiotik umožnilo úspěšně léčit řadu infekčních onemocnění, jejichž terapeutické ovlivnění dříve známými prostředky nebylo prakticky reálné. Navíc umožnilo provádět dříve nerealizovatelné chirurgické zákroky včetně transplantací apod. vzhledem k výskytu infekčních komplikací [11].

V čem nám škodí antibiotika

- Poškození střevní mikroflóry - mikroflóra je po antibiotické léčbě více nebo méně narušena
- Zvýšená přecitlivělost na určitou látku
- Oslabení imunitního systému - má za následek opakované infekční onemocnění a celkové strádání lidského organismu.
- Únava
- Zažívací potíže
- Bolesti hlavy
- Alergické reakce
- Toxické projevy - postižení krve, sluchu, ledvin, jater, nervového systému.

- Riziko vzniku deformit plodu během těhotenství
- Gynekologické výtoky [17]

## 2.1 Účinek antibiotik

Pro antibakteriální látky je charakteristická jejich schopnost cíleného zásahu do určitých struktur bakteriální buňky. Podle toho o jakou strukturu jde, se potom odvíjí i celkový účinek antibiotika. Znalost zasahovaných cílů u jednotlivých antibiotik pak umožňuje i použití jejich kombinací. Zde je stručný výčet základních cílů:

Buněčná stěna bakterií - vytváří většinou silnou a tuhou vrstvu, která chrání cytoplazmatickou membránu proti vnějším vlivům. Charakteristickou složkou stěny je peptidoglykan (mukopeptid nebo také murein), který se vyskytuje pouze u bakterií. Peptidoglykan obsahuje dva cukry, kyselinu N-Acetylmuramovou a N- acetylglukosamin. Tetrapeptidy vycházející ze zbytků kyseliny N-acetylmuramové se navzájem vážou peptidickými můstky reakcí zvanou transpeptidace.

Buněčná stěna G+ bakterií je tvořena dominantně mohutnou vrstvou peptidoglykanu, kterou kolmo k povrchu pronikají řetězce kyseliny teichoové. Narozdíl od G- bakterií jsou všechny zbytky kyseliny N-acetylmuramové spojeny peptidickými můstky. Transpeptidace je inhibována působením beta-laktamových antibiotik.

Buněčná stěna G- bakterií je daleko složitější. Povrchovou vrstvu tvoří tzv. zevní membrána a pod ní je uložen peptidoglykan pouze v jedné vrstvě, která je součástí periplazmatického prostoru, který se nachází nad cytoplazmatickou membránou. Periplazmatický prostor obsahuje bílkoviny, které se funkčně uplatňují jako enzymy štěpící nebo transportující živiny. Některé z těchto enzymů jsou schopné inaktivovat antibiotika, jako například beta-laktamázy.

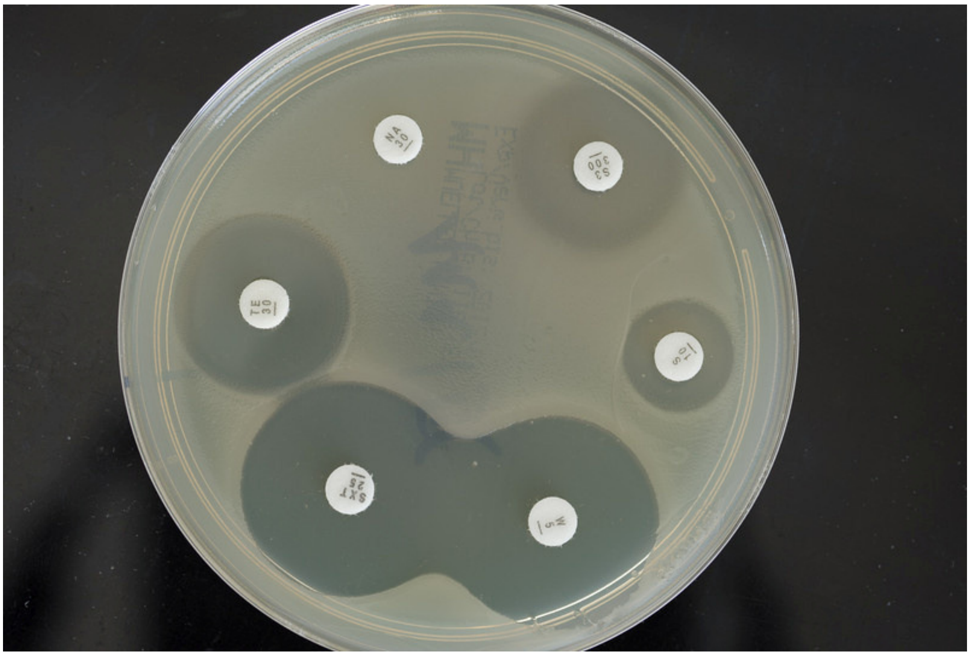
Zevní membrána brání prostupu řady látek do buňky, včetně některých antibiotik (erythromycin). Součástí zevní membrány, kterou tvoří fosfolipidová dvojvrstva je především lipopolysacharid (endotoxin), který vyčnívá polysacharidovou částí ven z membrány ve které je ukotven lipidovou částí (lipoid A). Vazbu zevní membrány na peptidoglykan zajišťují lipoproteiny vnořené do fosfolipidové dvojvrstvy zevní membrány.

Cytoplasmatická membrána se skládá hlavně z fosfolipidové dvojvrstvy a vnořených proteinů. Tyto bílkoviny se uplatňují v transportu živin do bakteriální buňky, dále v respiračních pochodech, v syntéze některých složek buněčné stěny a v sekreci látek z cytoplasmy do zevního prostředí nebo do stěny.

Syntéza proteinů - bakteriální ribozomy s 30S a 50S podjednotkami jsou pro léčiva dobrým cílem, protože se odlišují od ribozomálních podjednotek 40S a 60S člověka a zvířat. Syntézu proteinů inhibují: aminoglykosidy, amfenikoly, makrolidy a tetracykliny.

Metabolismus nukleidů - pro jejich metabolismus je nutná kyselina listová, která je u člověka získávaná vestavbou fosfátů z potravin, bakterie ji však musí samy syntetizovat z kyseliny paraaminobenzoové (PABA) a přeměnit ji na tetrahydrofolát; tyto pochody jsou dobrými cíly pro antibakteriální léčiva. Do syntézy a využití folátu zasahují negativně sulfonamidy a diaminopyrimidiny.

Bakteriální genom - chromosom a plasmidy jsou uloženy volně v cytoplazmě. Metabolismus DNA a RNA, replikace a transkripce jsou v mnohém ohledu podobné lidským, bakteriální topoisomeráza II se však odlišuje a je tak dobrým cílem pro léčiva. Na této úrovni zasahují fluorochinolony ale i ansamyciny jakožto i specifické inhibitory bakteriální RNA-polymerázy [11].



*Obr. 5* **Test rezistence na ATB rodu *Salmonella***. Na každém disku je uvedena zkratka ATB (SXT-ko-trimoxazol, TE-tetraciklin,NA-kyselina nalidixiova,W-trimetoprim,S-sulfonamidy,S3-sulfonamidy s potencovaným účinkem) a různý stupeň rezistence je vidět z odlišně velkých kruhů, kde probíhá inhibice růstu salmonely. S laskavým svolením převzato z

**http://machjakub.smugmug.com/Nature/Wildlife/5649027_LT7PgK/1786136510_9z37mbv#!i=1786136510&k=9z37mbv&lb=1&s=A**

## 2.2 Třídění antibiotik

Tabulka č. 2 Třídění antibiotik

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **β-Laktamy** | Peniciliny | *Přirozené peniciliny* | Penicilin G | Penicilin V | | | | |
| | | *Peniciliny rezist. k β-laktázám* | Oxalicin | Nafcilin | Cloxacilin | Dicloxacilin | Fluoxacilin | |
| | | *Aminopeniciliny* | Ampicilin | Amoxicilin | Amoxicilin | Ampicilin | | |
| | | *Peniciliny protipseudomo-nadové* | Ticarcilin | Tecarcilin | Mezlocilin | Piperacilin | | |
| | Cefalosporiny | *Cefalosporiny 1. generace* | Cefalotin | Cefazolin | Cefalexin | | | |
| | | *Cefalosporiny 2. generace* | Cefuroxim | Cefuroxim axetil | Cefamandol | Cefoxitin | Cefaclor | |
| | | *Cefalosporiny 3. generace* | Ciftriaxon | Cefotaxim | Cefoperazon | Ceftazidim | Moxalactam | |
| | | *Cefalosporiny 4. generace* | Cefepim | Cefpirom | | | | |
| | Karbapenemy | | Imipenem | Meropenem | | | | |
| | Monobactamy | | Aztreonam | | | | | |
| **Aminoglykosi-dy** | | | Streptomycin | Kanamycin | Gentamycin | Tobramycin | Netilmycin | Amikacin |
| **Tetracykliny** | | | Tetracyklin | Doxycyklin | Minocyklin | | | |
| **Makrolidy** | | | Erythromycin | Roxitro-mycin | Azitromycin | Josamycin | | |
| **Linkosamidy** | | | Linkomycin | Clindamycin | | | | |
| **Glykopeptidy** | | | Vancomycin | Teicoplanin | | | | |
| **Chinolony** | | | Ciprofloxacin | Norfloxacin | Ofloxacin | Perfloxacin | Lomefloxa-cin | |
| **Antimykotika** | | | Amphotericin B | Ketoconazol | Fluconazol | Clotrimazol | Flucytosin | Miconazol |
| | | | Chloramfenikol | | | | | |
| | | | Spectinomycin | | | | | |
| | | | Rifampin | | | | | |
| | | | Colistin | | | | | |
| | | | Fusidová kys. | | | | | |
| **Antimykotika** | | | Sulfametoxazol | Sulfonamid | | | | |

*Zdroj:* [12]

# 3. Statistika

Ve statistice se pracuje s několika základními pojmy, které si zde popíšeme. V prvé řadě jde o statistický soubor, což je konečná množina nějakých dat, která chceme zkoumat. Data mohou být obecná, může to být v zásadě cokoliv. Pokud chcete zkoumat počet onemocnění v České republice, bude statistickým souborem množina všech lidí v České republice. Počet prvků ve statistickém souboru se nazývá rozsah souboru. Rozsah námi definovaného statistického souboru by tak byl roven počtu obyvatel České republiky.

Dále existuje pojem statistická jednotka, což je konkrétní prvek statistického souboru. V našem případě by tak statistická jednotka byl jeden konkrétní člověk.

Nakonec máme statistický znak, což je to, co chceme měřit. V našem příkladě by statistickým znakem bylo onemocnění. Statistický znak může být buď kvalitativní nebo kvantitativní. Kvantitativní (kvantita = množství, počet) znak je takový znak, který je vyjádřitelný čísly (výška, počet, …), kvalitativní znak je pak vyjádřitelný slovně (barva, ano/ne,) [18].

Slovo statistika pochází z latinského „*status*“, což znamená stav. Původně se jednalo pouze o stav nějaké země či státu a statistikou se rozuměla činnost spočívající ve zjišťování tohoto stavu. Později se pole působnosti statistiky značně rozšířilo, statistika navíc přestala být pouze praktickou činností a stala se vysoce propracovanou vědeckou naukou. Dnes tato nauka zahrnuje velmi širokou škálu kvantitativních metod umožňujících zjišťovat „stav“ věcí a poměrů v rozličných strukturách. Kromě přírodních, společenských a hospodářských poměrů v daném státě lze zjišťovat např. hospodářské poměry v nějaké firmě, stav zásob v obchodním domě, stav vody na českých tocích, stav lesů v České republice apod.

Chceme-li zjistit „stav státu“, provedeme v něm např. sčítání lidu, podobně chceme-li zjistit stav zásob v obchodním domě, provedeme inventuru. Rovněž tak v lese můžeme provést inventuru, té se však v lesnické terminologii říká inventarizace. Tato inventarizace by mohla být v principu zaměřena na zjišťování stavu libovolných složek lesního ekosystému. Mohli bychom například zkoumat stav zvěře, lesních plodin, stromů, půdy, lesních cest apod. Středem zájmu lesníka je přitom zpravidla stav zásob dřeva. Popis stavu zásob dřeva spočívá v určení celé řady kvalitativních i kvantitativních údajů jako je např. biologický druh vyskytujících se dřevin a jejich původ, stáří stromů či jejich výška a tloušťka. Zrovna tak bychom ovšem mohli zaznamenat takové údaje jako stupeň opadu jehličí, velikost a počet šišek, kvalitu semen aj.

Zcela obecně pak při tzv. statistických zjišťováních zpravidla provádíme popis či měření velkého množství jistých hmotných objektů (např. výrobků, stromů či lidí), čímž získáme velké množství údajů (většinou číselných). Těmto údajům budeme říkat hromadná data (učený název pro hromadu čísel a údajů). Vzhledem k tomu, že získaná data nejsou v surové podobě ničím jiným než chaotickou a neuspořádanou horou údajů, nelze z nich bez dalšího zpracování vyčíst prakticky žádné užitečné informace. A právě takové zpracování hromadných dat, které vede k odhalení informací a zákonitostí v těchto datech skrytých, je předmětem statistiky.

Souhrn metod pro zpracování hromadných dat vedoucích k získání přehledných informací o konkrétních objektech, jejichž popisem a měřením byla data získána, tvoří tzv. statistiku popisnou (deskriptivní) [19].

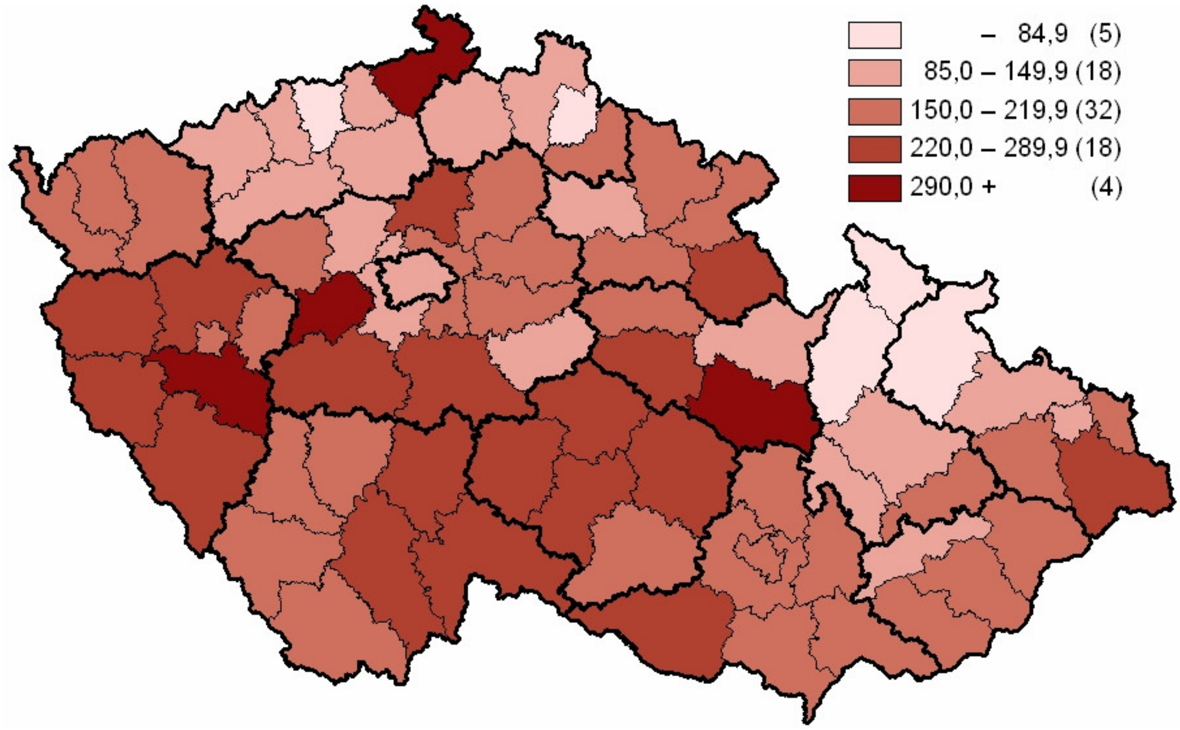
Nejprve se vymezí soubor prvků, na nichž se bude uvažovaný jev zkoumat. Následně se všechny prvky vyšetří z hlediska studovaného jevu. Výsledky šetření - kvalitativní i kvantitativní, vyjádřeny především číselným popisem - tvoří obraz studovaného hromadného jevu vzhledem k vyšetřovanému souboru [20].

Metody zpracování hromadných dat sloužící k odhalení obecných zákonitostí, které se v hromadných datech odrážejí, jsou pak předmětem statistiky matematické. Metody matematické statistiky jsou přitom metody matematické, založené převážně na teorii pravděpodobnosti [19]. Zatímco popisná statistika zkoumá soubory prvků přímo, matematická statistika zkoumá tyto soubory nepřímo prostřednictvím výběrů. Na získané údaje se pohlíží jako na výsledek určitého náhodného pokusu, který mohl dát i jiné výsledky. Tím se do zkoumání dostává určitý prvek náhodnosti, což má za následek, že všechny závěry matematické statistiky mají náhodný charakter. Matematická statistika je založena na počtu pravděpodobnosti a používá jeho pojmů. Základní soubor je množina všech prvků uvažované množiny. Z hlediska matematické statistiky lze tedy na základní soubor pohlížet jako na množinu všech prvků, které mohou být vybrány při výběrovém šetření do statistického výběrového souboru. O tento základní soubor se zajímáme a celého tohoto základního souboru se mají týkat všechny úsudky, vytvořené na základě výběrového statistického souboru. Termín znak a jeho dělení se zavádí stejně jako shora u popisné statistiky. V teoretických úvahách se velmi často nahrazuje původní základní soubor souborem hodnot sledovaného znaku na prvcích základního souboru. Při statistickém vyšetřování výsledků boje proti znečišťování toků jsou zajímavá a důležitá čísla vyjadřující množství znečištění, nikoliv to, že Nová Huť je větším znečišťovatelem než Ferona. Proto při zpracování netvoří základní soubor znečišťovatelé jako takoví, ale množství RAS - tedy hodnoty sledovaného znaku [20].

# II. PRAKTICKÁ ČÁST

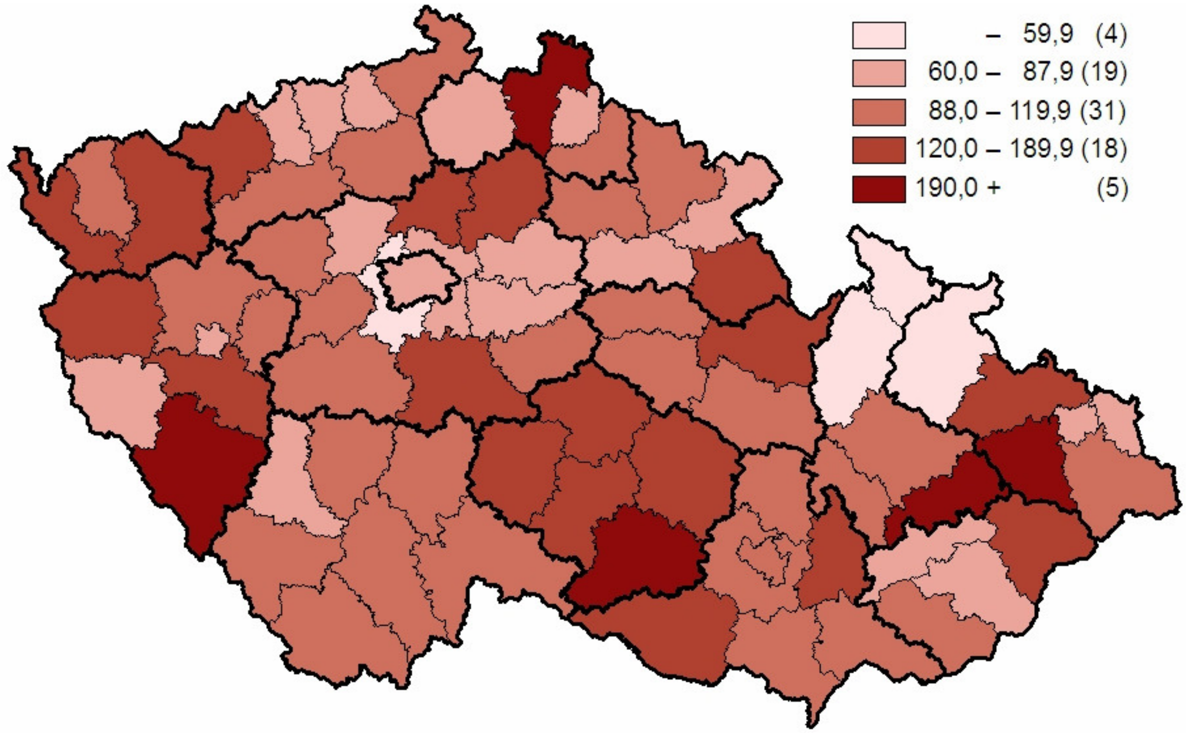
# 4 Výsledky a diskuze

## 4.1 Výskyt salmonelózy v okresech ČR v letech 2007-2012



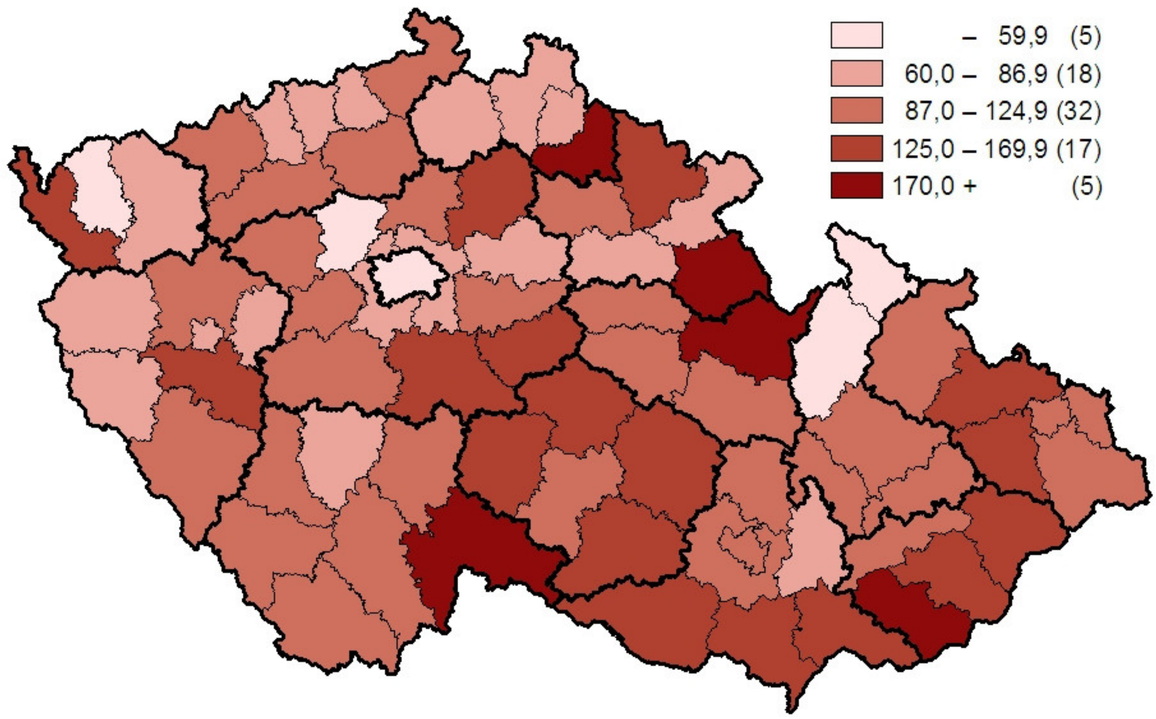

*Obr. 6* **Výskyt salmonelózy v okresech ČR na 100 000 obyvatel v roce 2007** [21]

Z hlediska četnosti výskytu infekcí se jako dlouhodobě nejzávažnější jeví střevní infekční nemoci. V roce 2007 bylo zaznamenáno přes 55 tisíc případů těchto onemocnění, tj. 41 % všech hlášených infekcí. Z těchto nemocí se ve většině případů jednalo o jiné bakteriální střevní infekce. Výskyt skupiny jiných bakteriálních střevních infekcí výrazně vzrostl mezi roky 1998 až 2005, a to téměř na 6 násobek úrovně v roce 1997. Poté došlo k poklesu incidence o necelou čtvrtinu a v roce 2007 opět mírně vzrostla na 263 případů na 100 tisíc obyvatel, z nichž téměř v 90 % případů byl původcem enteritidy *Campylobacter*. Druhé nejčastější střevní infekční onemocnění představují infekce způsobené salmonelami, které tvoří třetinu všech alimentárních onemocnění s incidencí 176 případů na 100 tisíc obyvatel. Výskyt salmonelóz se od roku 1998 i přes mírný nárůst v letech 2004 a 2005 snížil o 63 % a dosáhl tak nejnižší hodnoty za posledních 19 let [21].



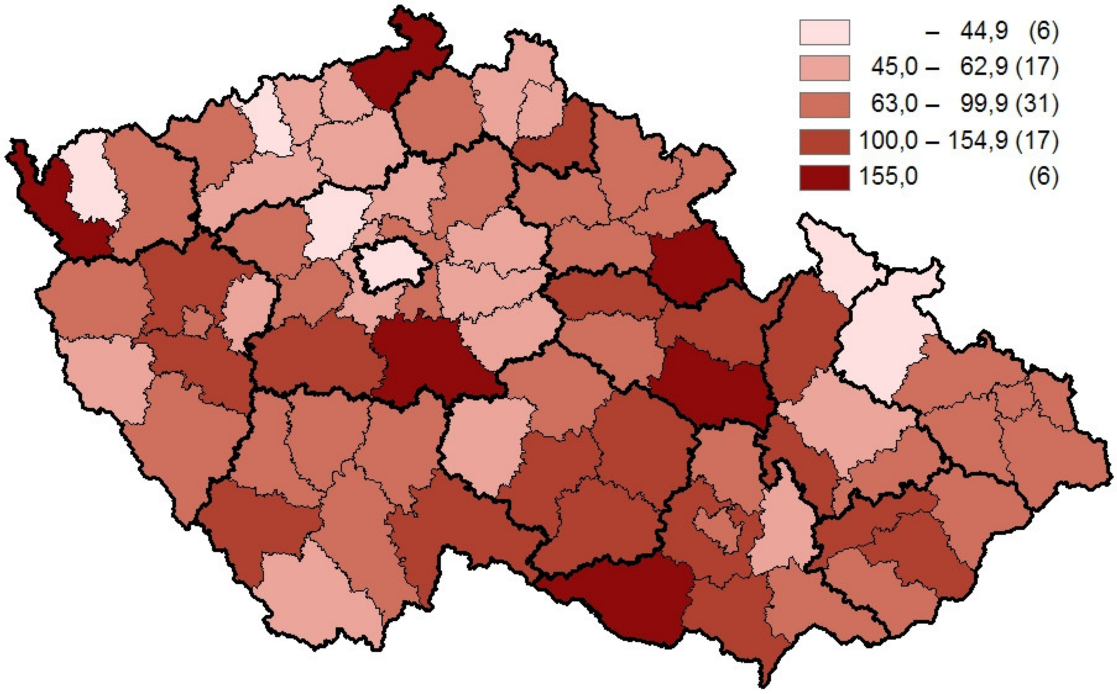

*Obr. 7* **Výskyt salmonelózy v okresech ČR na 100 000 obyvatel v roce 2008** [21]

Výrazný pokles výskytu střevních infekcí způsobených salmonelami od roku 2005 pokračoval i v roce 2008 až na třetinovou úroveň dosahující necelých 106 případů na 100 tisíc obyvatel [21].



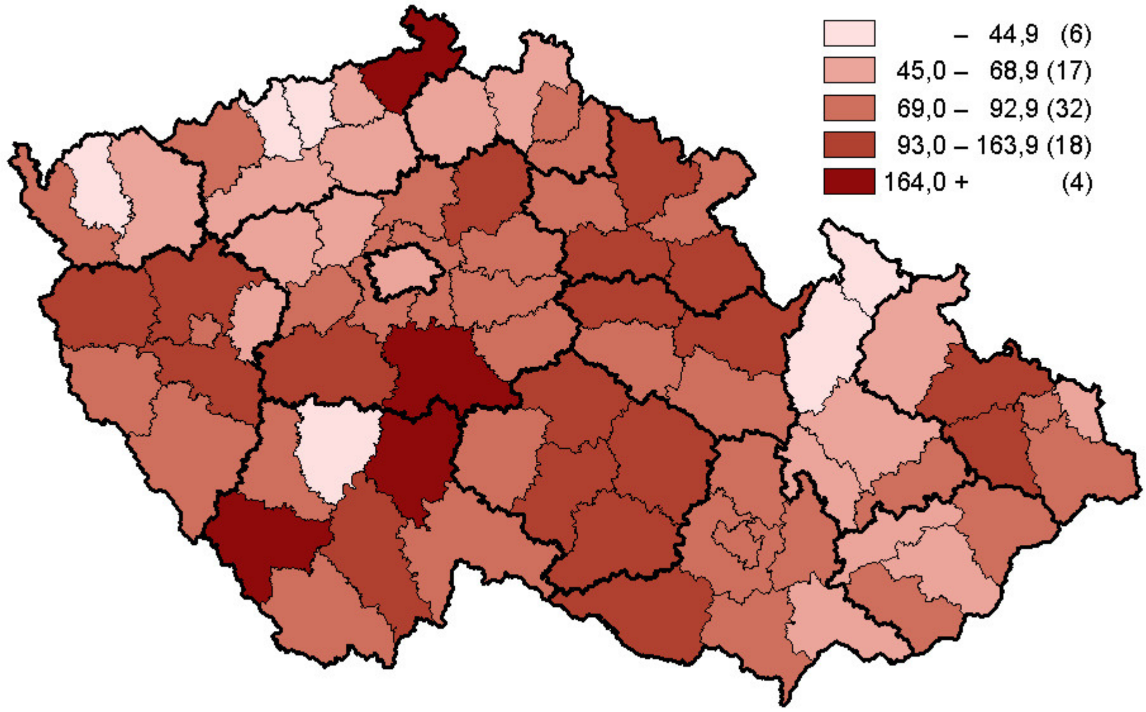

*Obr. 8* **Výskyt salmonelózy v okresech ČR na 100 000 obyvatel v roce 2009** [21]

Střevní infekční onemocnění zaujímala v roce 2009 i přes mírný pokles se svými 416 případy v přepočtu na 100 tisíc obyvatel více než třetinu hlášených případů infekčních onemocnění. Od roku 2005 dochází u těchto nemocí k postupnému poklesu výskytu, a to v přepočtu na obyvatele až o 42 %. Příčinou je především dlouhodobě klesající výskyt salmonelóz, které byly po roce 2006 výrazně předstiženy kampylobakteriózami se 194 případy na 100 tisíc obyvatel v roce 2009 [21].




*Obr. 9* **Výskyt salmonelózy v okresech ČR na 100 000 obyvatel v roce 2010** [21]

Skupina střevních infekčních onemocnění čítala v roce 2010 přes 45,4 tisíc hlášení. Po poklesu v letech 2008 a 2009 došlo k nárůstu o 4 % na 432 případů na 100 tisíc obyvatel. Přesto je počet hlášení tohoto druhu nákaz oproti roku 2007 o 19 % nižší. Opět výrazně poklesl o čtvrtinu výskyt salmonelóz na 82 případů na 100 tisíc obyvatel, přičemž ještě před rokem 2005 představovala tato onemocnění nejčastější střevní infekce s více než třemi sty případy ročně. Zaznamenány byly také 4 případy břišního tyfu a jeden případ paratyfu, jehož původci patří též mezi salmonely [21].



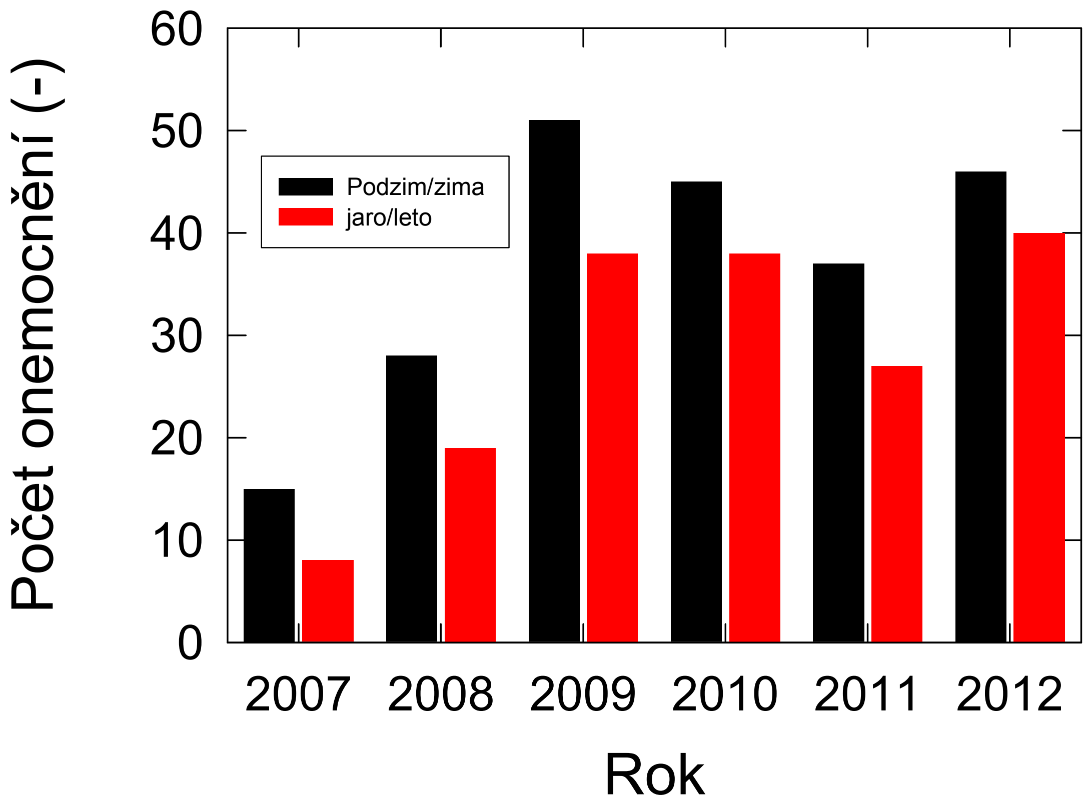

*Obr. 10* **Výskyt salmonelózy v okresech ČR na 100 000 obyvatel v roce 2011** [21]

U početně významné skupiny střevních infekčních nemocí, s podílem 36 % v rámci informačního systému EPIDAT, byl zaznamenán ve srovnání s předchozím rokem pouze nepatrný nárůst počtu hlášení o 491 případů více na 45 934 hlášení. Po přepočtu na 100 tisíc obyvatel se jednalo o nárůst incidence o 1,3 % na 437,6 případů. Zastavil se pokles počtu jiných infekcí způsobených salmonelami a jejich počet nepatrně vzrostl na 8 752 případů, tj. 83,4 případů na 100 tisíc obyvatel. Mezi infekce způsobené salmonelami patří také břišní tyfus a paratyfus, u něhož bylo zaznamenáno 8 případů. Od roku 2008 se po výrazném poklesu skupiny bakteriálních střevních infekcí projevuje spíše stagnace jejich výskytu a po mírném nárůstu počtu hlášení v roce 2010 došlo ke zpětnému poklesu na úroveň incidence 223 případů na 100 tisíc obyvatel, tj. 23 418 hlášení. Z tohoto celkového počtu se jedná nejčastěji o kampylobakteriózy s 18 811 případy, jejichž podíl na této skupině infekcí se tak snížil na 80 %. Střevní infekční onemocnění nejvíce zasahují děti do 5 let věku, u kterých incidence činila až 28 hlášení na tisíc obyvatel. Necelé procento, tj. 439 případů střevních infekcí, bylo hlášeno u cizinců. Výskyt střevních infekcí je v letních měsících až dvojnásobný než v zimním období. Nejvyšší incidencí se s 634 případy na 100 tisíc obyvatel vyznačoval Zlínský kraj, dále Moravskoslezský (558) a Jihomoravský (555) kraj. Z důvodu střevních infekcí zemřelo v průběhu roku 2011 286 osob [21].


*Obr. 11* **Okresy České republiky** [21]

# 5 VÝSKYT POČTU ONEMOCNĚNÍ *SALMONELLOU TYPHIMURIUM* V LETNÍM A ZIMNÍM OBDOBÍ VE ZLÍNSKÉM KRAJI V LETECH 2007-2012

*Graf č. 1* Počet onemocnění v letním a zimním období




*Zdroj:* [23]

*Tabulka č. 3* Počet onemocnění dle týdnů v období podzim - zima

| **Týden** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** |
|---|---|---|---|---|---|---|
| 1 | | | 2 | 2 | | |
| 2 | | | 1 | | 2 | |
| 3 | | | | | | 1 |
| 4 | | 1 | | 1 | | 1 |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | 1 | |
| 8 | | | | 1 | | 2 |
| 9 | | | | | | |
| 10 | 1 | | 2 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 11 | | | | | | |
| 44 | 1 | 1 | | | 1 | |
| 45 | 1 | | 2 | 1 | 1 | |
| 46 | 1 | 1 | | 1 | 2 | 2 |
| 47 | 1 | 2 | 2 | | | |
| 48 | | 1 | 1 | 1 | 1 | |
| 49 | 1 | 1 | 1 | | 2 | |
| 50 | 1 | | 1 | | | |
| 51 | | 1 | 1 | | | |
| 52 | | | | | | |
| 53 | | 1 | | | | |
| **Celkem** | **15** | **28** | **51** | **45** | **37** | **46** |

*Zdroj:* [23]

Tabulka č. 4 Počet onemocnění dle týdnů v období jaro - léto

| | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** |
|---|---|---|---|---|---|---|
| 12 | | | | | | 2 |
| 13 | | | | | | 1 |
| 14 | | | | 1 | 1 | 2 |
| 15 | | 1 | | 1 | | |
| 16 | 1 | | 1 | 2 | | 2 |
| 17 | | | 1 | | | |
| 18 | | | | 1 | | |
| 19 | | 1 | 1 | | 1 | 2 |
| 20 | | | 2 | 1 | 1 | |
| 21 | | 1 | 1 | 1 | 1 | |
| 22 | 1 | | | | 1 | 2 |
| 23 | | | 1 | 1 | 1 | 1 |
| 24 | | 1 | | | | 2 |
| 25 | | | 3 | | 1 | 1 |
| 26 | | | 1 | | 1 | 1 |
| 27 | | 1 | | 1 | | |
| 28 | | | | 2 | 1 | |
| 29 | 1 | 1 | | 1 | | 1 |
| 30 | | | | 2 | 3 | |
| 31 | | 1 | 2 | 1 | 3 | 1 |
| 32 | 1 | 1 | | 2 | 1 | |
| 33 | | | 1 | | | 2 |
| 34 | 1 | | 1 | 4 | | |
| 35 | | 1 | 1 | 3 | 2 | 1 |
| 36 | 2 | 2 | 1 | 1 | 2 | 1 |
| 37 | | 1 | 2 | 2 | 1 | 5 |
| 38 | | 2 | 2 | 2 | 1 | 1 |

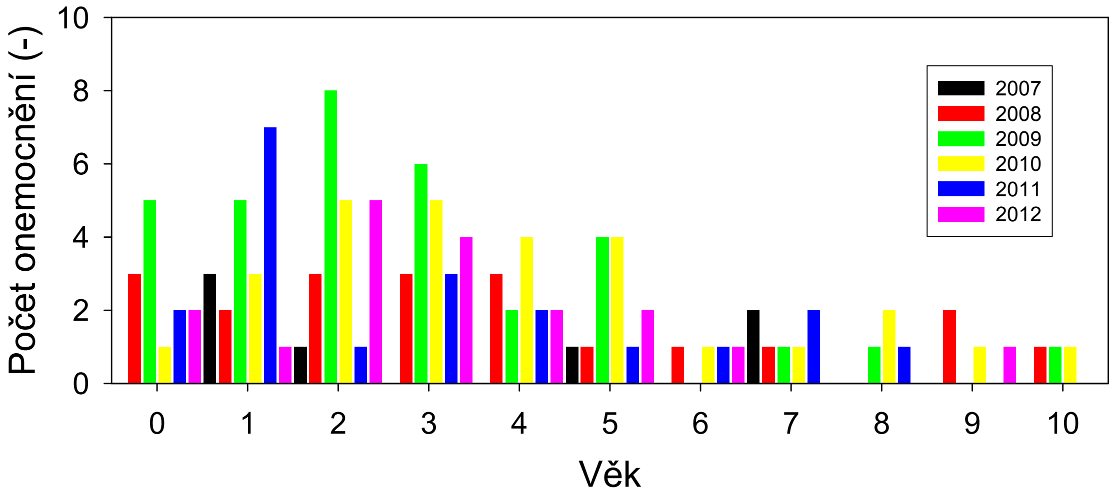
| | | | | | | |
|---|---|---|---|---|---|---|
| 39 | | | 5 | 1 | | 2 |
| 40 | | 2 | 4 | 5 | 3 | 2 |
| 41 | | | 2 | 1 | 2 | 3 |
| 42 | 1 | | 3 | 1 | | 2 |
| 43 | | 3 | 3 | 1 | | 3 |
| **Celkem** | **8** | **19** | **38** | **38** | **27** | **40** |

*Zdroj:* [23]

Dalo by se předpokládat, že výskyt salmonel bude vyšší v letním období, jelikož rod *Salmonella* se nejlépe množí při teplotách 37°C, ale jak můžeme vysledovat z přiloženého grafu, u Salmonelly typhimurium tomu tak není. Opačnou skutečnost lze zdůvodnit vyšší opatrností spotřebitelů při konzumaci tepelně neopracovaných produktů a jejich celkovou nižší prodejností v teplých měsících, kdy se výskyt tohoto druhu nejvíce předpokládá. Nejvyšší výskyt salmonely byl ve sledovaném období zaznamenán v období podzim/zima roku 2009, jednalo se o 51 hlášených případů. Naopak nejnižší výskyt byl zaznamenán v létě roku 2007, a to pouhých 8 hlášených případů.

## 5.1 ONEMOCNĚNÍ *SALMONELLOU TYPHIMURIUM* DLE VĚKOVÉ STRUKTURY OBYVATEL

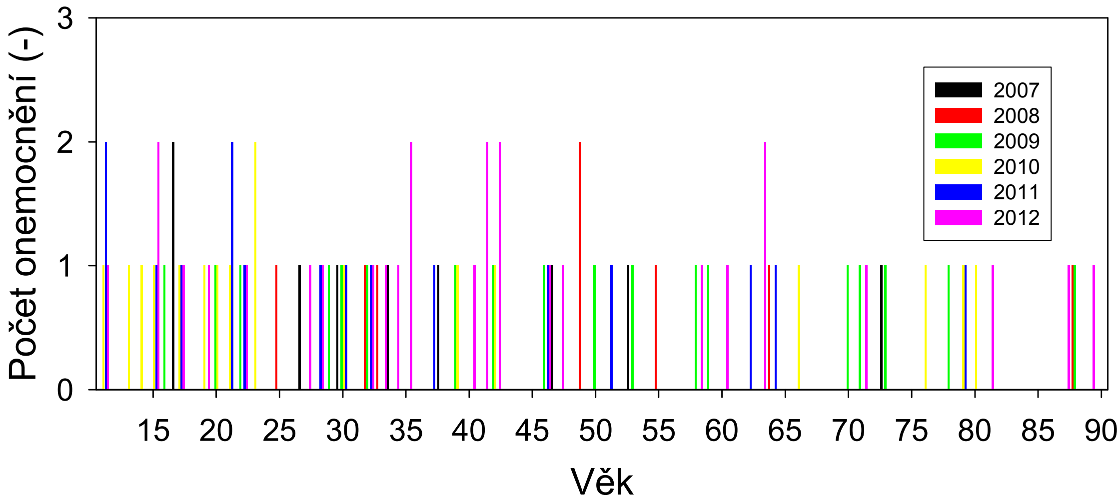
*Graf č. 2* Počet onemocnění u dětí do 10-ti let




*Zdroj:* [23]

Zajímavé je, že výskyt salmonel v dětském věku převyšuje výskyt salmonel u dospělých jedinců. Zřejmě je to způsobeno větší náchylností dětského organismu k infekčním onemocněním a také nedostatečnou hygienou před i při konzumaci potravin. Nejvyšší výskyt tohoto onemocnění byl zaznamenán u dětí ve věku dvou let, jednalo se o 8 jedinců. Naopak nejnižší výskyt *Salmonelly typhimurium* byl u dětí ve věku 10-ti let, kdy dochází ke zvýšené aktivitě imunitního systému, tudíž je menší náchylnost k onemocnění.

*Graf č. 3* Počet onemocnění u osob starších 10-ti let




*Zdroj:* [23]

Nízký výskyt onemocnění u dospělých může být způsoben i nenahlášením případu na epidemiologickou stanici. Důvodem by mohla být i případná nevědomost o jaké onemocnění se jedná, a také to, že se většina spoléhá na domácí léčbu. Ve věku od 15 -ti let došlo k výskytu infekce *Salmonellou typhimurium* maximálně u 2 jedinců.

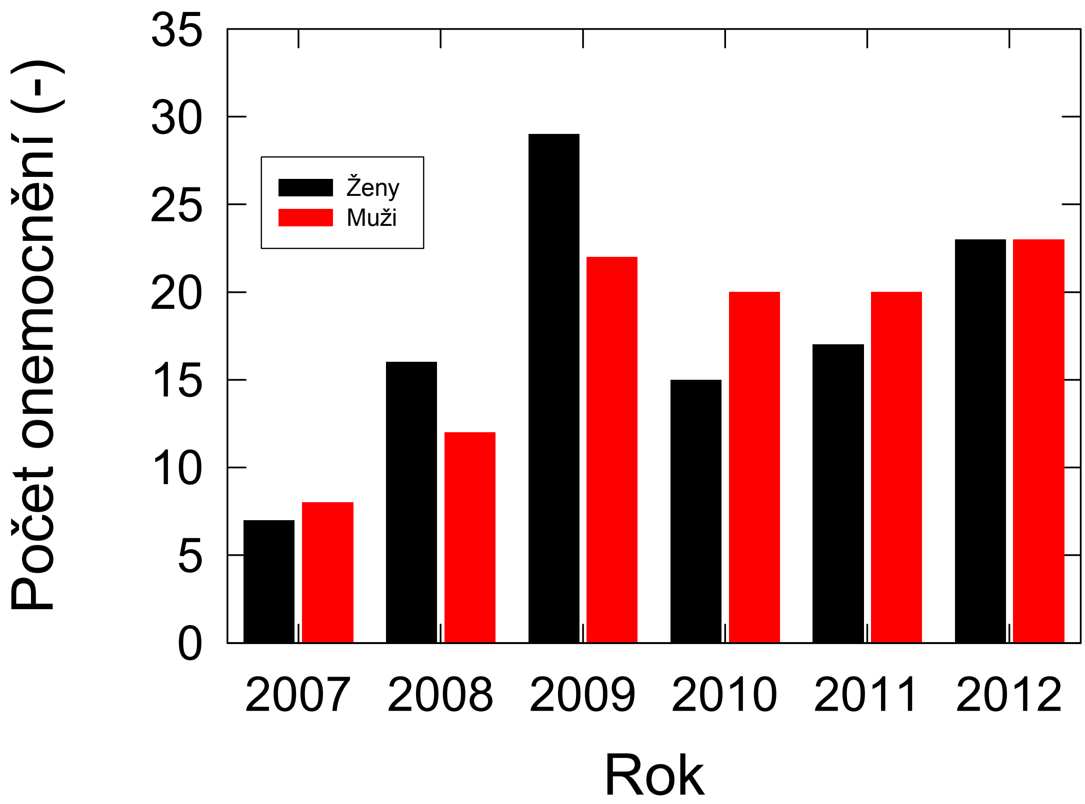
## 5.2 POROVNÁNÍ ONEMOCNĚNÍ *SALMONELLOU TYPHIMURIUM* DLE POHLAVÍ OBYVATEL

Tabulka č 5 - Počet onemocnění dle pohlaví

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|
| **Ženy** | 7 | 16 | 29 | 25 | 17 | 23 |
| **Muži** | 8 | 12 | 22 | 20 | 20 | 23 |

*Zdroj:* [23]

*Graf č. 4* Porovnání počtu onemocnění u mužů a žen




*Zdroj:* [23]

Již z předchozích údajů je patrné, že v roce 2009 byl výskyt *Salmonelly typhimurium* nejvyšší za sledované období. Teoretický podíl na tomto faktu mohou mít i povodně, které proběhly v létě tohoto roku a jejich následky v podobě špatné hygienické situace v chovech drůbeže a jiných hospodářských zvířat, jež jsou rezervoárem salmonel. Vyšší výskyt byl zaznamenán u žen. V ostatních posuzovaných obdobích nebyl rozdíl mezi mužskou a ženskou populací tak patrný.

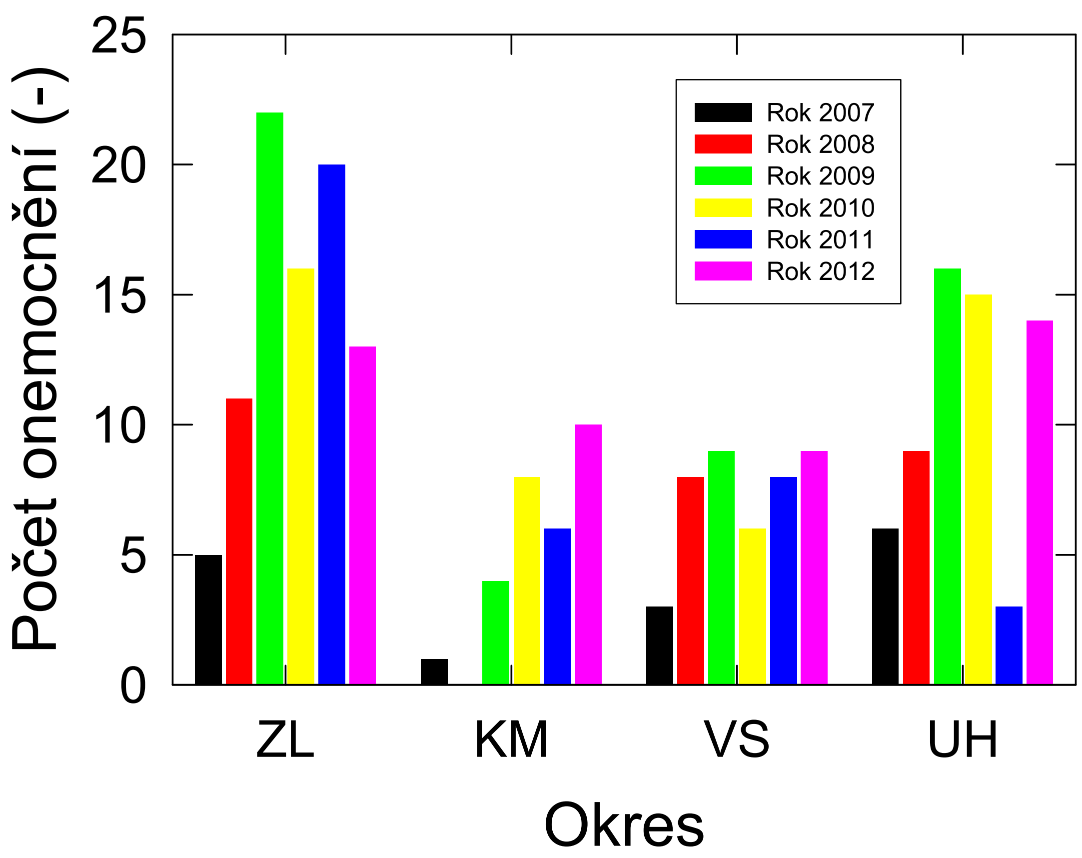
## 5.3 POROVNÁNÍ ONEMOCNĚNÍ *SALMONELLOU TYPHIMURIUM* DLE HUSTOTY OSÍDLENÍ OBYVATEL

Tabulka č. 6 - Počet onemocnění dle hustoty osídlení obyvatelstva

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|
| **Zlín** | 5 | 11 | 22 | 16 | 20 | 13 |
| **Kroměříž** | 1 | 0 | 4 | 8 | 6 | 10 |
| **Vsetín** | 3 | 8 | 9 | 6 | 8 | 9 |
| **Uherské hradiště** | 6 | 9 | 16 | 15 | 3 | 14 |

*Zdroj:* [23]

*Graf č. 5* Rozdělení počtu onemocnění dle okresních měst Zlínského kraje




*Zdroj:* [23]

Dle údajů vyplývá neúměrnost mezi počtem obyvatel dané lokace a počtem výskytu onemocnění. Nejvyšší počet onemocnění *S. Typhimurium* byl zaznamenán v r. 2009 ve Zlíně, a to 22 případů. Naopak nejméně případů bylo zaznamenáno v Kroměříži v r. 2008, kdy nebyl ani jeden nemocný.

# 6 VÝSKYT SALMONEL V ŽIVOČIŠNÝCH PRODUKTECH V ZEMÍCH EU

V následující příloze jsou pro porovnání uvedeny údaje z některých zemí EU vycházející z Vědecké zprávy EFSA a ECDC. Jedná se o výskyt salmonel v produktech živočišného původu.

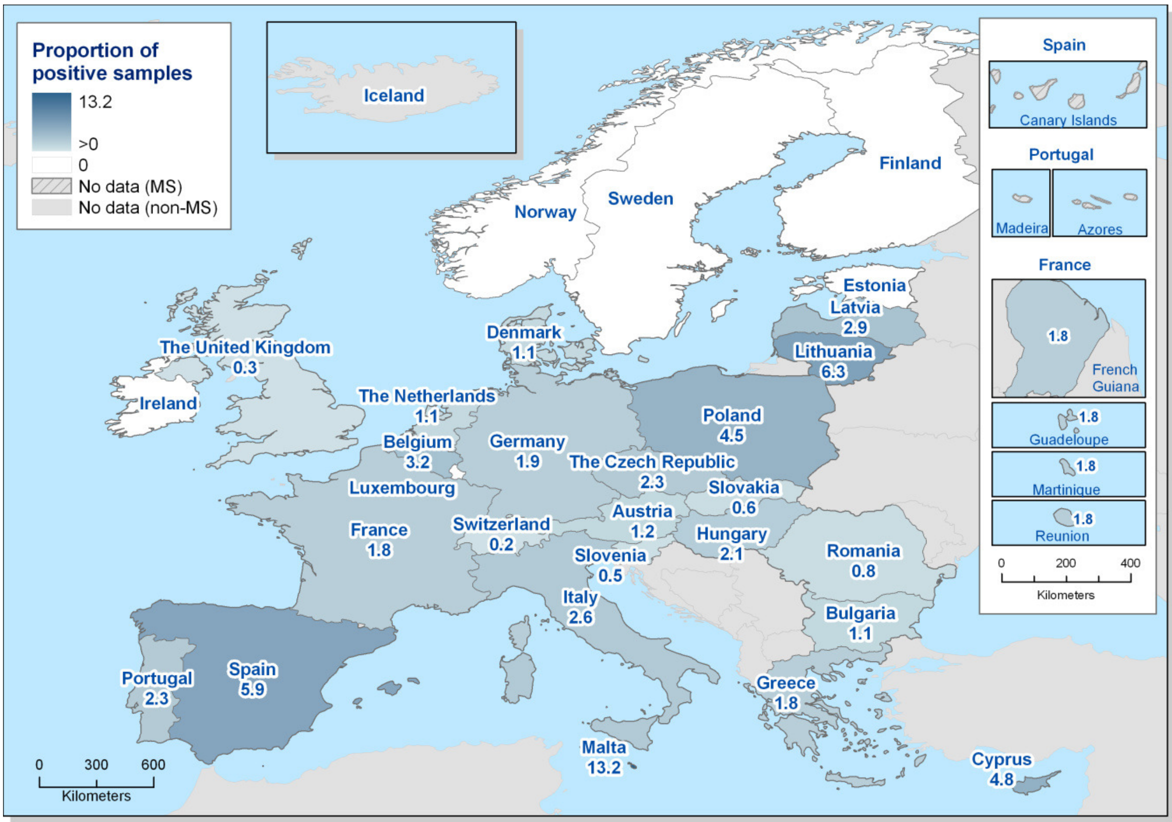
Vejce a vaječné výrobky

Podle právních předpisů EU, od 1. ledna 2009 by se vejce měla používat k přímé lidské spotřebě jako konzumní vejce pouze pokud pocházejí z obchodního hejna nosnic, na které se vztahuje národní program pro tlumení salmonel. Vejce, pocházející z hejn s neznámým zdravotním stavem, které jsou podezřelé z nákazy *S. Enteritidis* a *S. Typhimurium* nebo z potvrzených infikovaných hejn, mohou být uváděny na trh pouze tehdy, pokud byly ošetřeny způsobem, který zaručuje zničení všech sérovarů salmonel a označeny takovým způsobem, který je snadno odliší od konzumních vajec před uvedením na trh (Nařízení (ES) č. 1237/2007) 12.

Tato ustanovení spolu s povinnými programy pro tlumení salmonel v hejnech nosnic přispěly ke snížení výskytu salmonel u nosnic v EU. Třináct členských států hlásilo údaje z vyšetřování konzumních vajec. V roce 2010 celkem 0,4% testovaných jednotlivých vzorků a 0,1% šarží vzorků bylo pozitivní na salmonely, což ukázalo snížení z

počtu hlášených případů v letech 2008 a 2009. Nejvyšší uváděný procentuální podíl pozitivních nákaz pocházel z maloobchodních vzorků odebraných v Irsku a ve Španělsku (6,1% a 5,3%), i když Irsko testovalo pouze 33 vzorků.

Deset členských států hlásilo výsledky vyšetřování vaječných výrobků a vajec jiných než konzumních s 25 vzorky nebo více. 1,2 % pozitivních testovaných vaječných produktů pocházelo z České republiky.




*Obr. 12* **Prevalence dvou cílených sérovarů *S. enteritidis* a *S. typhimurium* s pozitivním hejnem nosnic druhu Kuru bankivského během produkčního období 2010** [24]

Pět členských států, Irsko, Norsko, Švédsko, Finsko a Estonsko nevykazovalo žádná pozitivní hejna, zatímco 14 jiných členských států hlásilo množství salmonel mezi 0,2% a 3,9%. V roce 2010 byl celkový podíl salmonel pozitivních hejn pozorovaných v členských státech 1,6%, ve srovnání s 2,4% v roce 2009. *S. Enteritidis* (0,3%) byla nejčastěji izolovaným sérovarem a byla hlášena z pěti členských států ze stád pozitivních rodičovských chovů.

Vepřové maso

Mnoho z vnitrostátních monitorovacích programů pro tlumení salmonel u vepřového masa a výrobků z něj je založeno na odběru vzorků na jatkách. Na jatkách se provádí odběr vzorků pomocí stěru z korpusu nebo odběr vzorků masa. Celkově 0,9% testovaných vzorků byly pozitivní na salmonely v roce 2010, který byl na podobné úrovni jako v roce 2009 (0,7%) a 2008 (0,8%), i když počet hlášených vzorků významně klesl (z 109.174 v roce 2008 na 69.005 v roce 2010). Podíl salmonela - pozitivních vzorků odebraných na jatkách se pohyboval od 0,3% do 8,9%. Belgie nahlásila nejvyšší podíl pozitiv, které mohou být v důsledku použití citlivé metody výběru vzorků v rámci šetření. Finsko, Švédsko a Norsko nehlásily žádné pozitivní vzorky na porážku. Španělsko hlásí nejvyšší podíl pozitivních vzorků, těsně za ním následuje Portugalsko (10,3%). V maloobchodní síti byla salmonela zaznamenána až u 18,5% vzorků, což byl velký nárůst z nejvyšší hodnoty vykázané v roce 2009 (3,5%), ale podobná jako v roce 2008 (12,7%). Celkové procento pozitivních vzorků v maloobchodním prodeji, bylo 1,0% ve srovnání s 0,7% v roce 2009. Pouze v Bulharsku nebyly hlášeny žádné pozitivní vzorky čerstvého vepřového masa v maloobchodě.

Hovězí maso a výrobky z něj

Stejně jako v předchozí ohlašovací roky, celkový podíl salmonela pozitivních vzorků byl velmi nízký (0,2%) v roce 2010. V souladu s tím, podíl pozitivních vzorků byl velmi nízký ve většině sledovaných zemí. Nejvyšší úrovně kontaminace na jatkách byly hlášeny ze Španělska (3,8%) a Itálie (3,2% z národního průzkumu). Oba z těchto členských států hlásily nízký počet vzorků, a proto jsou údaje statisticky méně důvěryhodné, zatímco v zemích, které uvádějí větší množství vzorků, byl velice nízký podíl kontaminace. Norsko, Finsko, Irsko a Švédsko hlásí procento pozitivních vzorků menší než 0,1% ve všech posledních třech ohlašovacích letech.

Maso z ostatních nebo nespecifikované druhů zvířat

V některých případech jsou údaje uváděny bez přesného uvedení živočišného druhu, z nichž bylo maso odebráno. Itálie ohlásila 2,8% salmonela pozitivních vzorků z 6975 kusů různých druhů zvířat. V České republice bylo 5083 vzorků ze závodu zpracovávajícího maso na masné polotovary a mleté maso určené k tepelné úpravě. 0,3% vzorků bylo pozitivních.

Mléko a mléčné výrobky

Jako v minulých letech, bylo velmi málo salmonel hlášeno z mléka a mléčných výrobků i v roce 2010. V České republice (425 dávek) a Německu (221 jednotlivých vzorků) nebyly zjištěny žádné pozitivní. Tři členské státy hlásily vyšetřování syrového kravského mléka určeného k pasterizaci: Česká republika (343 vzorků), Německo (359 jednotlivých vzorků) a Polsko (30 šarží). Žádný z testovaných vzorků nebyl pozitivní. Dva členské státy hlásily vyšetřování syrového kravského mléka bez uvedení účelu: Maďarsko (161 jednotlivých vzorků) a Slovensko (308 jednotlivých vzorků). Žádný ze vzorků nebyl pozitivní. Pět členských států oznámilo údaje z šetření pasterovaného či UHT mléka krav: Rakousko (25 jednotlivých vzorků), Bulharsko (34 dávek), Česká republika (77 dávek), Německo (1009 jednotlivých vzorků) a Španělsko (52 jednotlivých vzorků). Žádný z nich také nebyl pozitivní. Německo rovněž oznámilo 328 jednotlivých vzorků farmářského původu určených k pasterizaci.

Patnáct členských států hlásilo vyšetřování salmonel ve 34109 vzorcích sýrů, celkem 0,1% pozitivních. Německo uvedlo dva pozitivní (3,3%) z 61 vzorků měkkých a poloměkkých sýrů, vyrobených ze syrového nebo málo tepelně ošetřeného mléka krav, Maďarsko jeden pozitivní (1,2%) z 84 vzorků sýrů z ovčího mléka. Itálie uvádí dva pozitivní (0,4%) z 454 vzorků sýrů vyrobených z kravského mléka a 16 pozitivních (0,4%) z 4496 vzorků bez dalších informací. Dále zjistili tři Portugalské pozitivní vzorky (0,6%) z 489 vzorků z měkkých a poloměkkých sýrů vyrobených ze syrového nebo málo tepelně ošetřeného mléka ovcí. Španělsko mělo 10 pozitivních (2,4%) ze 409 vzorků měkkých a poloměkkých sýrů z kravského mléka a jeden pozitivní (0,2%) ze 463 vzorků nespecifikovaných druhů sýrů vyrobených z kravského mléka.
Osm členských států hlásilo vyšetřování másla s 25 vzorky nebo více. Žádný z 1615 vzorků nebyl pozitivní.

Zelenina, ovoce a bylinky
V roce 2010 byla salmonela zjištěna v bylinkách a koření pouze ve 4 státech EU, největší podíl pozitivních vzorků byl zaznamenán v Irsku (3,6%), v Nizozemsku se jednalo o 1,6% vzorků.

Ryby, produkty rybolovu, korýši, živí mlži a měkkýši se schránkami
Jedenáct členských států a Norsko hlásily vyšetřování salmonel v rybách a produktech rybolovu s 25 vzorky nebo více. Čtyři členské státy (Belgie, Německo, Maďarsko a Itálie) uvedly pozitivní vzorky. Itálie nahlásila 69 vzorků nespecifikovaných produktů rybolovu, v nichž 11 vzorků bylo pozitivních (15,9%). Celkově 0,6% testovaných vzorků bylo pozitivních na salmonely, což znamenalo nárůst z 0,3% vykázaných v roce 2008 a 2009. Celkem 2171 vzorků (z devíti členských států a Norska), 10 z nich bylo pozitivních (z Belgie, Řecka a Španělska). Ne všechny zprávy o měkkýších obsahují informace o tom, zda vzorky

byly vařené či syrové. Testy na korýše byly hlášeny u osmi členských států (s 25 vzorky nebo více). Osm (0,5%) z celkového počtu 1455 vzorků bylo pozitivních. Vyšetřování obecně ukázalo na nízký počet pozitivních vzorků, i když v Řecku byla zjištěna dvě pozitiva z 37 vzorků surovin korýšů.

Ostatní potraviny

V roce 2010 bylo jen několik zpráv o salmonele v jiných potravinách. Tato skupina zahrnuje pečivo, nápoje (nealko), cereálie, čokoláda a jiné sladkosti, kakao a kakaové přípravky, potraviny určené pro zvláštní výživu, kojenecké výživy, šťávy, omáčky, zálivky a polévky. Celkem bylo testováno 33 839 vzorků, 73 (0,2%) z nich obsahovalo salmonely. Ve Španělsku 9 357 těchto vzorků (0,3% pozitivních) pocházelo z jiných zpracovaných potravin a hotových jídel. Druhý nejvyšší podíl pozitivních vzorků pocházel z České republiky a byl hlášen v kategorii ostatních zpracovaných potravin a hotových jídel (6,3%) a sladkostí (5,6%). Celkem 1 795 vzorků sušené počáteční kojenecké výživy a sušených dietních potravin určených pro kojence do 6 měsíců věku bylo testováno, žádné nebyly pozitivní [24].

# ZÁVĚR

I přes vysoké hygienické nároky dnešní doby ve většině světových zemí jsou salmonelózy poměrně rozšířeným typem infekce. Je proto velmi důležité dodržovat správné hygienické postupy nejen při výrobě, úpravě, ale i při konzumaci potravin. Měli bychom se také vyvarovat konzumaci syrových nebo nedostatečně tepelně opracovaných živočišných produktů, jako jsou vejce či syrové maso, které patří k nejčastějším rezervoárům salmonel. Nejvíce rozšířené sérovary jsou *Salmonella enteritidis* a *Salmonella typhimurium*.

Onemocnění salmonelou, jak vyplývá z uvedených výsledků má mírně klesající tendenci. Můžeme se domnívat, že jde o větší informovanost veřejnosti a snahu těmto infekcím předcházet. Svou úlohu hrají také kontroly patřičných veterinárních orgánů a Státní zemědělské a potravinářské inspekce ve výrobnách a prodejnách potravin. Také se ukázalo, že *Salmonella typhimurium* je větším problémem v zimním než v letním období, avšak střevní infekce jako celek jsou více detekovány v období letním. Dalším zajímavým faktem je větší výskyt salmonel u dětí než u dospělých. To může být důsledkem větší náchylnosti dětského organismu k infekcím a také nižší infekční dávkou, potřebnou ke vzniku onemocnění.

Věřím, že je důležité a přínosné dále sledovat vývoj tohoto infekčního onemocnění, abychom se mu naučili předcházet, a stalo se spíše ojedinělou záležitostí.

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# SEZNAM POUŽITÝCH SYMBOLŮ A ZKRATEK

**Seznam zkratek názvů krajů a okresů**

*List of abbreviations of regions*

| | | | | | |
|---|---|---|---|---|---|
| **PHA** | **Hl. m. Praha** | DC | Děčín | BK | Blansko |
| BN | Benešov | CV | Chomutov | BM | Brno-město |
| BE | Beroun | LT | Litoměřice | BO | Brno-venkov |
| KD | Kladno | LN | Louny | BV | Břeclav |
| KO | Kolín | MO | Most | HO | Hodonín |
| KH | Kutná Hora | TP | Teplice | VY | Vyškov |
| ME | Mělník | UL | Ústí nad Labem | ZN | Znojmo |
| MB | Mladá Boleslav | **UST** | **Ústecký kraj** | **JHM** | **Jihomoravský kraj** |
| NB | Nymburk | CL | Česká Lípa | JE | Jeseník |
| PH | Praha-východ | JN | Jablonec nad Nisou | OL | Olomouc |
| Pz | Praha-západ | LI | Liberec | PV | Prostějov |
| PB | Příbram | SM | Semily | PR | Přerov |
| RA | Rakovník | **LIB** | **Liberecký kraj** | SU | Šumperk |
| **STC** | **Středočeský kraj** | HK | Hradec Králové | **OLO** | **Olomoucký kraj** |
| CB | České Budějovice | JC | Jičín | KM | Kroměříž |
| CK | Český Krumlov | NA | Náchod | UH | Uherské Hradiště |
| JH | Jindřichův Hradec | RK | Rychnov nad Kněžnou | VS | Vsetín |
| PI | Písek | TU | Trutnov | ZL | Zlín |
| PT | Prachatice | **HRA** | **Královéhradecký kraj** | **ZLI** | **Zlínský kraj** |
| ST | Strakonice | CR | Chrudim | BR | Bruntál |
| TA | Tábor | PU | Pardubice | FM | Frýdek-Místek |
| **JHC** | **Jihočeský kraj** | SY | Svitavy | KI | Karviná |
| DO | Domažlice | UO | Ústí nad Orlicí | NJ | Nový Jičín |
| KT | Klatovy | **PAR** | **Pardubický kraj** | OP | Opava |
| PM | Plzeň-město | HB | Havlíčkův Brod | OT | Ostrava-město |
| PJ | Plzeň-jih | JI | Jihlava | **MSK** | **Moravskoslezský kraj** |
| PS | Plzeň-sever | PE | Pelhřimov | | |
| RO | Rokycany | TR | Třebíč | | |
| TC | Tachov | ZR | Žďár nad Sázavou | | |
| **PLZ** | **Plzeňský kraj** | **VYS** | **Vysočina** | | |
| CH | Cheb | | | | |
| KV | Karlovy Vary | | | | |
| SO | Sokolov | | | | |
| **KAR** | **Karlovarský kraj** | | | | |

*Zdroj:* [21]

# SEZNAM OBRÁZKŮ

# SEZNAM TABULEK

# SEZNAM GRAFŮ

# SEZNAM PŘÍLOH

**Příloha P. I.**

Scientific report of EFSA and ECDC - The European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne Outbreaks in 2010

**PŘÍLOHA P I:**

EFSA Journal 2012;10(3):2597

# SCIENTIFIC REPORT OF EFSA AND ECDC

## The European Union Summary Report on Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne Outbreaks in 2010[1]

**European Food Safety Authority**[2, 3]

**European Centre for Disease Prevention and Control**[2, 3]

This scientific output, published 11 May 2012, replaces the earlier version published on 8 March 2012[4].


## ABSTRACT

The European Food Safety Authority and the European Centre for Disease Prevention and Control analysed the information on the occurrence of zoonoses and food-borne outbreaks in 2010 submitted by 27 European Union Member States. In 2010, 99,020 salmonellosis cases in humans were reported and the decreasing trend in case numbers continued. Most Member States met their *Salmonella* reduction targets for poultry, and *Salmonella* is declining in these populations. In foodstuffs, *Salmonella* was most often detected in fresh broiler and turkey meat. Campylobacteriosis was the most commonly reported zoonosis with 212,064 human cases. *Campylobacter* was most often detected in fresh broiler meat. The number of human listeriosis cases decreased slightly to 1,601. *Listeria* was seldom detected above the legal safety limit from ready-to-eat foods at retail. A total of 4,000 confirmed verotoxigenic *Escherichia coli* (VTEC) infections were reported and this number has been increasing since 2008. VTEC was also observed in food and animals. The numbers of human yersiniosis cases have been decreasing in recent years and, 6,776 cases were reported in 2010. *Yersinia enterocolitica* was isolated also from pig meat and pigs; 133 cases of *Mycobacterium bovis* and 356 cases of brucellosis in humans were also reported. The prevalence of bovine tuberculosis in cattle increased, and the prevalence of brucellosis decreased in cattle, sheep and goat populations. Trichinellosis and echinococcosis caused 223 and 750 confirmed human cases, respectively. These parasites were mainly detected in wildlife. The number of Q fever cases in humans decreased to 1,414. In animals Q fever was found in domestic ruminants. There were two human cases of rabies in 2010 and the number of rabies cases in animals slightly increased. Most of the 5,262 reported food-borne outbreaks were caused by *Salmonella*, viruses, *Campylobacter* and bacterial toxins and the main food sources were eggs, mixed or buffet meals and vegetables.





## KEY WORDS

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


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1 On request of EFSA, Question No EFSA-Q-2010-789, adopted on 21 February 2012.

2 Correspondence: in EFSA zoonoses@efsa.europa.eu; in ECDC FWD@ecdc.europa.eu

3 Acknowledgement: EFSA and ECDC wish to thank the members of the Task Force on Zoonoses Data Collection and the Food and Waterborne Disease Network who provided the data and reviewed the report. Also the contributions of the following for their support provided to this scientific output are gratefully acknowledged: EFSA staff members Pia Mäkelä, Frank Boelaert, Valentina Rizzi, Anca Stoicescu, Pierre-Alexandre Beloeil, Marios Georgiadis, Elena Mazzolini, Giusi Amore, Francesca Riolo, Kenneth Mulligan and Fabrizio Abbinante; ECDC staff members Johanna Takkinen, Angela Lahuerta-Marin and Taina Niskanen; EFSA's contractor, the Animal Health and Veterinary Laboratories Agency, and their staff members Richard Smith and Lucy Brunton; and peer reviewer Franz Allerberger.

4 The acknowledgement was changed on page 1 and 3. On page 290 figure RA6 was replaced.'*C. parvum'* was replaced with '*C. hominis'* on pages 20, 358 (second paragraph), 361 and 362. On page 342 the Table OUT11 was replaced. On page 388, the EU totals were amended from 4,951,058 to 4,950,903 for 2007 and from 4,976,834 to 4,976,770 for 2008 and 2010 data were added for Switzerland. Abbreviations in the Appendices were updated.

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# THE EUROPEAN UNION SUMMARY REPORT

## Trends and Sources of Zoonoses, Zoonotic Agents and Food-borne Outbreaks in 2010

Issued on 21 February 2012

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## About EFSA

The European Food Safety Authority (EFSA), located in Parma, Italy, was established and funded by the European Union as an independent agency in 2002 following a series of food scares that caused the European public to voice concerns about food safety and the ability of regulatory authorities to protect consumers. EFSA provides objective scientific advice on all matters, in close collaboration with national authorities and in open consultation with its stakeholders, with a direct or indirect impact on food and feed safety, including animal health and welfare and plant protection. EFSA is also consulted on nutrition in relation to EU legislation. EFSA's work falls into two areas: risk assessment and risk communication. In particular, EFSA's risk assessments provide risk managers (EU institutions with political accountability, i.e. the European Commission, the European Parliament and the Council) with a sound scientific basis for defining policy-driven legislative or regulatory measures required to ensure a high level of consumer protection with regard to food and feed safety. EFSA communicates to the public in an open and transparent way on all matters within its remit. Collection and analysis of scientific data, identification of emerging risks and scientific support to the Commission, particularly in the case of a food crisis, are also part of EFSA's mandate, as laid down in the founding Regulation (EC) No 178/2002[5] of 28 January 2002.

## About ECDC

The European Centre for Disease Prevention and Control (ECDC), an EU agency based in Stockholm, Sweden, was established in 2005. The objective of ECDC is to strengthen Europe's defences against infectious diseases. According to Article 3 of the founding Regulation (EC) No 851/2004[6] of 21 April 2004, ECDC's mission is to identify, assess and communicate current and emerging threats to human health posed by infectious diseases. In order to achieve this mission, ECDC works in partnership with national public health bodies across Europe to strengthen and develop EU-wide disease surveillance and early warning systems. By working with experts throughout Europe, ECDC pools Europe's knowledge on health so as to develop authoritative scientific opinions about the risks posed by current and emerging infectious diseases.

## About the report

EFSA is responsible for examining the data on zoonoses, antimicrobial resistance and food-borne outbreaks submitted by Member States in accordance with Directive 2003/99/EC[7] and for preparing the EU Summary Report from the results. Data from 2010 in this EU Summary Report were produced in collaboration with ECDC who provided the information on and analyses of zoonoses cases in humans. The Zoonoses Collaboration Centre (ZCC, contracted by EFSA) of the Animal Health and Veterinary Laboratories Agency (AHVLA), United Kingdom, assisted EFSA and ECDC in this task.

## Acknowledgement

EFSA and ECDC wish to thank the members of the Task Force on Zoonoses Data Collection and the Food and Waterborne Disease Network who provided the data and reviewed the report. Also the contributions of the following for their support provided to this scientific output are gratefully acknowledged: EFSA staff members Pia Mäkelä, Frank Boelaert, Valentina Rizzi, Anca Stoicescu, Pierre-Alexandre Beloeil, Marios Georgiadis, Elena Mazzolini, Giusi Amore, Francesca Riolo, Kenneth Mulligan and Fabrizio Abbinante; ECDC staff members Johanna Takkinen, Angela Lahuerta-Marin and Taina Niskanen; EFSA's contractor, the Animal Health and Veterinary Laboratories Agency, and their staff members Jennifer Broughan, Jemma Brown, Lucy Brunton, Tanya Cheney, Richard Clifton-Hadley, Rob Davies, Sarah Denman, Daisy Duncan, Tobias Floyd, Ian Hillis, Daniel Horton, Keith Hunt, Paul Hutchinson, Roberto LaRagione, Elizabeth Marier, Rebecca Mearns, Hannah Reeves, Peter Sewell, Richard Smith, Judy Stack, Ana Vidal, and Guanghui Wu; and peer reviewer Franz Allerberger.

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

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

7 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.

## Summary

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

In 2010, 27 Member States submitted information on the occurrence of zoonoses, zoonotic agents and food-borne outbreaks to the European Commission and the European Food Safety Authority. Further, information on zoonoses cases reported in humans was provided by the European Centre for Disease Prevention and Control. In addition, four European countries that were not European Union Member States provided information. The European Food Safety Authority and the European Centre for Disease Prevention and Control jointly analysed the data, the results of which are published in this annual European Union Summary Report, which covers 15 zoonoses.

In 2010, the number of salmonellosis cases in humans decreased by 8.8 % compared with 2009, and the statistically significant decreasing trend in the European Union continued for the sixth consecutive year. In total, 99,020 confirmed human cases were reported in 2010. It is assumed that the observed reduction in salmonellosis cases is mainly due to successful *Salmonella* control programmes in fowl populations. Most Member States met their *Salmonella* reduction targets for poultry, and *Salmonella* is declining in these animal populations. In foodstuffs, *Salmonella* was most often detected in fresh broiler and turkey meat. Products in non-compliance with the European Union *Salmonella* criteria were mainly observed in minced meat and meat preparations as well as live bivalve molluscs.

The notification rate and confirmed number of human campylobacteriosis in the European Union increased in 2010 compared with 2009. Human campylobacteriosis has followed a significant increasing five-year trend in the European Union, since 2006 and continued to be the most commonly reported zoonosis with 212,064 confirmed cases. The proportions of *Campylobacter*-positive food and animal samples remained at similar levels as in previous years, with the occurrence of *Campylobacter* continuing to be high in broiler meat, at European Union level.

The number of listeriosis cases in humans slightly decreased, and 1,601 confirmed human cases were reported in 2010. As in previous years, a high fatality rate of 17 % was reported among the cases. *Listeria monocytogenes* was seldom detected above the legal safety limit from ready-to-eat foods at retail. There were no major changes in the occurrence of the bacterium in foodstuffs compared with the previous year.

A total of 4,000 confirmed verotoxigenic *Escherichia coli* infections were reported in 2010, and most of these cases were caused by the serogroup O157. The numbers of the reported verotoxigenic *Escherichia coli* human cases have been increasing in the European Union since 2008. In animals and food most verotoxigenic *Escherichia coli*-positive findings were made from cattle and bovine meat, but the bacteria were also detected in other animal species and foodstuffs.

The numbers of the reported yersiniosis cases have been decreasing during the past years, and in 2010 6,776 confirmed yersiniosis cases in humans were recorded at European Union level. *Yersinia enterocolitica* was mainly isolated from pig meat and pigs but also from other foodstuffs and other animal species.

Since 2006, the numbers of confirmed cases of tuberculosis in humans caused by *Mycobacterium bovis* have increased slightly. In 2009 (2010 data were not available) there were 133 confirmed cases in humans. The reported prevalence of bovine tuberculosis increased in cattle in the European Union, even though remaining at low level.

The numbers of confirmed brucellosis cases in humans continued to decline, and 356 confirmed cases were reported in 2010 at European Union level. The numbers of brucellosis-positive sheep and goat herds have shown a substantial decrease in the past years. Bovine brucellosis decreased only marginally compared with 2009.

In 2010, two parasitic zoonoses, trichinellosis and echinococcosis, caused 223 and 750 confirmed human cases in the European Union, respectively. Compared with the previous years, the number of human trichinellosis cases at the European Union level declined remarkably. In 2010, also, fewer *Trichinella*-positive pigs were reported than in the previous year. The parasite was more prevalent in wildlife. The number of human echinococcosis cases decreased slightly in 2010. *Echinococcus* was reported in farm animals by some Member States and *E. multilocularis* was often found in foxes in the central European Member States.

Only congenital toxoplasmosis cases (21) in infants less than one year old were reported in 2010 according to the new European Union case definition. In animals, the parasite was reported from several animal species.

Q fever cases in humans decreased sharply in 2010 compared with 2009. A total of 1,414 confirmed cases were reported in 2010, with the majority of cases reported from one Member State. In animals Q fever was reported from cattle, goats or sheep by most Member States.

Two human cases of rabies were reported in the European Union in 2010. The general decreasing trend in the total number of rabies cases in animals observed during previous years discontinued in 2010 and there was a slight increase in the rabies cases in animals, and rabies was reported in both domestic and wildlife animal species in the Baltic and some Eastern and Southern European Member States, mostly in farm animals and foxes.

A total of 5,262 food-borne outbreaks were reported in the European Union, causing 43,473 human cases, 4,695 hospitalisations and 25 deaths. Most of the reported outbreaks were caused by *Salmonella*, viruses, *Campylobacter* and bacterial toxins. The most important food sources were eggs and egg products and mixed or buffet meals and vegetables and products thereof. The numbers of outbreaks caused by vegetables and products thereof have increased compared to previous years. In addition, 14 waterborne outbreaks were reported in 2010 related to the contamination of private and public water sources.

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# 1. INTRODUCTION

## The framework of reporting

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

Decision 2119/98/EC[6] on setting up a network for the epidemiological surveillance and control of communicable diseases in EU, as complemented by Decision 2000/96/EC[7] with amendment 2003/542/EC[8] on the diseases to be progressively covered by the network, established the basis for data collection on human diseases from MSs. The Decisions foresee that data from the networks shall be used in the EU Summary Report.

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

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

This EU Summary Report 2010 was prepared in collaboration with ECDC with the assistance of EFSA's Zoonoses Collaboration Centre (ZCC) at the Animal Health and Veterinary Laboratories Agency (AHVLA). MSs, other reporting countries, the EC, members of EFSA's scientific panels on Biological Hazards (BIOHAZ) and Animal Health and Welfare (AHAW) and the relevant EU Reference Laboratories were consulted while preparing the report.

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

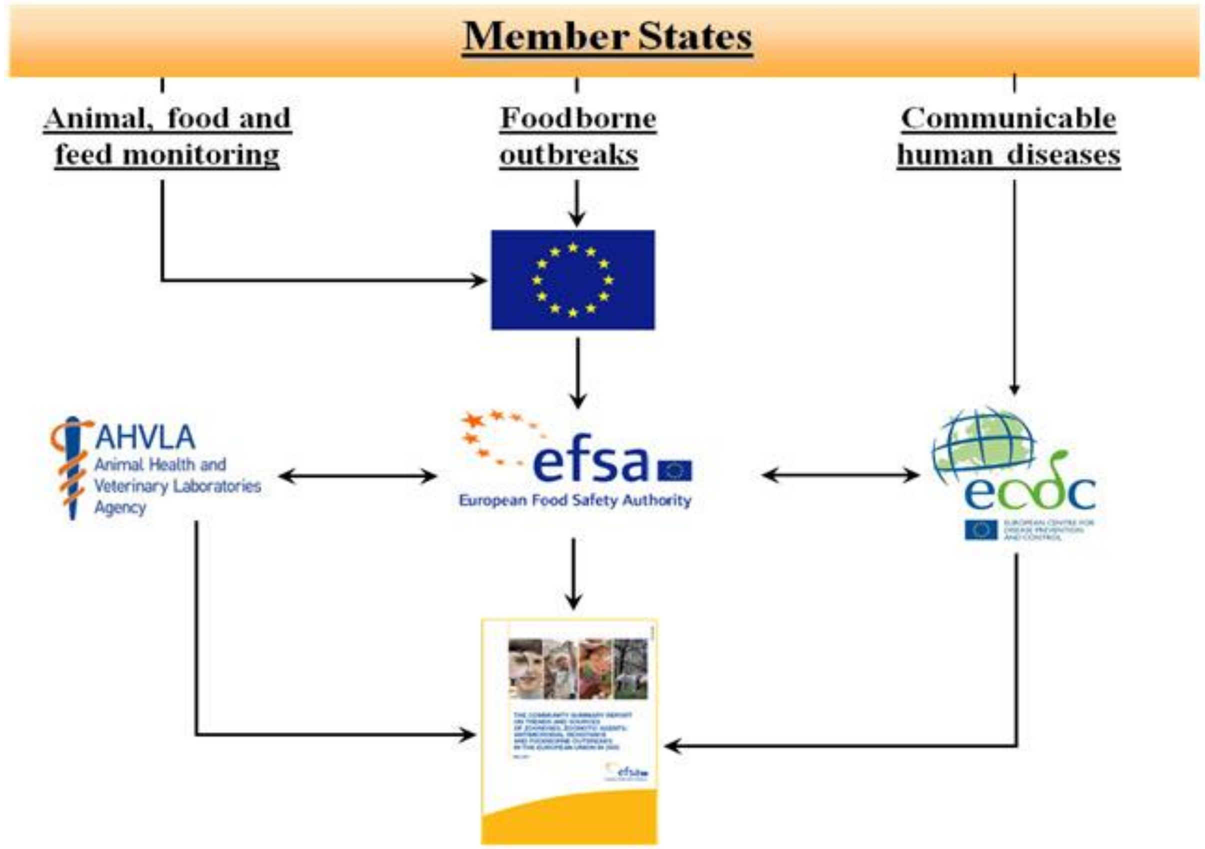
The data flow for the 2010 EU Summary Report is shown in Figure IN1.

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

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

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

***Figure IN1. Scheme of the data flow for the EU Summary Report, 2010***




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

### Data received for 2010

In 2010, data were collected on a mandatory basis for the following eight zoonotic agents: *Salmonella*, thermophilic *Campylobacter*, *Listeria monocytogenes*, verotoxigenic *Escherichia coli*, *Mycobacterium bovis*, *Brucella*, *Trichinella* and *Echinococcus*. Data on human cases were reported via TESSy by the 27 MSs and three European Economic Area (EEA)/European Free Trade Association (EFTA) countries (Iceland, Lichtenstein and Norway) for all diseases. Switzerland reported human cases directly to EFSA. Moreover, mandatory reported data included antimicrobial resistance in *Salmonella* and *Campylobacter* isolates, food-borne outbreaks and susceptible animal populations. Additionally, based on the epidemiological situations in MSs, data were reported on the following agents and zoonoses: *Yersinia*, rabies, Q fever, *Toxoplasma, Cysticerci,* and *Francisella*. Data on *Staphylococcus* and antimicrobial resistance in indicator *E. coli* and enterococci isolates were also submitted. Furthermore, MSs provided data on certain other microbiological contaminants in foodstuffs: histamine, staphylococcal enterotoxins and *Enterobacter sakazakii* (*Cronobacter* spp.), for which food safety criteria are set down in EU legislation.

All 27 MSs submitted national zoonoses reports concerning the year 2010. In addition, zoonoses reports were submitted by two non-MSs (Norway and Switzerland). Data on zoonoses cases in humans were also received from all 27 MSs and additionally from four non-MSs: Iceland, Liechtenstein (human data only), Norway and Switzerland. The deadline for data submission was 31 May 2011.

The draft EU Summary Report was sent to MSs for consultation on 24 November 2011 and comments were collected by 16 December 2011. The utmost effort was made to incorporate comments and data amendments within the available time frame. The report was finalised by 21 February 2012 and published online by EFSA and ECDC on 8 March 2012.

## The structure of the report

The information received from 2010 is published in two EU Summary Reports. This first report covers information reported on zoonoses, zoonotic agents and food-borne outbreaks. The second report will cover data reported on antimicrobial resistance.

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

*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 be derived from sampling plans that are statistically designed, and may not accurately represent the national situation regarding zoonoses. Results are generally not directly comparable between MSs and sometimes not even between different years in one country.*

Data presented in this report were chosen so that trends could be identified whenever possible. As a general rule, and as described for food, feed and animal samples, a minimum number of 25 tested samples were required for the data to be selected for analysis. Furthermore, as a general rule, data from at least five MSs should be available to warrant presentation leading to a table or a figure. However, for some zoonoses or zoonotic agents fewer data have been accepted for analysis. Historical data and trends are presented, whenever possible. Data reported as Hazard Analysis and Critical Control Points (HACCP) or own control are not included in the detailed tables, and unless stated otherwise, data from import, suspect sampling and outbreak or clinical investigations are also excluded.

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

# 2. MAIN FINDINGS

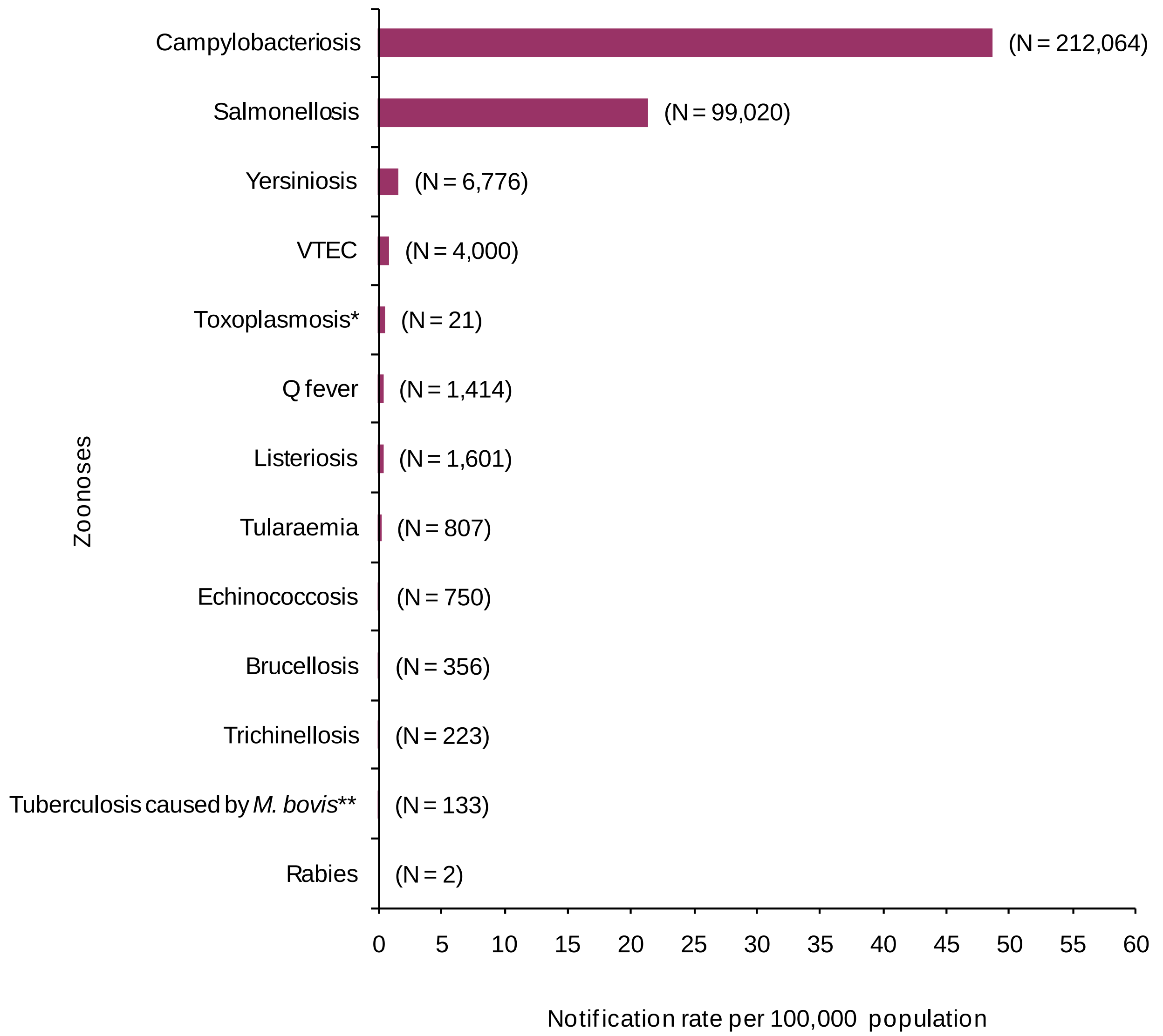
## 2.1 Main conclusions of the EU Summary Report on zoonoses, zoonotic agents and food-borne outbreaks 2010

- The EU notification rate of campylobacteriosis has followed an increasing five-year trend since 2006, and campylobacteriosis was, once again, by far the most frequently reported zoonotic disease in humans in 2010. The occurrence of *Campylobacter* continued to be high in broiler meat at EU-level.
- The numbers of human salmonellosis cases reported in the EU continued to decline in 2010 as a part of a statistically significant trend since 2006. It is assumed that the observed reduction in salmonellosis cases is mainly due to successful *Salmonella* control programmes in fowl populations. Most MSs met their *Salmonella* reduction targets for poultry in 2010 and *Salmonella* is declining in these animal populations. *Salmonella* in foodstuffs was mainly detected in meat and products thereof.
- There were no major changes in the incidence of listeriosis cases in humans and in the occurrence of *Listeria monocytogenes* in foodstuffs compared with the previous year.
- Notified cases of verotoxigenic *Escherichia coli* (VTEC) in humans have been increasing in the EU since 2008. Most of these cases are caused by the serogroup O157. In animals and food most findings of these bacteria were reported from cattle and bovine meat but findings were also made in other animal species and foodstuffs. The data on food and animals are not comparable between years.
- Notification of yersiniosis cases in humans has been decreasing in the EU since 2006. *Yersinia enterocolitica* was mainly isolated from pig meat and pigs but also from other foodstuffs and other animal species. The data on food and animals are not comparable between years.
- The numbers of reported human cases due to *Mycobacterium bovis* have been slightly increasing since 2007. The reported prevalence of bovine tuberculosis in cattle increased slightly at EU level.
- Brucellosis cases in humans, cattle, sheep and goats continued to decrease at EU level in 2010.
- Trichinellosis in humans decreased sharply in 2010 compared with 2009. *Trichinella* was also found less often in pigs. The parasite was more prevalent in wildlife.
- Cases of echinococcosis in humans decreased slightly in 2010. *Echinococcus* was reported in farm animals by several MSs*. E. multilocularis* was often found in foxes in the Central European MSs.
- Only congenital toxoplasmosis cases in infants less than one year old were reported in 2010 according to the new EU case definition. The parasite was also reported in several animal species.
- In 2010, the reported number of Q fever human cases decreased sharply compared with previous years, mainly due to effective control measures in a large ongoing outbreak in one MS. In animals Q fever was reported from cattle, goats or sheep by most MSs. The data from animals are not comparable between years.
- Two human cases of rabies were acquired in the EU in 2010. Rabies in domestic animals and wildlife was reported in slightly increased numbers by some MSs.
- The number of reported food-borne outbreaks in 2010 was similar to that reported in 2009. *Salmonella* was the most frequently reported cause of these outbreaks, followed by viruses and *Campylobacter.* The main food vehicles in the reported food-borne outbreaks were eggs and egg products, mixed or buffet meals and vegetables, juices and products thereof.

## 2.2 Zoonoses and item-specific summaries

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

***Figure SU1. Reported notification rates of zoonoses in confirmed human cases in the EU, 2010***




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

* Data for congenital toxoplasmosis.

** Data from 2009.

## ***Salmonella***

### Humans

In 2010, a total of 99,020 confirmed cases of human salmonellosis were reported in the EU. This represents a decrease of 8.8 % over the previous year. The EU notification rate for confirmed cases was 21.5 cases per 100,000 population. The case fatality rate of human salmonellosis was 0.13 % in 2010. As in previous years, *S.* Enteritidis and *S*. Typhimurium were the most frequently reported serovars (45.0 % and 22.4 %, respectively, of all known serovars in human cases). As a result of the harmonised reporting, monophasic *S.* Typhimurium 1,4,[5],12:i:- entered the top 10 group as the fourth most commonly reported serovar (1.5 %).

As in previous years, the highest notification rate for human cases was for the age groups 0-4 years and 5-14 years. A seasonal peak in the number of cases during the late summer and early autumn was again observed in many MSs for all age groups. In 2010, the proportion of cases reported as domestic remained at the same level, 63.1 %, as in 2009 (62.4 %), although for some Nordic countries (Sweden, Finland and Norway) imported cases represented the majority of all salmonellosis cases.

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

### Foodstuffs

Information on *Salmonella* was reported from a wide range of foodstuff categories in 2010, but the majority of data were from various types of meat and products thereof. The highest proportions of *Salmonella*-positive units were reported for fresh broiler meat and fresh turkey meat, at average levels of 4.8 % and 9.0 %, respectively. In fresh pig meat, 0.9 % of tested samples were found positive for *Salmonella* in the reporting MSs group, and in the case of fresh bovine meat 0.2 % of sampling units were positive.

*Salmonella* was only found in a very low proportion of table eggs, at levels of 0.3 %, which was a reduction from 2009 (0.5 %). In vegetables, fruit and herbs, 0.6 % of units tested were reported positive. However, as in 2009, a higher occurrence (up to 3.6 %) was reported for herbs and spices by some MSs.

Non-compliance with the EU *Salmonella* criteria was, once again, most often observed in food categories of meat origin. Minced meat and meat preparations from poultry intended to be eaten cooked had the highest level of non-compliance (5.3 % of single samples). In batch samples, 4.3 % of mechanically separated meat was found to be contaminated with *Salmonella*. In the case of minced meat and meat preparations intended to be eaten raw, *Salmonella* was detected in 1.8 % of single samples and 0.3 % of batch samples. The proportion of egg products (single samples) not in compliance with *Salmonella* criteria (0.7 %) increased slightly compared with 2009 (0.2 %). In other food categories, the proportion of units in non-compliance with the criteria was very low, apart from the proportion of positives in live bivalve molluscs (1.5 % of single samples).

Monophasic *S.* Typhimurium was the third most commonly reported serovar in pig meat and bovine meat, following *S*. Typhimurium and *S.* Derby in pig meat and *S*. Typhimurium and *S*. Dublin in bovine meat.

### Animals

In 2010, 20 MSs (compared with 18 MSs in 2009) met the *Salmonella* reduction target of ≤1 % set for breeding flocks of *Gallus gallus* (fowl), which covers five target serovars (*S.* Enteritidis, *S.* Typhimurium, *S.* Hadar, *S.* Infantis, *S.* Virchow). Overall, 0.7 % of breeding flocks in the EU were positive for the target serovars during the production period, which was a sharp reduction from 1.2 % detected in 2009. The five MSs not meeting the target, reported prevalence of the five target serovars, from 1.3 % to 2.5 %. Together 2 % of the breeding flocks in the EU were positive for *Salmonella* spp., which was also a reduction from the proportion reported in 2009 (2.7 %).

In case of flocks of laying hens, 25 MSs (compared with 21 in 2008 and 17 in 2009) met their relative *Salmonella* reduction targets, which cover *S.* Enteritidis and *S.* Typhimurium. The EU prevalence was reduced for the two target serovars from 3.5 % (in 2008) to 1.9 % (in 2010). Overall, during the production period, 5.9 % (6.7 % in 2009 and 5.9 % in 2008) of laying hen flocks in the EU were positive for *Salmonella* spp.

2010 was the second year of implementing the EU reduction target of ≤1 % for *S.* Enteritidis and *S*. Typhimurium for broiler flocks. Together 22 MSs (18 in 2009) met this target and a decrease in the EU prevalence for the target serovars was observed (from 0.7 % in 2009 to 0.4 % in 2010). The *Salmonella* spp. prevalence also reduced from 5.0 % in 2009 to 4.1 % in 2010.

2010 was the first year for MSs to implement the *Salmonella* reduction targets for turkey flocks (≤1 % for *S.* Enteritidis and *S*. Typhimurium). All 13 MSs that reported data on turkey breeding flocks already met the target, with an EU prevalence of 0.3 % of the two target serovars. A further 20 MSs met the target for fattening turkey flocks before slaughter, with only one MS not meeting the target. At EU level 0.5 % of the fattening turkey flocks were infected with the two target serovars. In total, 6.9 % and 12.1 % of turkey breeding and fattening flocks, respectively, were positive for *Salmonella* spp.

Concerning other animal species, *Salmonella* findings were also reported from ducks (36.8 %), geese (4.1 %), pigs (0.7 % and 6.9 % at animal and herd level, respectively) and cattle (0.9 % and 8.4 % at animal and herd level, respectively).

Monophasic *S.* Typhimurium was the second most common serovar reported in pigs and the third most common in cattle, following *S*. Typhimurium in pigs and *S*. Dublin and *S*. Typhimurium in cattle.

### Feedingstuffs

A marked increase was observed in reports of *Salmonella* contaminated fish meal (9.1 % in 2010 compared with 0.7 % in 2009). This rise in contamination is related to the reporting of positive batch samples by one MS. On average, 0.5 %-0.7 % of compound feedingstuffs units for pigs, cattle and poultry tested was reported positive for *Salmonella*. The positive development was that the poultry feedingstuffs contamination reduced from 1.0 % out of 15,249 samples reported by 15 MSs in 2009 to 0.5 % out of 10,838 samples reported by 16 MSs in 2010.

## *Campylobacter*

### Humans

Campylobacteriosis remained the most frequently reported zoonotic disease in humans in the EU since 2005. In total, 212,064 confirmed cases of campylobacteriosis were reported by 25 MSs, which represents an increase of 6.7 % compared with 2009. The overall notification rate of human campylobacteriosis was 48.6 per 100,000 population. Human campylobacteriosis in the EU has followed a significant increasing five-year trend (2006-2010), especially marked since 2008. As in previous years, children under the age of five had the highest notification rate (126.8 per 100,000 population). However, the case fatality rate for human campylobacteriosis was low (0.22 %).

### Foodstuffs

For 2010, most of the information on *Campylobacter* in foodstuffs was reported regarding broiler meat and products thereof. At EU level, 29.6 % of fresh broiler meat units were found positive for *Campylobacter*, varying from 3.1 % to 90.0 % among reporting MSs. The reported *Campylobacter* contamination in fresh broiler meat has stayed at this same level since 2004. In fresh turkey meat, 29.5 % of tested units were found positive for *Campylobacter*. In samples of fresh pig meat and bovine meat, *Campylobacter* was detected less frequently at EU level, at levels of 0.6 % and 0.4 %, respectively. *Campylobacter* was detected in other foodstuffs only occasionally, including some findings in milk from cows and cheeses.

### Animals

In 2010, the proportion of *Campylobacter*-positive broiler flocks at reporting MS level was 18.2 % ranging from 0 % to 92.9 % among MSs. In the case of pigs and cattle, fewer MSs provided data, but on average 34.8 % and 51.2 % of animals and herds, respectively, tested positive for pigs, while the corresponding figures for cattle were 6.2 % and 24.3 %.

## *Listeria*

### Humans

The number of reported listeriosis cases in humans in the EU in 2010 decreased by 3.2 % compared with 2009. As in previous years, elderly persons were especially affected by the disease, with 60.2 % of cases occurring in individuals over the age of 65 (a notification rate of 1.2 per 100,000 population). Overall, a high case fatality rate of 17.0 % was recorded among those cases for which information was available (2009: 16.6 %). A total of 1,601 confirmed cases of listeriosis were reported by 26 MSs in 2010. The EU notification rate was 0.35 per 100,000 population, which is slightly lower than in 2009 (0.4 per 100,000 population). The highest notification rates were observed in Finland, Denmark and Spain.

### Foodstuffs

MSs provided information on numerous investigations of *L. monocytogenes* in different categories of ready-to-eat (RTE) food in 2010. In the case of RTE products at retail, very low proportions of samples were generally found to be non-compliant with the EU criterion of ≤100 cfu/g. The highest level of non-compliance was once again observed in fishery products (1 % of single samples), followed by RTE products of meat origin (0.4 % of single samples) and cheeses (especially soft and semi-soft cheeses, 0.2 % of single samples). At processing, higher proportions of RTE products tested did not meet the criterion of absence of *L. monocytogenes* in 25 g of product. The highest levels of non-compliance at processing were found in RTE fishery products (9.6 % of single samples) and other RTE products (4.9 % of single samples). There were no major developments in the levels of non-compliant RTE food units compared with previous years.

### Animals

In 2010, some findings of *L. monocytogenes* in various animal species, including goats, sheep, cattle and fowl, were reported by MSs. *L. monocytogenes* was mostly detected in ruminants, but also in a few samples from fowl in Germany. Positive samples from other animals such as water buffalo and rodents were also reported.

## Verotoxigenic *E. coli*

### Humans

In 2010, a total of 4,000 confirmed human VTEC cases were reported by 25 MSs, representing an increase of 12.0 % compared with 2009 (3,573). The EU notification rate was 0.83 per 100,000 population, which is also slightly higher than in 2009 (0.75 per 100,000 population). As in previous years, the most commonly identified VTEC serogroup was O157 (N=1,501), with an 18.8 % decrease compared with 2009 (N=1,848). As in previous years, the notification rate was highest in 0 to 4 year old children (4.7 cases per 100,000 population), and this group also accounted for two-thirds (65.8 %) of the 222 cases of Haemolytic Uraemic Syndrome (HUS) for which information on age was available; these cases were mainly associated with VTEC O157 infections. The case fatality rate of VTEC infections was 0.39 % in 2010.

### Foodstuffs

Nineteen MSs reported data on VTEC in food in 2010. Data were mostly reported on VTEC and the VTEC O157 serogroup in food and animals. Overall, 0.5 % and 0.1 % of fresh bovine meat units tested in 2010 were positive for VTEC and VTEC O157, respectively. Some isolations of the other human pathogenic serogroups were also made. Less information is available for other foodstuffs, but some positive VTEC findings were made in 2007-2010 from raw cow's milk, cheeses, sheep meat, pig meat, broiler meat, vegetables and fishery products. The human pathogenic serogroups were occasionally detected also in these other foodstuffs.

### Animals

Sixteen MSs provided data on VTEC in animals. In 2010, VTEC and VTEC O157 were mostly reported from cattle, at levels of 13.5 % and 0.2 %, respectively. In addition other human pathogenic serogroups were reported. Less information was provided from the other animal species but in 2007-2010 VTEC and VTEC O157 were sometimes detected in dogs, pigs, poultry, solipeds and water buffalo, mainly at low to very low levels. Generally, the reported prevalence varied widely among the MSs.

## *Yersinia*

### Humans

In 2010, 6,776 confirmed human yersiniosis cases were reported in the EU, which is slightly lower (10 %) than in 2009 (N=7,533). The number of yersiniosis cases in the EU has been declining with a statistically significant five-year trend since 2006. *Yersinia enterocolitica* was the most common species reported in human cases and was isolated from 91.0 % of all confirmed cases. No human deaths due to yersiniosis infections were reported in the EU in 2010.

### Foodstuffs

Nine MSs have provided data on *Yersinia* in food in the years 2008-2010. *Y. enterocolitica* and its human pathogenic biotypes and serovars were most often detected in pig meat and products thereof. Few investigations were reported from bovine meat, sheep meat, milk and dairy products, but some positive findings were made also from these investigations.

### Animals

Seven MSs reported data from animals in 2008-2010. *Y. enterocolitica* was most often detected in pigs, but was also found in cattle, sheep, dogs, horses and some wildlife species. Although the reported data are few, there seem to be differences in the occurrence of *Y. enterocolitica* in the MSs.

## Tuberculosis due to *Mycobacterium bovis*

### Humans

No information on *M. bovis* cases in 2010 was available; thus, the 2009 data were included in the report. As in previous years, human infections due to *M. bovis* were rare in the EU. In 2009, the total number of confirmed human tuberculosis cases due to *M. bovis* was 133, representing a slight increase compared with 2008 (122). As in previous years, five MSs, Germany, Ireland, the Netherlands, Spain and the United Kingdom, accounted for 87 % of all confirmed cases. As in previous years, the highest notification rate (0.12 cases per 100,000 population) occurred in those aged 65 or older. There were seven deaths due to tuberculosis caused by *M. bovis* reported in 2009. The overall case fatality rate was 5.3 % in 2009.

### Animals

In 2010, one MS, two regions and four provinces became officially bovine tuberculosis free (Officially Tuberculosis Free, OTF), increasing the number of OTF MSs to 14 and two non-MSs, as well as Scotland (the United Kingdom) and six regions and 10 provinces in Italy. Four OTF MSs reported infected cattle herds in 2010. Eight non-OTF MSs reported positive or infected herds; Ireland and the United Kingdom accounted for the highest prevalence. In most of these non-OTF MSs the prevalence of bovine tuberculosis remained at a level comparable to 2009. Considering all MSs, *M. bovis* was also detected in over 10 animal species other than cattle. The detection of *M. bovis* in these species appears to reflect the OTF status of the MSs.

## *Brucella*

### Humans

In 2010, a total of 356 confirmed human brucellosis cases were reported in the EU, representing a decrease of 11.7 % compared with 2009 (N=403). The EU notification rate was 0.07 cases per 100,000 population. A significant decreasing five-year trend in human brucellosis was noted in the EU. As in previous years, the highest numbers were reported by non-Officially Brucellosis Free (non-OBF) countries, Greece, Portugal and Spain, together accounting for 74 % of all reported confirmed cases. *Brucella melitensis* was the most commonly reported *Brucella* species for those cases where this information was provided. In the EU, the highest notification rate of brucellosis was noted for adults between 45 and 64 years of age (0.1 per 100,000). No deaths due to brucellosis infection were reported in 2010.

### Foodstuffs

Two MSs provided information (with a sample size ≥25) on the occurrence of *Brucella* in milk, cheese and dairy products in 2010. None of the food items tested by these MSs were found to be contaminated with *Brucella*.

### Animals

In 2010, 15 MSs were OBF and 19 MSs were officially free of brucellosis in sheep and goats (Officially *Brucella melitensis* Free, ObmF). In addition, some regions and provinces in Italy, Spain and Portugal as well as Great Britain in the United Kingdom were OBF. Furthermore, a number of departments in France and some regions and provinces in Italy, Portugal and Spain were ObmF.

At the EU level, the prevalence of bovine brucellosis in cattle herds has been steadily decreasing to a very low level since 2005. In 2010, overall, 0.06 % of the existing cattle herds tested positive. In the EU non-OBF MSs, the percentage of existing infected/positive herds decreased between 2005 and 2007 but since then has remained stable. The prevalence of brucellosis in sheep and goat herds has decreased more substantially both at the EU level and in the non-ObmF MSs, with a statistically significant trend in EU co-financed non-ObmF MSs since 2005. In 2010, the proportion of existing infected/positive sheep and goat herds infected with *B. melitensis* in the EU was 0.18 %.

## *Trichinella*

### Humans

In 2010, confirmed cases of trichinellosis decreased sharply, by 70.2 %, with 223 cases reported, compared with 748 cases reported in 2009. The highest decrease was reported in Bulgaria and Romania. In general, human cases were most likely to be associated with food-borne outbreaks due to consumption of meat from domestic pigs raised in backyards. No deaths due to *Trichinella* infection were reported in 2010.

### Animals

All MSs provided data on *Trichinella* in animals. The parasite was very rarely detected in pigs in 2010 and less than 0.0001 % of pigs tested *Trichinella*-positive in the EU. The prevalence of the parasite in slaughter pigs was reduced compared with previous years, mainly because fewer positive slaughter pigs were detected in Romania. The parasite was isolated more frequently from farmed and hunted wild boar. *Trichinella* was prevalent in wildlife species, whit most MSs reporting positive findings in wildlife.

## *Echinococcus*

### Humans

Reported cases of human echinococcosis decreased by 4.9 % in 2010 (N=750) compared with 2009 (N=789) in the EU. In 2010, the case fatality rate for human echinococcosis was 0.9 %. As in previous years, *Echinococcus granulosus* accounted for the majority (69.1 %) of human cases with known species. The highest notification rate occurred in 45 to 64 year olds (0.23 per 100,000 population). Alveolar echinococcosis increased in Germany with 30 *E. multilocularis* cases reported in 2010 compared with 24 cases reported in 2009.

### Animals

In 2010, 19 MSs and one non-MS reported data on *Echinococcus* in farm animals. Most MSs reported no or very few findings of *Echinococcus*. At EU level, the parasite was detected in sheep, goats and cattle, solipeds and pigs at levels of 1.3 %, 1.1 %, 0.6 %, 0.7 % and 0.2 %, respectively. *E. multilocularis* was detected from 15.2 % of tested foxes in 2010, mainly in the central European MSs.

## *Toxoplasma*

### Humans

Eighteen MSs reported data on human congenital toxoplasmosis (infants <1 year) in 2010. In total, 21 confirmed cases were reported with an EU notification rate of 0.56 per 100,000 population. No deaths due to toxoplasmosis were reported in 2010. This is the first year for which data are presented strictly according to the EU case definition, which is targeted to congenital toxoplasmosis cases only.

### Animals

In 2010, 19 MSs and two non-MSs provided information on *Toxoplasma* in animals. The highest proportions of positive samples at the EU level were reported for sheep and goats (18.2 %), cats (12.9 %) and dogs (13.4 %), while only 1.2 % of the tested cattle and 2.3 % of tested pigs were positive.

## Rabies

### Humans

Rabies is a very rare zoonotic disease in Europe. Two indigenous human fatal cases in young girls in contact with sick animals were reported in rural Romania. This is the third year that Romania has reported indigenous cases.

### Animals

Twenty-three MSs provided data on rabies cases in animals. Seven MSs reported rabies cases in farm animals and pets, and eight MSs in wildlife animal species (other than bats) in 2010, and the total number of rabies cases in animals increased slightly compared with 2009. Rabies is still prevalent in wildlife in the Baltic and some South-Eastern European MSs, and most cases are reported by Romania. In wildlife most cases of rabies were attributable to foxes. Six MSs reported rabies findings in bats. Two imported animal cases of rabies were reported in 2010, one of which was a dead bat imported for diagnosis only, the other being a dog.

## Q fever

### Humans

In 2010, a total of 1,414 confirmed human cases of Q fever were reported in the EU, representing a 28.9 % decrease compared with 2009 (1,988). The Netherlands was the country with the highest decrease, by 67.0 %, which shows that the control measures to tackle the ongoing outbreak since 2007 have been effective. Two deaths due to Q fever were reported among elderly persons from the Netherlands.

### Animals

In total, 17 MSs and two non-MSs provided data on Q fever in farm animals for 2010. All these MSs, with the exception of Finland and one non-MS (Norway), reported positive cases in cattle, sheep or goats with different prevalence.

## Tularaemia

### Humans

In 2010, a total of 807 cases of tularaemia were reported in the EU. Three MSs, Finland, Hungary and Sweden, accounted for 87 % of reported cases. No human deaths due to tularaemia were reported in 2010.

### Animals

In 2010, *Francisella tularensis* was reported by only one MS (Sweden) and one non-MS (Norway). Sweden detected *F. tularensis* in five wild animal samples and Norway detected *F. tularensis* in 10 wild hares that were sampled as part of a clinical investigation.

## *Cysticercus*

Two MSs, Estonia and Sweden, provided information on cysticerci in 2010. In Estonia *Cysticercus tenuicollis*, which is not zoonotic, was detected at rare levels in pigs and sheep, respectively. Additionally, *Cysticercus* was visually detected in 38 pigs, but these findings were not confirmed by laboratory testing. In Sweden *Cysticercus bovis* was detected in three cattle, but in none of the pigs analysed.

## Mycobacteria spp.

In 2010, several species and subspecies of mycobacteria other than *M. bovis* were reported by eight MSs in 10 different animal species. The most commonly reported finding was *Mycobacterium* 'unspecified', while *Mycobacterium avium* subsp. *avium* was the most commonly reported identified species.

## Food-borne outbreaks

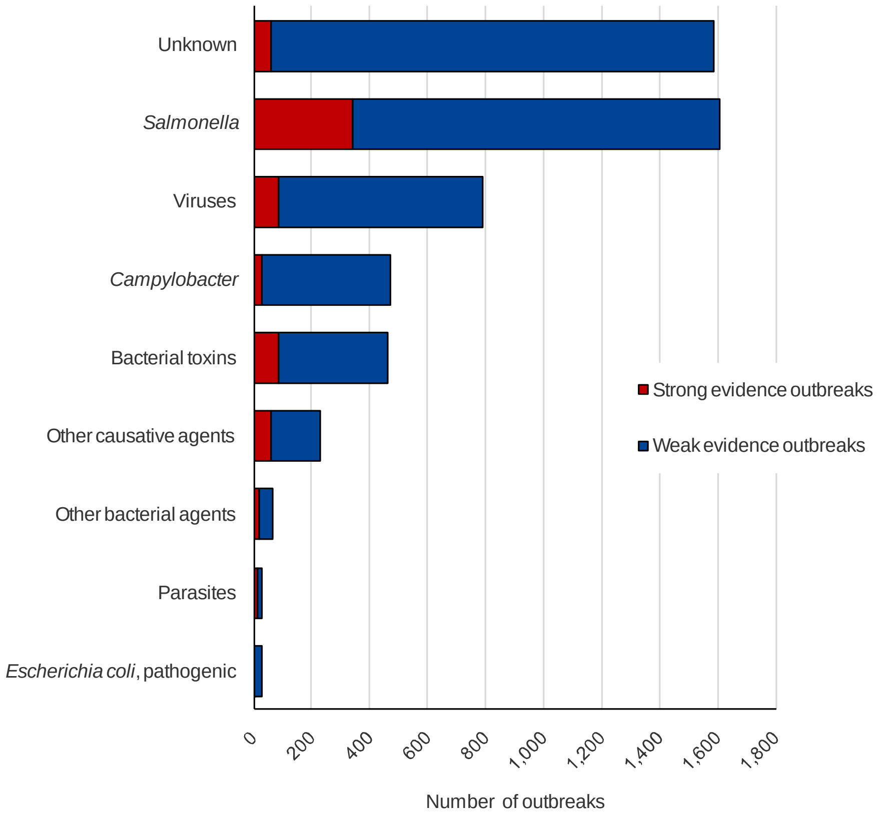
A total of 5,262 food-borne outbreaks were reported in the EU, which is at a similar level to 2009. Overall, 43,473 human cases, 4,695 hospitalisations and 25 deaths were recorded. The number of outbreaks, in which the evidence implicating a food vehicle was strong was 698.

The largest number of reported food-borne outbreaks was caused by *Salmonella* (30.5 % of all outbreaks), followed by viruses (15.0 %) and *Campylobacter* (8.9 %). The number of *Salmonella* outbreaks continued to decline. The most important food vehicles in the outbreaks were eggs and egg products (22.1 %), mixed or buffet meals (13.9 %), vegetables and juices and other products thereof (8.7 %) and crustaceans, shellfish, molluscs and products thereof (8.5 %). The numbers of reported outbreaks caused by vegetables and products thereof increased, mainly due to virus outbreaks attributed to vegetables.

In 2010, 14 waterborne outbreaks were reported in the EU, and the main causative agents were *Campylobacter,* calicivirus*, Salmonella* and *Cryptosporidium hominis*. The largest outbreaks, involving a substantial number of human cases, were caused by contamination of public water sources.

The new reporting specifications for the food-borne outbreaks were implemented for the first time in 2010 and they appeared to have an impact on the nature and numbers of reported outbreaks.

***Figure SU2. Distribution of food-borne outbreaks (weak and strong evidence- excluding strong evidence waterborne outbreaks) per causative agent in the EU, 2010***




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

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.1 *Salmonella*

*Salmonella* has long been recognised as an important zoonotic pathogen of economic significance in animals and humans. The genus *Salmonella* is currently divided into two species*:* *S. enterica* and *S. bongori*. *S. enterica* is further divided into six sub-species, and most zoonotic *Salmonella* belong to the subspecies *S. enterica* subsp. *enterica*. Members of this subspecies have usually been named based on where the serovar or serotype was first isolated. In the following text, the organisms are identified by genus followed by serovar, for example *S.* Typhimurium. More than 2,600 serovars of zoonotic *Salmonella* exist and the prevalence of the different serovars changes over time.

Human salmonellosis is usually characterised by the acute onset of fever, abdominal pain, nausea, and sometimes vomiting, after an incubation period of 12-36 hours. Symptoms are often mild and most infections are self-limiting, lasting a few days. However, in some patients, the infection may be more serious and the associated dehydration can be life threatening. When *Salmonella* causes systemic infections, such as septicaemia, effective antimicrobials are essential for treatment. Salmonellosis has also been associated with long-term and sometimes chronic sequelae e.g. reactive arthritis. Mortality is usually low, and less than 1 % of reported *Salmonella* cases have been fatal.

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

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

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

Table SA1 presents the countries reporting data for 2010.

***Table SA1. Overview of countries reporting data for* Salmonella*, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 27 | **All MSs**<br>**Non-MSs:** CH, IS, NO |
| Food | 26 | **All MSs** except MT<br>**Non-MSs:** CH, NO |
| Animal | 27 | **All MSs**<br>**Non-MSs:** CH, NO |
| Feed | 26 | **All MSs** except MT<br>**Non-MSs:** CH, NO |
| Serovars (food and animals) | 23 | **All MSs** except BE, BG, LU, MT<br>**Non-MS:** NO |

Note: The overview table includes all data reported by MSs. However, in the following chapter, data reported as HACCP or own control are not included in the detailed tables, and, unless stated otherwise, data from import, suspect sampling and outbreak or clinical investigations are also excluded. Also, only countries reporting 25 samples or more have been included for analysis.

### 3.1.1 Salmonellosis in humans

In 2010, the number of reported human *Salmonella* cases continued to decrease, and 99,020 confirmed cases (notification rate 21.5 cases per 100,000 population) were reported by 27 EU MSs (Table SA2). The reduction was 8.8 % (9,598 cases) in 2010, which is about half of the reported reduction rate in 2009 (17.4 % and 22,854 cases). In 2010, 62 deaths due to non-typhoidal salmonellosis were reported (N=46,639).

Germany accounted for 51.5 % of the reduction in the reported number of confirmed cases. Despite decreases in several countries, 16 MSs reported more *Salmonella* cases in 2010 than in 2009 (Table SA2). The highest proportional increases in confirmed case numbers, of 24.1 % (760 cases) and 23.3 % (736 cases), were reported by Slovakia and Poland, respectively.

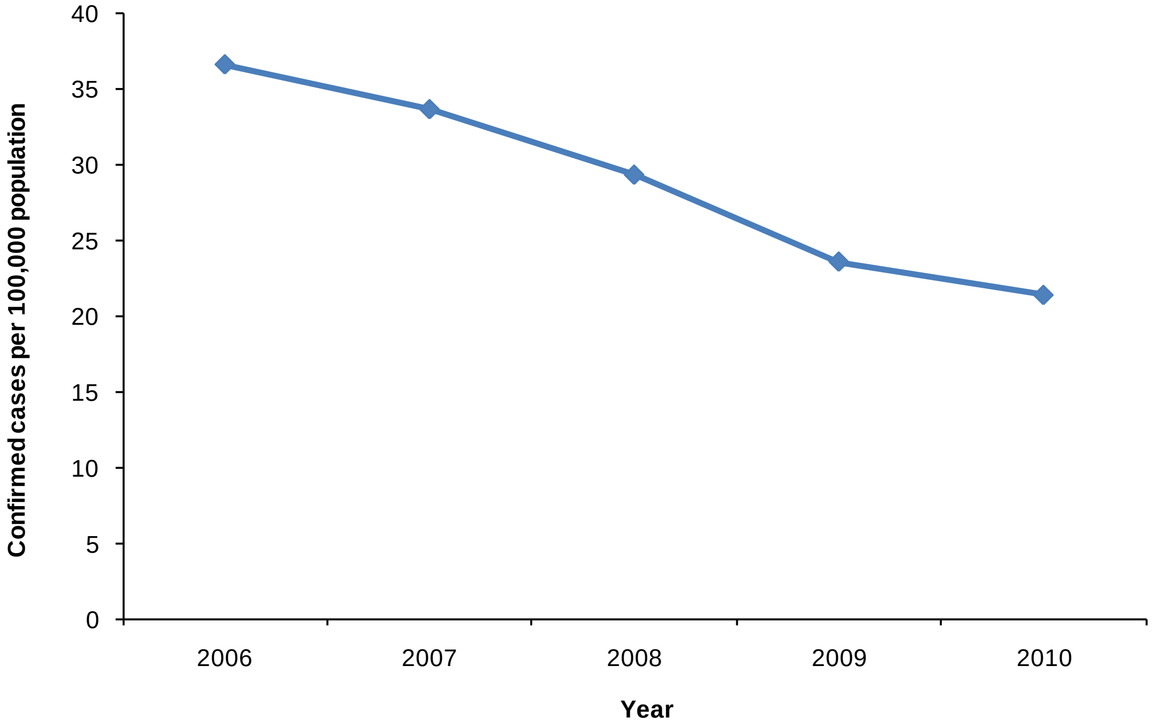
The five-year EU-trend (2006-2010) was calculated for the whole EU for the first time. The trend showed a statistically significant decrease (Figure SA1). However, there were still some country-specific variations. Although 14 countries showed a significant decreasing trend, Malta and Romania presented an increasing trend. Trends were not significant in the rest of the 11 countries that reported data on *Salmonella* for the five consecutive years. Within the five-year period, the greatest average annual decline of 25.0 % in reported cases was observed in the Czech Republic, whereas the highest average annual rise in case numbers, 24.0 %, was observed in Malta.

***Table SA2. Reported human salmonellosis cases in 2006-2010 and notification rates for 2010***

| Country | 2010 | | | | 2009 | 2008 | 2007 | 2006 |
|---|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases | Confirmed cases/ 100,000 | Confirmed cases | | | |
| Austria | C | 2,179 | 2,179 | 26.0 | 2,775 | 2,312 | 3,386 | 4,787 |
| Belgium | C | 3,169 | 3,169 | 29.2 | 3,113 | 3,831 | 3,915 | 3,630 |
| Bulgaria | A | 1,217 | 1,153 | 15.2 | 1,247 | 1,516 | 1,136 | 1,056 |
| Cyprus | C | 137 | 136 | 16.9 | 134 | 169 | 158 | 99 |
| Czech Republic | C | 8,456 | 8,209 | 78.1 | 10,480 | 10,707 | 17,655 | 24,186 |
| Denmark | C | 1,608 | 1,608 | 29.1 | 2,130 | 3,669 | 1,648 | 1,662 |
| Estonia | C | 414 | 381 | 28.4 | 261 | 647 | 428 | 453 |
| Finland | C | 2,422 | 2,422 | 45.3 | 2,329 | 3,126 | 2,738 | 2,576 |
| France | C | 7,184 | 7,184 | 11.1 | 7,153 | 7,186 | 5,313 | 6,008 |
| Germany | C | 25,306 | 24,833 | 30.4 | 31,395 | 42,885 | 55,399 | 52,575 |
| Greece | C | 300 | 299 | 2.6 | 403 | 792 | 706 | 890 |
| Hungary | C | 6,246 | 5,953 | 59.4 | 5,873 | 6,637 | 6,578 | 9,389 |
| Ireland | C | 356 | 349 | 7.8 | 335 | 447 | 440 | 420 |
| Italy | C | 2,730 | 2,730 | 4.5 | 4,156 | 6,662 | 6,731 | 6,272 |
| Latvia | C | 951 | 881 | 39.2 | 798 | 1,229 | 619 | 781 |
| Lithuania | C | 1,962 | 1,962 | 58.9 | 2,063 | 3,308 | 2,270 | 3,479 |
| Luxembourg | C | 211 | 211 | 42.0 | 162 | 153 | 163 | 308 |
| Malta | C | 160 | 160 | 38.7 | 125 | 161 | 85 | 63 |
| Netherlands[2] | C | 1,447 | 1,447 | 13.6 | 1,205 | 1,627 | 1,224 | 1,644 |
| Poland | A | 9,732 | 9,257 | 24.3 | 8,521 | 9,148 | 11,155 | 12,502 |
| Portugal | C | 207 | 205 | 1.9 | 220 | 332 | 438 | 387 |
| Romania | C | 1,291 | 1,285 | 6.0 | 1,105 | 624 | 620 | 645 |
| Slovakia | C | 5,171 | 4,942 | 91.1 | 4,182 | 6,849 | 8,367 | 8,191 |
| Slovenia | C | 363 | 363 | 17.7 | 616 | 1,033 | 1,336 | 1,519 |
| Spain[3] | C | 4,420 | 4,420 | 38.4 | 4,304 | 3,833 | 3,842 | 5,117 |
| Sweden | C | 3,612 | 3,612 | 38.7 | 3,054 | 4,185 | 3,930 | 4,056 |
| United Kingdom | C | 9,670 | 9,670 | 15.6 | 10,479 | 11,511 | 13,557 | 14,124 |
| **EU Total** | | **100,921** | **99,020** | **21.5** | **108,618** | **134,579** | **153,837** | **166,819** |
| Iceland | C | 34 | 34 | 11.0 | 35 | 134 | 93 | 114 |
| Liechtenstein | C | - | - | - | - | - | 1 | 14 |
| Norway | C | 1,370 | 1,370 | 25.7 | 1,235 | 1,941 | 1,649 | 1,813 |
| Switzerland[4] | C | 1,179 | 1,179 | 15.1 | 1,298 | 2,031 | 1,778 | 1,768 |

1. A: aggregated data report; C: case-based report.
2. Sentinel system; notification rates calculated with estimated population coverage of 64 %.
3. Notification rates calculated with estimated population coverage of 25 %.
4. Switzerland provided data directly to EFSA.

***Figure SA1. Trend in reported confirmed cases per 100,000 population of human salmonellosis in the EU, 2006-2010***

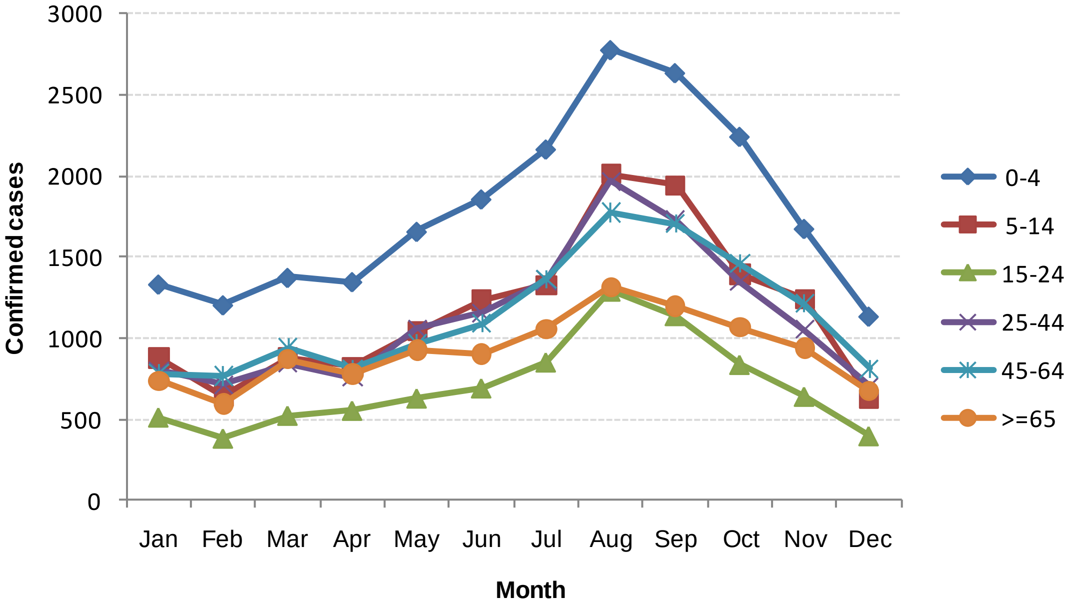



Source: TESSy data for 27 EU MSs.

Age data were available for almost all (99 %) reported cases. The notification rate was highest in small children, in the 0-4 years age group (112.7 per 100,000 population), remaining at the same level as in 2009 (112.4 per 100,000 population). The notification rate is still three times higher in small children than in 5 to 14 year olds (35.1 per 100,000 population), and six to nine times higher than in those aged 15 and over, among whom the notification rate ranges from 12.1 per 100,000 population in the 25-44 years age group to 17.7 per 100,000 population in the 15-24 years age group. The case fatality was 0.13 % (62 cases) among 46,639 confirmed cases for which this information was reported.

A peak in the number of reported *Salmonella* cases normally occurs in August-September, with a rapid decline in winter months (Figure SA2). This pattern is prominent for all age groups, supporting the influence of outside temperature on multiplication of bacteria in foods and environment.

***Figure SA2. Number of confirmed salmonellosis cases in humans by month and age group in 2010***




Source: TESSy data for 24 MSs: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia, Spain, Sweden and United Kingdom (N= 82,642).

The proportion of *Salmonella* infections that were reported as domestically acquired in MSs and EEA countries remained at the same level in 2010 as in 2009 (63.1 % versus 62.4 %) (Table SA3). A similar observation was made for the proportion of imported cases or those acquired while travelling abroad, which in 2010 was 10.9 % compared with 10.5 % in 2009. The proportion of confirmed cases with an unknown origin represented slightly less (26.0 %) in 2010 than in the previous year (27.1 %). As before, three of the four Nordic countries, Finland, Sweden and Norway, continued to have the highest proportions of imported cases of salmonellosis (83.8 %, 73.8 % and 65.5 %, respectively) whereas the infections seem to be mainly domestically acquired in the majority of other countries. Although data on domestic/imported cases are often incomplete and may not provide a true picture of the distribution between domestic and imported cases, the continuous repetitive results may indicate common cultural features and/or domestic sources in some geographical areas.

***Table SA3. Distribution of confirmed[1] salmonellosis cases in humans by reporting countries and origin of infection (domestic/imported) in 2010***

| Country | Domestic (%) | Imported (%) | Unknown (%) | Total (n) |
|---|---|---|---|---|
| Austria | 97.2 | 2.8 | 0 | 2,179 |
| Belgium | - | - | 100 | 3,169 |
| Bulgaria | - | - | 100 | 922 |
| Cyprus | - | - | 100 | 136 |
| Czech Republic | 98.1 | 1.9 | 0 | 8,209 |
| Denmark | 42.9 | 35.5 | 21.6 | 1,608 |
| Estonia | 93.7 | 6.3 | 0 | 381 |
| Finland | 13.1 | 83.8 | 3.1 | 2,422 |
| France | - | - | 100 | 7,184 |
| Germany | 88.3 | 7.3 | 4.4 | 24,833 |
| Greece | 90.6 | 2.0 | 7.4 | 299 |
| Hungary | 99.8 | 0.2 | 0 | 5,953 |
| Ireland | 41.3 | 36.1 | 22.6 | 349 |
| Italy | - | - | 100 | 2,730 |
| Latvia | 100 | 0 | 0 | 881 |
| Lithuania | - | - | 100 | 1,962 |
| Luxembourg | 77.7 | 3.8 | 18.5 | 211 |
| Malta | 100 | 0 | 0 | 160 |
| Netherlands | 88.7 | 11.3 | 0 | 1,447 |
| Poland | 99.9 | 0.1 | 0 | 9,732 |
| Portugal | 0.5 | 0 | 99.5 | 205 |
| Romania | 16.5 | 0 | 83.5 | 1,285 |
| Slovakia | 99.1 | 0.9 | 0 | 4,942 |
| Slovenia | - | - | 100 | 363 |
| Spain | 100 | 0 | 0 | 4,420 |
| Sweden | 22.5 | 73.8 | 3.7 | 3,612 |
| United Kingdom | 24.9 | 32.2 | 42.9 | 9,670 |
| **EU Total** | **63.1** | **10.9** | **26.0** | **99,264** |
| Iceland | 23.5 | 50 | 26.5 | 34 |
| Liechtenstein | - | - | - | - |
| Norway | 15.1 | 65.5 | 19.4 | 1,370 |

1. Aggregated data for Bulgaria and Poland include all reported cases.

### 3.1.2 *Salmonella* in food

Most MSs and non-MSs provided data on *Salmonella* in various foodstuffs (Table SA4), with fewer data provided for fruit and vegetables (15 MSs). In the report, only results based on 25 or more units tested are presented. Results from industry own-check programmes and Hazard Analysis and Critical Control Point (HACCP) sampling as well as specified import control, suspect sampling and clinical investigations have been excluded due to difficulties in interpretation of data. These data are, however, presented in the Level 3 tables, and the details of the monitoring schemes applied in MSs are summarised in Appendix tables SA7b (broiler meat), SA10 (turkey meat), SA16 (pig meat) and SA17 (bovine meat).

*Table SA4. Overview of countries reporting data for* Salmonella *in food, 2010*

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Broiler meat | 25 | **All MSs** except MT, UK<br>**Non-MS:** CH |
| Turkey meat | 22 | **All MSs** except CY, DK, ES, MT, UK<br>**Non-MS:** CH |
| Eggs and egg products | 20 | **All MSs** except DK, FI, FR, MT, NL, SI, UK |
| Pig meat | 23 | **All MSs** except HU, LT, MT, UK<br>**Non-MS:** NO |
| Bovine meat | 22 | **All MSs** except FR, HU, LT, MT, UK<br>**Non-MS:** NO |
| Milk and dairy products | 21 | **All MSs** except DK, FI, FR, LU, MT, UK |
| Fruit and vegetables | 15 | **MSs:** AT, BG, CZ, DE, EE, HU, IE, IT, LT, LV, PT, RO, SE, SI, SK |
| Fish and other fishery products[1] | 20 | **All MSs** except CY, DK, FI, FR, LU, MT, UK<br>**Non-MSs:** NO, CH |

Note: The overview table includes all data reported by MSs. However, in the following chapter, data reported as HACCP or own control are not included in the detailed tables, and, unless stated, data from import, suspect sampling and outbreak or clinical investigations are also excluded. Also, only countries reporting investigations with 25 samples or more have been included for analysis.

1. This category includes fish, fishery products, crustaceans, live bivalve molluscs, molluscan shellfish and live echinoderms, tunicates and gastropods.

#### Compliance with microbiological criteria

The *Salmonella* criteria laid down by Regulation (EC) No 2073/2005[10] were applied from 1 January 2006. The criteria were modified by Regulation (EC) No 1441/2007[11], which came into force in December 2007. The Regulations prescribe rules for sampling and testing, and set limits for the presence of *Salmonella* in specific food categories and in samples from food processing. The food safety criteria for *Salmonella* apply to products placed on the market during their shelf life. According to the criteria, *Salmonella* must be absent in the food categories mentioned in Table SA5. Absence is defined by testing five or 30 samples of 25 g per batch depending on the food category. In official controls, often only single samples are taken to verify compliance with the criteria.

10 Commission Regulation (EC) No 2073/2005 of 15 November 2005 on microbiological criteria for foodstuffs. OJ L 338, 22.12.2005, p. 1–26.

11 Commission Regulation (EC) No 1441/2007 of 5 December 2007 amending Regulation (EC) No 2073/2005 on microbiological criteria for foodstuffs. OJ L 322, 7.12.2007, p. 12–29.

In 2010, as in 2009 and 2008, the highest levels of non-compliance with *Salmonella* criteria generally occurred in foods of meat origin (Figure SA3). Minced meat and meat preparations from poultry intended to be eaten cooked had the highest level of non-compliance (category 1.5, 5.3 % of single samples). Minced meat and meat preparations from animal species other than poultry intended to be eaten cooked (category 1.6) had the second highest proportion with 2.8 % of single samples being positive for *Salmonella*. However, in both these food categories the levels of non-compliance are lower than in the two previous years, particularly in single samples.

The percentage of non-compliance in single samples of egg products (food category 1.14 in Table SA5) was 0.7 % in 2010 and in live bivalve molluscs and live echinoderms, tunicates and gastropods (category 1.17) 1.5 %.

Of particular relevance because of the risk they pose to human health are the *Salmonella* findings in RTE foods, such as minced meat and meat preparations intended to be eaten raw (food category 1.4 in Table SA5) and RTE sprouted seeds (food category 1.18), with 1.8 % and 0.8 %, respectively, of the single samples testing positive.

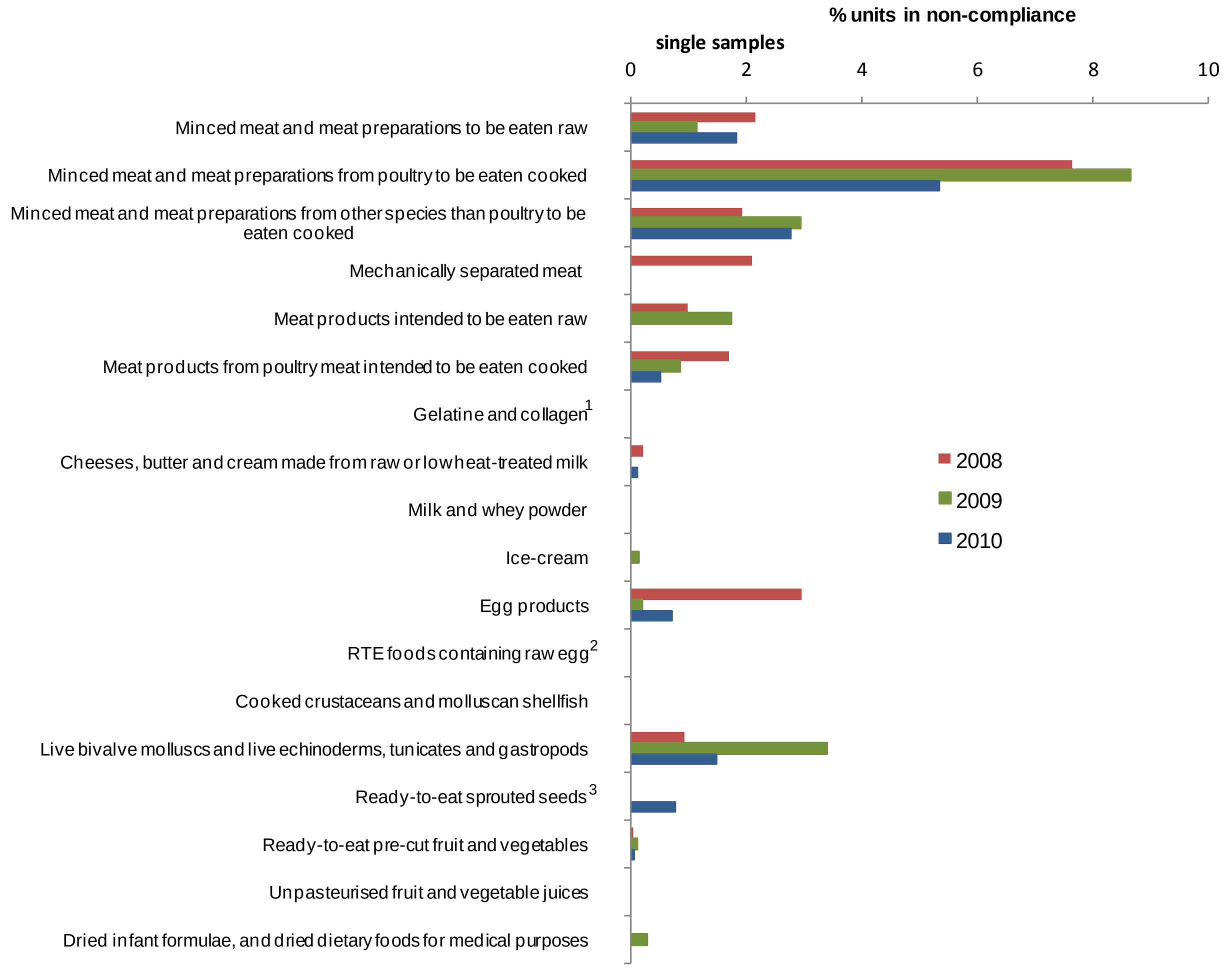
In the other food categories, the level of non-compliance was generally very low, and overall the level of non-compliance in 2010 was comparable to the findings in previous years (Figure SA3).

*Table SA5. Compliance with the food safety* **Salmonella** *criteria laid down by EU Regulations 2073/2005 and 1441/2007, 2010*

| Food categories[1] | | Total single samples | | | Total batches | | |
|---|---|---|---|---|---|---|---|
| | | Sample weight | N | % non-compliant | Sample weight | N | % non-compliant |
| 1.4 | Minced meat and meat preparations intended to be eaten raw | 25 g | 3,373 | 1.8 | 25 g or not stated | 1,184 | 0.3 |
| 1.5 | Minced meat and meat preparations from poultry intended to be eaten cooked | 25 g or not stated | 2,458 | 5.3 | 10 g or 25 g or not stated | 8,248 | 0.9 |
| 1.6 | Minced meat and meat preparations from other species than poultry intended to be eaten cooked | 10 g or 25 g or various or not stated | 9,467 | 2.8 | 10 g or 25 g or not stated | 29,205 | 0.4 |
| 1.7 | Mechanically separated meat | 10 g or 25 g | 242 | 0 | 10 g or 25 g or 100 g or 200 g or not stated | 1,639 | 4.3 |
| 1.8 | Meat products intended to be eaten raw | 25 g | 164 | 0 | 25 g | 1,368 | 0 |
| 1.9 | Meat products from poultry meat intended to be eaten cooked | 25 g or various or not stated | 3,991 | 0.5 | 25 g or not stated | 4,407 | 1.2 |
| 1.10 | Gelatine and collagen | 25 g | 327 | 0 | 25 g | 87 | 0 |
| 1.11 | Cheeses, butter and cream made from raw or low heat-treated milk | 25 g or various | 1,685 | 0.1 | 25 g or not stated | 9,278 | <0.1 |
| 1.12 | Milk and whey powder | 25 g | 304 | 0 | 25 g or not stated | 3,011 | 0 |
| 1.13 | Ice-cream | 25 g or not stated | 11,245 | 0 | 25 g or not stated | 2,513 | 0 |
| 1.14 | Egg products | 25 g or not stated or various | 853 | 0.7 | 25 g or not stated | 1,282 | 0.3 |
| 1.15 | RTE foods containing raw egg | 25 g | - | - | 25 g | - | - |
| 1.16 | Cooked crustaceans and molluscan shellfish | 25 g | 80 | 0 | 25 g or not stated | 405 | 0.5 |
| 1.17 | Live bivalve molluscs and live echinoderms, tunicates and gastropods | 25 g | 201 | 1.5 | 25 g or not stated | 243 | 0 |
| 1.18 | Sprouted seeds (RTE) | 25 g | 130 | 0.8 | 25 g | - | - |
| 1.19 | Pre-cut fruit and vegetables (RTE) | 25 g | 1,975 | <0.1 | 25 g or not stated | 1,202 | 0 |
| 1.20 | Unpasteurised fruits, vegetables and juices (RTE) | 25 g | 25 | 0 | 25 g | 308 | 0 |
| 1.22-23 | Dried infant formulae, and dried dietary foods for medical purposes[2] and dried follow-on formulae | 25 g | 873 | 0 | 25 g | 64 | 0 |

Note: RTE: ready-to-eat products. Data are presented only for sample sizes ≥25.
1. Numbers before food categories refer to Annex 1, chapter 1 of Regulation (EC) No 1441/2007. See this Regulation for full description of food categories.
2. Intended for infants below six months of age.

*Figure SA3. Proportion of units in non-compliance with EU* Salmonella *criteria, 2008-2010*




Note: only investigations covering 25 or more samples are included.

1. No investigations with 25 or more batches of gelatine and collagen in 2009.

2. No investigations with 25 or more samples of RTE foods containing raw egg in 2009 and 2010, and batches in 2009 and 2010.

3. No investigations with 25 or more batches of RTE sprouted seeds in 2010.

### Broiler meat and products thereof

The occurrence of *Salmonella* in fresh broiler meat at different levels of the production chain is presented in Table SA6. Overall, 4.8 % of the tested units within the EU were positive for *Salmonella*. This is a decrease compared with 2009, but at the same level as in 2008. When investigating by logistic regression analysis combined single sample data from all sampling contexts from the 10 MSs reporting from 2004 to 2010, no significant trend in the MS-group weighted prevalence of positive samples was observed (Figure SA4). See Section 6.2 in the Materials and methods chapter for a description of the statistical methodology. The MS-specific trends in test-positive samples of fresh broiler meat in 10 MSs from 2004 to 2010 are shown in Figure SA5. The trellis graph shows that in Belgium the proportion of positive samples decreased during these years.

*Salmonella* was detected in most of the reported investigations, with only three MSs reporting no positives (Estonia, Finland and Greece). The highest proportions of positive samples (>20 %) were reported from Cyprus, Hungary and Lithuania (Table SA6). Hungary consistently reported high proportions (>20 %) of positive samples at slaughter, at processing/cutting plant and at retail from 2008 to 2010, and this is thought to be related to a significant prevalence of *S*. Infantis in the Hungarian broiler industry.

At slaughter, the reported proportion of positive samples varied among MSs from 0.3 % to 24.0 % (which was a reduction from 60.8 % reported by Hungary last year), and at processing *Salmonella* was detected in 1.4 % to 43.8 % of samples. At retail level, the range was from <0.1 % to 29.1 %. Data from the four MSs (Belgium, Hungary, Romania and Spain) reporting investigations at all three sampling stages showed that samples tested at retail were less contaminated than samples tested earlier in the food chain (8.4 %, compared with 10.7 % at processing and 10.8 % at slaughter) (Table SA6).

The majority of poultry meat results reported by Sweden were from unspecified poultry types and therefore are not included in Tables SA6 and SA7. However, the proportion of positive poultry meat samples in Sweden was very low in previous years, and in 2010 it was less than 0.1 % (at slaughterhouse N=5,746, 1 positive and at cutting plant N=1,405, 1 positive).

In 2010, 19 MSs and one non-MS (Switzerland) reported *Salmonella* findings in non-RTE broiler meat products (meat products, meat preparations and minced meat). Eighteen of these MSs and the non-MS reported investigations with 25 samples or more. Among these, the proportion of *Salmonella*-positive samples varied between 0.2 % and 27.8 %, but on average, at EU level, 1.2 % of the samples were positive. The highest contamination levels were reported by Hungary in non-RTE meat preparations at retail (27.8 %, single samples). Where it was not indicated whether the food was RTE or non-RTE, the data have been assumed to originate from non-RTE materials. Refer to the level 3 tables for the data.

Eleven MSs reported data for RTE broiler meat products with a sample size of 25 or more. Most MSs reported no positive findings; Germany and Portugal were the exceptions with 0.4 % (single samples) and 2.6 % (batch samples) positive, respectively (Table SA7).

***Table SA6.* Salmonella *in fresh broiler meat at slaughter, processing/cutting level and retail, 2008-2010***

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| **At slaughter** | | | | | | | | |
| Belgium[1] | Single | 1 g | 395 | 3.0 | 422 | 5.9 | 285 | 14.4 |
| Cyprus | Batch | 25 g | 184 | 0 | - | - | - | - |
| Czech Republic[2] | Batch | 25 g | 725 | 7.0 | 708 | 3.0 | 1,367 | 4.2 |
| Denmark | Batch | 60 g | 346 | 0.3 | 375 | 0.8 | 518 | 0.6 |
| Estonia | Batch | 25 g | 51 | 0 | 48 | 0 | - | - |
| France[3] | Batch | 25 g | 67 | 10.4 | - | - | - | - |
| Germany | Single | 25 g | - | - | 248 | 1.6 | 55 | 12.7 |
| Greece | Single | 25 g | - | - | - | - | 76 | 6.6 |
| Hungary | Single | 25 g | 538 | 24.0 | 653 | 60.8 | - | - |
| Ireland[4,5] | Single | Various | 430 | 6.3 | 366 | 10.4 | - | - |
| | Batch | Various | - | - | - | - | 219 | 15.1 |
| Latvia[2] | Single | 10 g | - | - | - | - | 50 | 22.0 |
| Poland | Batch | 25 g | 2,720 | 11.4 | 8,664 | 5.5 | - | - |
| Romania[6] | Batch | 25 g | 561 | 5.2 | 1,167 | 0.9 | 2,027 | 0.6 |
| Spain[7] | Single | 25 g | 171 | 5.3 | 90 | 26.7 | 465 | 15.1 |
| **At processing/cutting plant** | | | | | | | | |
| Austria | Single | 25 g | - | - | 39 | 2.6 | 64 | 0 |
| Belgium | Single | 25 g | - | - | 415 | 8.2 | 568 | 7.0 |
| | Batch | 25 g | 358 | 5.9 | - | - | - | - |
| Cyprus | Batch | 25 g | 80 | 43.8 | - | - | - | - |
| Czech Republic | Batch | 25 g | 272 | 12.9 | - | - | - | - |
| Estonia | Batch | 25 g | 47 | 0 | 48 | 0 | 48 | 0 |
| Finland | Single | 25 g | 753 | 0 | 802 | 0 | 768 | 0 |
| Germany | Single | 25 g | 111 | 6.3 | 60 | 6.7 | 79 | 5.1 |
| Greece | Single | 25 g | - | - | - | - | 77 | 15.6 |
| Hungary | Single | 25 g | 273 | 20.5 | 302 | 31.1 | - | - |
| Poland | Single | 25 g/300 g | 35 | 8.6 | - | - | - | - |
| | Batch | 25 g | 530 | 11.9 | - | - | - | - |
| | Batch | 200 g/500 g | 55 | 9.1 | 70 | 0 | - | - |
| Portugal[14] | Single | 25 g | 216 | 1.4 | - | - | - | - |
| Romania | Batch | 25 g | 73 | 0 | 153 | 0 | 294 | 0.7 |
| Slovenia | Single | 25 g | 100 | 2.0 | 96 | 0 | - | - |
| Spain | Single | 25 g | 63 | 7.9 | 105 | 5.7 | 91 | 15.4 |

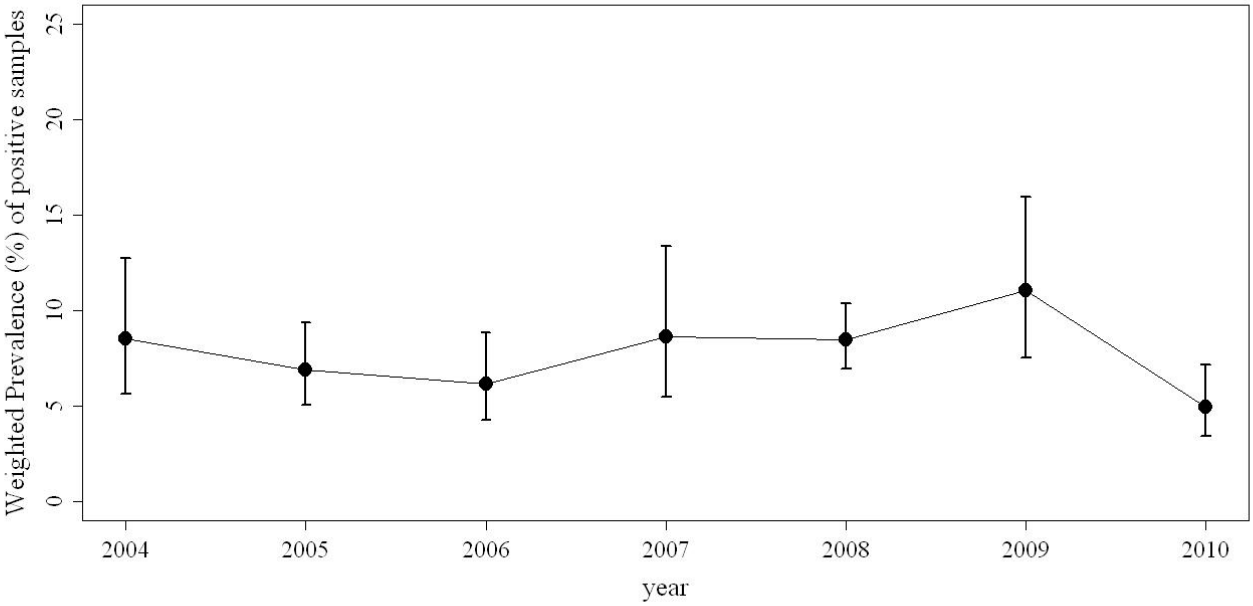
Table continued overleaf.

***Table SA6 (continued).* Salmonella *in fresh broiler meat at slaughter, processing/cutting level and retail, 2008-2010***

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| **At retail** | | | | | | | | |
| Austria | Single | 25 g | 372 | 5.6 | 51 | 0 | 295 | 7.8 |
| Belgium[8] | Single | 25 g | - | - | 119 | 5.9 | 88 | 11.4 |
| | Batch | 25 g | 418 | 4.8 | - | - | - | - |
| Bulgaria | Batch | 25 g | 8,677 | <0.1 | 8,414 | 0.1 | 4,046 | 0.3 |
| Czech Republic | Single | 27 g | - | - | 240 | 1.7 | - | - |
| France[9] | Single | 25 g | 330 | 1.2 | 361 | 3.6 | - | - |
| Germany[10, 11] | Single | 25 g | 713 | 9.0 | 599 | 6.2 | 993 | 10.8 |
| | Single | 25 g | - | - | 449 | 7.6 | - | - |
| Greece | Single | 25 g | 28 | 0 | - | - | 64 | 15.6 |
| Hungary | Single | 25 g | 117 | 29.1 | 97 | 36.1 | - | - |
| Latvia[12] | Single | 10 g/25 g | 75 | 5.3 | - | - | 85 | 8.2 |
| Lithuania | Single | 25 g | 26 | 23.1 | 71 | 1.4 | 136 | 16.2 |
| Luxembourg | Single | 25 g | 88 | 2.3 | 81 | 3.7 | 101 | 5.9 |
| Netherlands | Single | 25 g | 1,092 | 4.7 | 615 | 7.6 | - | - |
| | - | 25 g | - | - | - | - | 1,408 | 7.7 |
| Portugal | Batch | 25 g | 25 | 0 | - | - | - | - |
| Romania | Single | 25 g | - | - | 149 | 0 | - | - |
| | Batch | 25 g | 39 | 0 | - | - | 295 | 2.4 |
| Slovakia | Single | 25 g | - | - | 35 | 2.9 | - | - |
| Slovenia | Single | 25 g | - | - | 106 | 1.9 | 315 | 0.6 |
| Spain | Single | 25 g | 108 | 2.8 | 167 | 13.8 | 195 | 3.6 |
| **Sampling level not stated** | | | | | | | | |
| Austria[13] | Single | 25 g | - | - | 212 | 4.7 | - | - |
| Hungary | Batch | 25 g | - | - | - | - | 188 | 75.5 |
| Italy | Batch | 25 g | - | - | - | - | 38 | 2.6 |
| | Batch | - | - | - | - | - | 25 | 0 |
| | Single | - | 277 | 4.3 | 369 | 16.5 | - | - |
| Slovakia | Batch | 25 g | - | - | - | - | 32 | 12.5 |
| **EU Total** | **Total** | | **21,539** | **4.8** | **26,966** | **5.3** | **13,947** | **4.8** |
| | **Single** | | **6,311** | **7.2** | **7,319** | **12.4** | **4,850** | **8.2** |
| | **Batch** | | **15,228** | **3.8** | **19,647** | **2.7** | **9,097** | **3.0** |

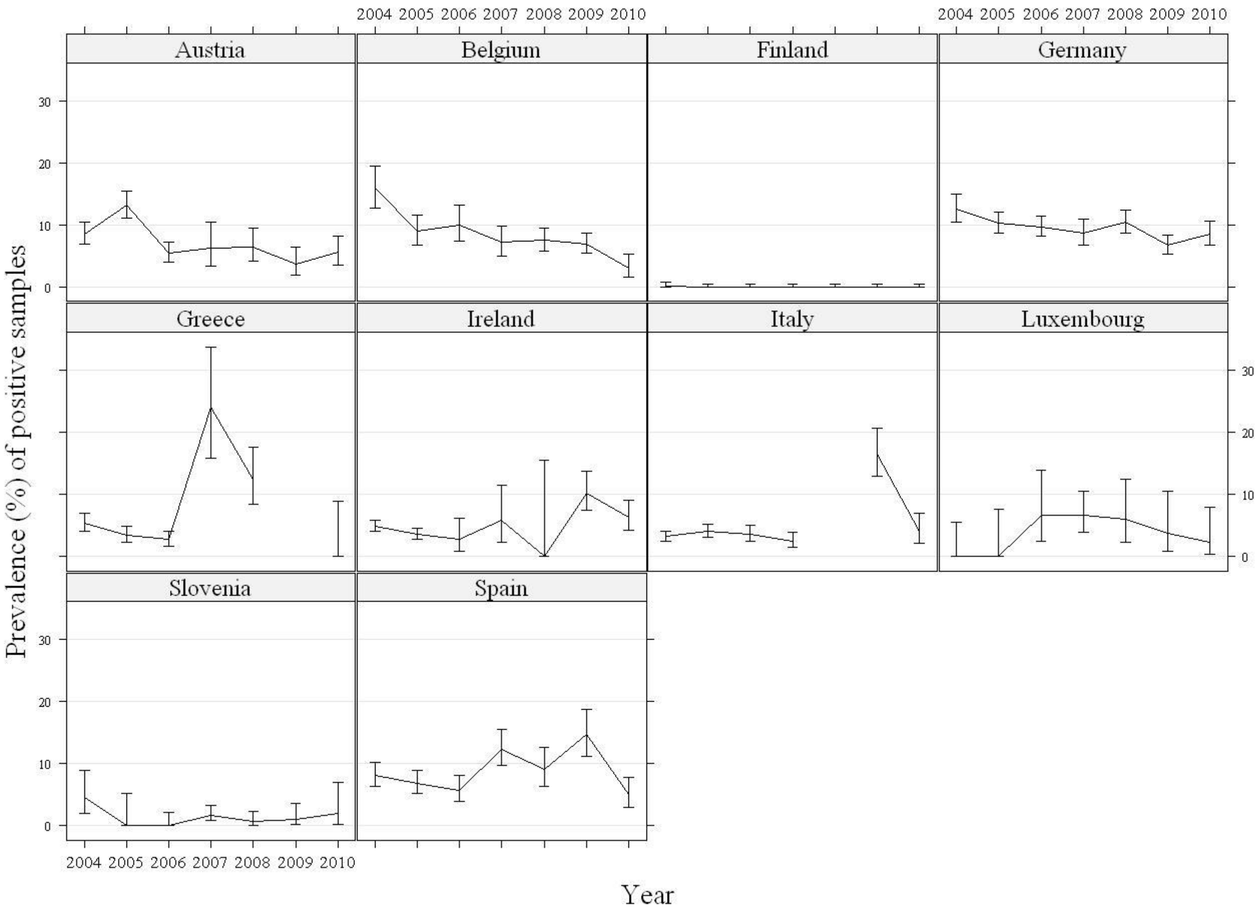
Note: Data are presented only for sample sizes ≥25. Carcass swabs are included in fresh meat. Investigations where no information was provided on whether samples were fresh or carcass have been included.
1. Carcass (neck skin) 2009-2008, unspecified 2010.
2. Carcass (neck skin).
3. Each batch comprised 5x(3x10 g) of neck skins from three different carcasses of the same flock.
4. In 2009 slaughter data from carcass wash and neck skin samples were combined, and in 2010 slaughter data from carcass swabs and neck skin samples were combined.
5. In 2010 325 of the samples were from carcasses (neck skin) (20 positive) and in 2009 250 of samples were from carcasses (neck skin) (35 positive).
6. In 2009, 266 of the samples were carcass (neck skin) (8 positive). All samples from 2010 were carcass (neck skin).
7. In 2008, 389 of the samples were from carcasses (58 positive).
8. Carcass in 2008.
9. In 2010, 111 of the samples (1 positive), and in 2009, 120 samples (9 positives), were from carcass. In 2010, 109 were legs with skin (2 positives) and 110 were skinned escalope (1 positive).
10. Surveillance in 2009.
11. Monitoring in 2009.
12. In 2008 sample weights was10 g and in 2010 was 25 g.
13. Carcass in 2009.
14. Portugal reported that 108 out of 216 samples were carcass (neck skin).

***Figure SA4. Weighted prevalence[1] and 95 % confidence interval[2] of* Salmonella*-positive broiler meat samples[3], overall for 10 Member States[4], 2004-2010***




1. The MS group prevalence is estimated using weights. The MS specific weight is the ratio between the slaughter broiler population size and the number of tested samples per MS per year. Slaughtered numbers of broilers were reported by MSs in the framework of the 2008 baseline survey in broiler flocks and broiler carcasses, and supplemented with EUROSTAT data from 2008. Batch-based data are excluded.
2. Vertical bars indicate the exact binomial 95 % confidence interval.
3. Combined data (samples taken at slaughter, at processing/cutting plant or at retail) have been used to calculate the percentage of *Salmonella*-positive fresh broiler meat samples. Batch based data are excluded.
4. Include only MSs that reported data for at least 6 years: Austria, Belgium, Finland, Germany, Greece, Ireland, Italy, Luxembourg, Slovenia and Spain.

***Figure SA5.* Salmonella *in fresh broiler meat*[1] *(single samples), prevalence and 95 % confidence interval*[2] *in 10 Member States*[3]*, 2004-2010***




1. Combined data (samples taken at slaughter, at processing/cutting plant or at retail) have been used to calculate the percentage of *Salmonella*-positive fresh broiler meat samples. Batch based data excluded.
2. Vertical bars indicate the exact binomial 95 % confidence interval.
3. Include only MSs that reported data for at least six years.

*Table SA7.* **Salmonella** *in ready-to-eat broiler meat product samples, 2010*

| Country | Sample unit | Sample weight | N | % pos |
|---|---|---|---|---|
| **At processing plant** | | | | |
| Belgium | Batch | 25 g | 45 | 0 |
| Czech Republic | Batch | 25 g | 124 | 0 |
| Hungary | Single | 25 g | 172 | 0 |
| Ireland | Single | 25 g | 151 | 0 |
| Poland | Single | 25 g | 229 | 0 |
| Portugal | Single | 25 g | 36 | 0 |
| Romania | Batch | 25 g | 73 | 0 |
| Slovakia | Batch | 25 g | 39 | 0 |
| **At retail** | | | | |
| Belgium | Batch | 25 g | 46 | 0 |
| Bulgaria | Batch | - | 453 | 0 |
| Germany | Single | 25 g | 265 | 0.4 |
| Hungary | Single | 25 g | 94 | 0 |
| Ireland[1] | Single | Various | 1,080 | 0 |
| Netherlands | Single | 25 g | 25 | 0 |
| Portugal | Batch | 25 g | 304 | 2.6 |
| Slovakia | Batch | 25 g | 117 | 0 |
| **Total (11 MSs)** | | | **3,253** | **0.3** |

Note: Data are presented only for sample sizes ≥25. Only meat product samples are presented.

1. Sample weights range from 10 g to 25.99 g.

### Turkey meat and products thereof

The occurrence of *Salmonella* in fresh turkey meat at different stages of the food chain in 2010 is presented in Table SA8. Overall, 9.0 % of the 4,329 tested samples in the EU were positive for *Salmonella*, ranging from 3.3 % up to 29.6 % in single samples. The overall occurrence of *Salmonella* in fresh turkey meat increased compared with the previous years. No contamination in RTE products from turkey meat was detected by the four MSs that provided data (Germany, Hungary, Ireland and Portugal; 587 single samples).

Seventeen MSs reported *Salmonella* findings in non-RTE turkey meat products (meat products, meat preparations and minced meat), and eight of these MSs reported data from more than 25 samples. The proportion of *Salmonella*-positive samples varied between 2.0 % (batch samples from the Czech Republic meat preparations intended to be eaten cooked) and 16.9 % (single samples from Italian meat preparations), with an average of 6.4 % at EU level. Where no indication of whether the samples came from RTE or non-RTE sources is provided, data are assumed to originate from non-RTE materials. Refer to the level 3 tables for the data.

### *Table SA8.* Salmonella *in fresh turkey meat, 2008-2010*

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| **At slaughter** | | | | | | | | |
| Czech Republic[1] | Batch | 25 g | 255 | 3.9 | 168 | 2.4 | 201 | 4.0 |
| Germany | Single | 25 g | - | - | - | - | 36 | 2.8 |
| France[4] | Batch | 25 g | 30 | 16.7 | - | - | - | - |
| Hungary | Single | 25 g | 489 | 14.5 | 463 | 20.7 | - | - |
| Poland | Batch | 25 g | 997 | 10.3 | 125 | 0 | - | - |
| **Cutting and processing plant** | | | | | | | | |
| Finland | Single | 25 g | 287 | 0 | 325 | 0 | 513 | 0 |
| Germany | Single | 25 g | 253 | 19.0 | 43 | 4.7 | 59 | 11.9 |
| Hungary | Single | 25 g | 331 | 6.9 | 255 | 19.2 | - | - |
| Poland | Batch | 10 g/25 g | - | - | 1,398 | 6.9 | - | - |
| Slovenia[6] | Single | 25 g | 49 | 0 | 26 | 0 | 74 | 4.1 |
| Spain | Single | 25 g | - | - | - | - | 88 | 17.0 |
| **At retail** | | | | | | | | |
| Austria | Single | 25 g | 41 | 14.6 | 34 | 11.8 | 28 | 17.9 |
| Bulgaria | Batch | - | 46 | 0 | 52 | 0 | - | - |
| France[2] | Single | 25 g | 242 | 8.7 | - | - | - | - |
| Germany[7] | Single | 25 g | 942 | 5.9 | 433 | 8.5 | 488 | 9.2 |
| Germany[5] | Single | 25 g | - | - | 434 | 5.8 | - | - |
| Hungary | Single | 25 g | 106 | 7.5 | 83 | 4.8 | - | - |
| Luxemburg | Single | 25 g | - | - | - | - | 28 | 3.6 |
| Netherlands | Single | 25 g | 153 | 3.3 | - | - | - | - |
| Romania | Batch | 25 g | - | - | - | - | 38 | 2.6 |
| Slovenia | Single | 25 g | - | - | 28 | 3.6 | 69 | 4.3 |
| Spain | Single | 25 g | - | - | - | - | 186 | 3.2 |
| **Sampling level not stated** | | | | | | | | |
| Italy[3] | Single | - | 108 | 29.6 | 86 | 30.2 | - | - |
| Hungary | Batch | 25 g | - | - | - | - | 253 | 13.4 |
| **Total (11 MSs in 2010)** | **Total** | | **4,329** | **9.0** | **3,953** | **8.7** | **2,061** | **6.3** |
| | **Single** | | **3,001** | **9.0** | **2,210** | **11.0** | **1,495** | **5.6** |
| | **Batch** | | **1,328** | **8.9** | **1,743** | **5.8** | **566** | **8.1** |

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

1. Neck skin.
2. Ninety-four samples without skin (1 positive),131 samples (19 positive) with skin and 17 carcass samples with skin (1 positive).
3. Samples positive for more than one serovar.
4. One batch includes five sample units. One unit is the result of pooling 10 g of neck skin from three poultry carcasses from the same flock.
5. Monitoring.
6. Batch in 2008.
7. Surveillance.

## Eggs and egg products

According to EU legislation, starting from 1 January 2009, eggs shall not be used for direct human consumption as table eggs unless they originate from a commercial flock of laying hens subject to a national *Salmonella* control programme. Eggs originating from flocks with unknown health status that are suspected of being infected with *S.* Enteritidis or *S.* Typhimurium or from confirmed infected flocks may be placed on the market only if treated in a manner that guarantees the elimination of all *Salmonella* serovars with public health significance and marked in a way that easily distinguishes them from table eggs before being placed on the market (Regulation (EC) No 1237/2007)[12]. These provisions, together with the mandatory *Salmonella* control programmes in flocks of laying hens, are believed to have contributed to the reduction in *Salmonella* contaminated laying hens in EU.

Thirteen MSs reported data from investigations of table eggs and the findings are presented in Table SA9. In 2010, a total of 0.4 % of the tested single samples and 0.1 % of batch samples were positive for *Salmonella*, which was a reduction from the results reported in 2008 and 2009. The highest reported percentages of positives were from retail samples collected by Ireland and Spain (6.1 % and 5.3 % respectively), even though Ireland reported testing only of 33 samples. Seven MSs (Austria, Belgium, Cyprus, Czech Republic, Italy, Romania and Slovakia) did not detect any *Salmonella* positive samples, although these MSs mainly reported a small number of samples and from a packing/processing plant context. It should be noted that what constituted a batch or single sample varied in terms of weight and content, and this may affect comparison between investigations.

Ten MSs reported results of investigations of egg products and eggs other than table eggs with 25 samples or more. At processing plant level, 0.9 % of 534 units tested were found positive with a maximum of 1.2 % in egg products from the Czech Republic. At retail level, only 0.4 % of 1,859 units tested were found positive with a maximum of 5.6 % in egg products from Lithuania. A further 0.3 % of 914 units tested were positive from an unspecified or farm level. Refer to the level 3 tables for the data.

12 Commission Regulation (EC) No 1237/2007 of 23 October 2007 amending Regulation (EC) No 2160/2003 of the European Parliament and of the Council and Decision 2006/696/EC as regards the placing on the market of eggs from *Salmonella* infected flocks of laying hens. OJ L 280, 24.10.2007, p 5-9.

### *Table SA9.* Salmonella *in table egg samples, 2008-2010*

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| **At farm** | | | | | | | | |
| Italy[1] | Batch | - | 37 | 0 | - | - | - | - |
| Romania | Batch | 25 g | - | - | 94 | 1.1 | - | - |
| **At packing centre/processing plant** | | | | | | | | |
| Austria | Single | 25 g | - | - | 25 | 0 | - | - |
| Bulgaria | Batch | - | 5,150 | 0 | 3,239 | 0 | - | - |
| Cyprus | Batch | 400 g | 241 | 0 | - | - | - | - |
| Czech Republic | Batch | 25 g | 201 | 0 | 330 | 0 | 451 | 0.4 |
| Germany[4] | Single | Eggs | 1,171 | 0 | 536 | 0.4 | 1,352 | <0.1 |
| Greece | Single | 25 g | - | - | 85 | 0 | 26 | 0 |
| Hungary | Batch | 10 eggs | 71 | 1.4 | - | - | - | - |
| Italy[1] | Batch | 25 g | - | - | - | - | 29 | 0 |
| | Single | 25 g | - | - | - | - | 46 | 0 |
| Poland | Batch | 25 g | - | - | 363 | 0 | - | - |
| Portugal | Single | 25 g | 66 | 1.5 | 40 | 0 | - | - |
| Romania | Batch | 25 g | 95 | 0 | 224 | 0 | 29 | 0 |
| Slovakia | Batch | 25 g | - | - | - | - | 81 | 3.7 |
| Spain | Single | 25 g | 1,534 | 0.6 | 1,947 | 0.2 | 207 | 6.3 |
| **At retail** | | | | | | | | |
| Austria | Single | Various[2] | 40 | 0 | 30 | 0 | 57 | 0 |
| Belgium | Batch | 25 g | 118 | 0 | 118 | 0 | 3,267 | <0.1 |
| | Single | 25 g | - | - | - | - | 109 | 0 |
| Bulgaria | Batch | - | 1,021 | 0.2 | 1,847 | 0 | - | - |
| Czech Republic | Single | 25 g | - | - | 48 | 2.1 | - | - |
| Germany[4] | Single | Eggs | 7,969 | 0.2 | 4,587 | 0.3 | 6,003 | 0.3 |
| Greece | Single | 25 g | - | - | 96 | 0 | 178 | 0 |
| Hungary | Batch | 10 eggs | 742 | 0.4 | 672 | 0 | 846 | 0.4 |
| Ireland | Single | Various[3] | 33 | 6.1 | - | - | 115 | 0.9 |
| Italy[1] | Batch | 25 g | - | - | - | - | 224 | 0.4 |
| | Single | - | 139 | 0 | - | - | 73 | 4.1 |
| Latvia | Single | 25 g | - | - | - | - | 128 | 2.3 |
| Lithuania | Single | 25 g | - | - | 26 | 0 | 45 | 4.4 |
| Poland | Batch | 25 g | - | - | 84 | 3.6 | 286 | 0 |
| Romania | Batch | 25 g | - | - | - | - | 54 | 0 |
| | Single | 25 g | - | - | 63 | 0 | - | - |
| Slovakia | Batch | 25 g | 27 | 0 | - | - | 53 | 22.6 |
| | Single | 25 g | - | - | 99 | 1.0 | - | - |
| Spain | Single | 25 g | 452 | 5.3 | 555 | 5.4 | - | - |
| **Sampling level not stated** | | | | | | | | |
| Italy[1] | Batch | - | 35 | 0 | 858 | 2.4 | - | - |
| **Total (13 MSs in 2010)** | | **Total** | **19,142** | **0.3** | **15,966** | **0.5** | **13,659** | **0.5** |
| | | **Single** | **11,404** | **0.4** | **8,137** | **0.6** | **8,339** | **0.5** |
| | | **Batch** | **7,738** | **0.1** | **7,829** | **0.3** | **5,320** | **0.4** |

Note: Data are presented only for sample sizes ≥25.
1. For Italy in 2009 and 2010, it is not stated whether samples were table eggs.
2. Sample weights varied from 25 g to 900 g and also included egg shells.
3. Sample weights varied from 10 g to 25.99 g.
4. Surveillance.

### Pig meat and products thereof

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

The occurrence of *Salmonella* in fresh pig meat at different stages of the production line from 2008 to 2010 is presented in Table SA10. Overall, 0.9 % of the tested samples were positive for *Salmonella* in 2010, which was at a similar level to 2009 (0.7 %) and 2008 (0.8 %), although the number of samples reported fell substantially (from 109,174 in 2008 to 69,005 in 2010). The proportion of *Salmonella*-positive samples taken at the slaughterhouse ranged from 0.3 % to 8.9 %. Belgium reported the highest proportion of positives which may have been due to the use of a sensitive sampling method in the investigation. Finland, Sweden and Norway reported no positive samples at slaughter. For those MSs using swabs, the area swabbed varied from 100 $cm^2$ to 1,400 $cm^2$ and it would be expected that MSs swabbing larger areas would be more likely to detect any *Salmonella* present. At processing and cutting plants, *Salmonella* was found in up to 10.4 % of fresh pig meat samples, with Spain reporting the highest proportion of positive samples, closely followed by Portugal (10.3 %). At retail, *Salmonella* was reported in up to 18.5 % of samples, which was a large increase from the highest value reported in 2009 (3.5 %), but more similar to that reported in 2008 (12.7 %). However, the largest proportion of positives came from the smallest number of sample units reported at retail, which may indicate less confidence in the representativeness of the value. The overall percentage of positive samples at retail was 1.0 %, compared with 0.7 % in 2009. Only Bulgaria reported no positive samples of fresh pig meat at retail.

In 2010, 17 MSs reported *Salmonella* findings in non-RTE pig meat products (meat products, meat preparations and minced meat). Each of these MSs reported data with 25 or more samples, reaching a total number of just over 31,000 samples. In particular, Bulgaria performed many analyses within this category, reaching a total of 18,093 tested units with 0.2 % positive samples. On average 1.2 % of the units were positive, with the highest contamination level for investigations with 25 or more samples coming from Greece (12.6 %) from meat preparations intended to be eaten cooked. Where no indication of whether the samples came from RTE or non-RTE sources is provided, data are assumed to originate from non-RTE materials. Refer to the level 3 tables for the data.

In RTE products of pig meat, *Salmonella* was detected in 0.6 % of the tested samples (Table SA11). The highest proportion of positive samples at processing was reported by Greece for meat products (11.1 %), whereas the highest proportion in retail samples came from minced meat in Germany (3.9 %).

***Table SA10. Salmonella in fresh pig meat, at slaughter, cutting/processing level and retail, 2008-2010***

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| **At slaughterhouse** | | | | | | | | |
| Belgium[1] | Single | 600 cm$^2$ | 743 | 8.9 | 840 | 13.7 | 281 | 14.6 |
| Czech Republic[1] | Batch | 100 cm$^2$ | 5,718 | 0.4 | 5,262 | 0.2 | 5,625 | 0.6 |
| Denmark[1,2] | Single | 300 cm$^2$ | 22,485 | 1.2 | 24,505 | 1.1 | 27,189 | 1.3 |
| Estonia[1,3,4] | Single | 1,400 cm$^2$ | 607 | 3.6 | 713 | 1.5 | 520 | 0.2 |
| Finland[1,3] | Single | 1,400 cm$^2$ | 6,559 | 0 | 6,479 | 0 | 6,447 | <0.1 |
| Germany[5] | Single | 10 g | 4,787 | 1.0 | 4,761 | 0.6 | 5,726 | 1.3 |
| Hungary[6] | Single | - | - | - | 860 | 0.2 | - | - |
| Latvia[1] | Single | - | - | - | - | - | 2,150 | 0.7 |
| Poland[7] | Batch | 100 cm$^2$ | - | - | - | - | 33,225 | 0.1 |
| | Batch | 400 cm$^2$ | - | - | 20,146 | 0.1 | - | - |
| | Batch | 25 g | 9,093 | 0.3 | 0 | - | - | - |
| Portugal[1] | Single | 100 cm$^2$ | - | - | - | - | 105 | 23.8 |
| | Batch | - | - | - | 125 | 2.4 | - | - |
| Romania[8] | Batch | 25 g | 1,005 | 2.1 | 633 | 0.3 | 1,438 | <0.1 |
| | Batch | 400 cm$^2$ | - | - | 824 | 1.2 | 1,491 | 1.0 |
| Spain | Single | 25 g | 179 | 7.3 | 174 | 6.9 | 276 | 6.2 |
| Sweden[1,9] | Single | 1,400 cm$^2$ | 5,906 | 0 | 5,989 | 0 | 5,833 | <0.1 |
| Norway[1] | Single | 1,400 cm$^2$ | 1,811 | 0 | 2,029 | 0 | 2,151 | 0 |
| **At cutting/processing plants** | | | | | | | | |
| Belgium | Single | 25 g | - | - | 239 | 3.3 | 122 | 5.7 |
| | Batch | 25 g | 297 | 1.7 | - | - | - | - |
| Estonia | Single | 25 g | 358 | 1.4 | 373 | 0 | 424 | 0 |
| Finland | Single | 25 g | 1,529 | 0 | 1,838 | 0 | 2,058 | 0 |
| Germany | Single | 25 g | 593 | 2.0 | 432 | 3.7 | 348 | 4.9 |
| Greece | Single | 25 g | - | - | 73 | 5.5 | - | - |
| Hungary | Single | 25 g | - | - | 363 | 1.7 | - | - |
| Ireland[7] | Single | 25 g | 25 | 0 | 28 | 0 | 30 | 0 |
| | Single | Various | - | - | - | - | 322 | 0.3 |
| Lithuania | Single | 25 g | - | - | 31 | 0 | - | - |
| Poland | Batch | 200 g | 46 | 0 | - | - | - | - |
| Portugal | Single | 25 g | 58 | 10.3 | 61 | 3.3 | - | - |
| Romania | Batch | 25 g | 98 | 2.0 | 424 | 1.7 | 1,698 | 0.8 |
| Slovenia | Single | 25 g | 292 | 0 | 322 | 0.3 | 281 | 0 |
| Spain | Single | 25 g | 48 | 10.4 | 27 | 3.7 | 149 | 4.0 |

Table continued overleaf.

***Table SA10 (continued).* Salmonella *in fresh pig meat, at slaughter, cutting/processing level and retail, 2008-2010***

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| **At retail** | | | | | | | | |
| Austria[10] | Single | 10 g/25 g | 1,001 | 1.2 | 46 | 0 | 30 | 0 |
| Bulgaria | Batch | - | 4,003 | 0 | 3,986 | <0.1 | 4,027 | 0.2 |
| France | Single | 25 g | 211 | 2.8 | - | - | - | - |
| Germany[11,12] | Single | 25 g | 2,154 | 2.0 | 2,059 | 1.7 | 1,902 | 2.2 |
| | Single | 25 g | - | - | 427 | 1.4 | - | - |
| Greece | Single | 25 g | - | - | 61 | 0 | - | - |
| Hungary | Single | 25 g | - | - | 89 | 0 | - | - |
| Italy | Single | 25 g | - | - | - | - | 28 | 0 |
| Netherlands | Single | 25 g | 642 | 0.5 | 313 | 1.6 | 319 | 2.8 |
| Romania | Batch | 25 g | 27 | 18.5 | - | - | 659 | 3.6 |
| | Single | 25 g | - | - | 124 | 0.8 | - | - |
| Spain | Single | 25 g | 111 | 9.0 | 85 | 3.5 | 236 | 12.7 |
| United Kingdom[13] | Single | - | - | - | - | - | 1,693 | 0.5 |
| **Sampling level not stated** | | | | | | | | |
| Hungary | Batch | 25 g | - | - | - | - | 360 | 1.7 |
| Italy | Single | 25 g | - | - | - | - | 1,034 | 2.3 |
| | Single | - | 355 | 3.9 | 1,085 | 2.4 | - | - |
| | Batch | 25 g | - | - | - | - | 2,908 | 2.9 |
| | Batch | - | - | - | - | - | 139 | 0 |
| Slovakia[3] | Batch | 25 g | - | - | - | - | 101 | 0 |
| Sweden | Single | - | 75 | 0 | - | - | - | - |
| **Total (17 MSs in 2010)** | | | **69,005** | **0.9** | **83,797** | **0.7** | **109,174** | **0.8** |

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

1. Carcass swab.
2. In Denmark, the majority of samples are tested in pools of five carcass swabs. At small slaughterhouses, carcass samples are tested individually. The proportion of the positive units is a prevalence estimated by a specific Danish study. Carcasses are sampled 12 hours after chilling.
3. Sample unit stated as 'animal' in 2008.
4. In 2010, 1 sample was from fresh pig meat weighting 25 g (0 positive).
5. In 2008 and 2010 sample weights was 25 g.
6. Surface sample in 2009. Area not indicated.
7. Carcass swabs in 2008. Various sample weights ranging from 10 g to 25.99 g.
8. Samples of 400 $cm^2$ are carcass swabs. In 2010, 694 of the samples were carcass swabs (21 positives).
9. Sample unit of 2009 not stated.
10. In 2009 and 2010 sample weights was 10 g/25 g and in 2008 was 25 g.
11. Surveillance in 2009.
12. Monitoring in 2009.
13. Samples are swab samples of the surface of red meat.

***Table SA11.* Salmonella *in ready-to-eat minced meat, meat preparations and meat products from pig meat, 2010***

| Country | Description | Sample unit | Sample weight | N | % pos |
|---|---|---|---|---|---|
| **At processing plant** | | | | | |
| Czech Republic | Meat products | Batch | 25 g | 210 | 0 |
| Estonia | Meat products | Single | 25 g | 130 | 0 |
| Germany | Meat preparation | Single | 25 g | 162 | 3.1 |
| | Meat products[1] | Single | 25 g | 81 | 0 |
| | Minced meat | Single | 25 g | 172 | 4.1 |
| Greece | Meat products | Single | 25 g | 144 | 11.1 |
| Ireland | Meat products | Single | 25 g | 177 | 0 |
| Latvia | Meat products | Single | 25 g | 60 | 5.0 |
| Poland | Meat preparation | Single | 10 g/25 g | 383 | 0 |
| | Meat products | Single | 25 g | 979 | 0 |
| | Meat products | Batch | 25 g/325 g | 122 | 0 |
| | Minced meat | Single | 10 g/25 g | 529 | 0 |
| | Minced meat | Batch | 200 g | 390 | 0 |
| Portugal | Meat products | Single | 25 g | 122 | 5.7 |
| Romania | Meat preparation | Batch | 25 g | 70 | 0 |
| | Meat products | Batch | 25 g | 659 | 0.3 |
| Slovakia | Meat products | Batch | 25 g | 233 | 0 |
| **At retail** | | | | | |
| Austria | Meat products | Single | 25 g | 290 | 0.3 |
| Belgium | Meat products | Batch | 25 g | 46 | 0 |
| Bulgaria | Meat products | Batch | - | 3,008 | <0.1 |
| | Meat preparation | Batch | - | 187 | 0 |
| Cyprus | Meat products | Batch | 25 g | 406 | 0 |
| Czech Republic | Meat products | Batch | 25 g | 102 | 0 |
| France | Meat products | Single | 25 g | 474 | 0 |
| Germany | Meat products[1] | Single | 25 g | 540 | 0.4 |
| | Minced meat | Single | 25 g | 492 | 3.9 |
| Greece | Meat products | Single | 10 g | 28 | 0 |
| Ireland | Meat products | Single | Various | 803 | 0 |
| Netherlands | Meat products | Single | 25 g | 31 | 0 |
| Portugal | Meat products | Batch | 25 g | 470 | 2.3 |
| Romania | Meat products | Batch | 25 g | 34 | 0 |
| Slovakia | Meat products | Batch | 25 g | 141 | 0 |
| **Total (16 MSs)** | | | | **11,675** | **0.6** |

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

1. Only heat treated meat products.

### Bovine meat and products thereof

The occurrence of *Salmonella* in fresh bovine meat at different stages of production from 2008 to 2010 is presented in Table SA12. As in previous reporting years, the overall proportion of *Salmonella*-positive samples was very low (0.2 %) in 2010. In accordance with this, the proportion of positive samples was very low in most reporting countries. The highest levels of contamination were reported from Spain (3.8 %) and Italy (3.2 %, from a national survey) at the slaughterhouse level. Both of these MSs reported low numbers of sampling units and so there is less statistical confidence in the values, whereas the other countries that reported larger numbers of units had very low proportions of contamination. Norway, Finland, Ireland and Sweden have consistently reported a percentage of positive samples of less than 0.1 % in all of the last three reporting years.

In 2010, 18 MSs reported *Salmonella* findings in non-RTE bovine meat products (meat products, meat preparations and minced meat), with 13 of these MSs reporting data with 25 or more samples. The overall proportion of positive samples was 0.5 % for non-RTE minced meat, meat preparations and meat products with values ranging up to 3.8 % in investigations with 25 or more samples (the Netherlands, raw meat products intended to be eaten cooked, at retail, N=80). Where no indication of whether the samples came from RTE or non-RTE sources is provided, data are assumed to originate from non-RTE materials. Refer to the level 3 tables for data.

Data on *Salmonella* findings in RTE bovine minced meat, meat preparations and meat products are summarised in Table SA13. The overall proportion of positive samples was very low (0.4 %) but higher than in fresh meat samples. The range of positive samples varied from 0.2 % to 2.4 % with the highest proportion reported by Belgium for meat preparations at retail level.

***Table SA12.* Salmonella *in fresh bovine meat, at slaughter, cutting/processing level and retail, 2008 -2010***

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| **At slaughterhouse** | | | | | | | | |
| Czech Republic[1] | Batch | 100 $cm^2$ | 5,053 | 0.3 | 4,410 | <0.1 | 4,505 | 0.2 |
| Denmark[1,3] | Single | 300 $cm^2$ | 7,660 | 0.3 | 7,270 | 0.3 | 8,120 | 0.2 |
| Estonia[1,2,4] | Single | 1,400 $cm^2$ | 286 | 0 | 289 | 0 | 324 | 0.6 |
| Finland[1,4] | Single | 1,400 $cm^2$ | 3,169 | 0 | 3,163 | 0 | 3,125 | 0 |
| Germany[5] | Single | 10 g | 7,520 | 0.3 | 9,736 | 0.3 | 8,479 | 0.4 |
| Hungary[6] | Single | 400 $cm^2$ | - | - | 186 | 1.1 | - | - |
| Italy[12] | Single | - | 31 | 3.2 | - | - | - | - |
| Latvia[1] | Single | - | - | - | - | - | 2,350 | <0.1 |
| Poland[1] | Batch | 400 $cm^2$ | 463 | 0 | 7,806 | 0.2 | - | - |
| | Single | 400 $cm^2$ | 74 | 0 | - | - | - | - |
| Portugal[1] | Batch | - | - | - | 180 | 6.1 | - | - |
| Romania[6,7] | Batch | 400 $cm^2$ | - | - | 402 | 0 | 925 | 0 |
| | Batch | 25 g | 645 | 0 | 379 | 0 | 1,118 | 0.3 |
| Spain | Single | 25 g | 104 | 3.8 | 426 | 2.1 | 892 | 1.9 |
| Sweden[1,4,8] | Single | 1,400 $cm^2$ | 3,610 | <0.1 | 3,621 | 0 | 3,280 | 0 |
| Norway[1, 13] | Single | 1,400 $cm^2$ | 1,626 | 0 | 2,097 | 0 | 1,588 | 0 |
| **At processing/cutting plants** | | | | | | | | |
| Estonia | Single | 25 g | 183 | 0 | 143 | 0 | 125 | 0 |
| Finland | Single | 25 g | 1,905 | 0 | 2,040 | 0 | 2,054 | 0 |
| Germany | Single | 25 g | 204 | 0.5 | 133 | 0.8 | 141 | 0 |
| Hungary | Single | 25 g | - | - | 280 | 1.8 | - | - |
| Ireland | Single | 25 g | 62 | 0 | 49 | 0 | 40 | 0 |
| Poland[1] | Batch | 100 $cm^2$ | - | - | 432 | 0 | - | - |
| Portugal | Single | 25 g | 55 | 0 | - | - | - | - |
| Romania | Batch | 25 g | 98 | 0 | 154 | 0 | 699 | 1.0 |
| Slovenia | Single | 25 g | 291 | 0 | 299 | 0 | 266 | 0 |
| Spain | Single | 25 g | - | - | 104 | 0 | 105 | 3.8 |

Table continued overleaf.

***Table SA12 (continued).* Salmonella *in fresh bovine meat, at slaughter, cutting/processing level and retail, 2008-2010***

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| **At retail** | | | | | | | | |
| Austria | Single | 10 g/25 g | - | - | 30 | 0 | - | - |
| Bulgaria | Batch | - | 1,070 | <0.1 | 951 | 0.1 | 1,226 | 0 |
| Germany[9, 10] | Single | 25 g | 620 | 0.6 | 547 | 0.7 | 575 | 0.7 |
| | Single | 25 g | - | - | 404 | 0.5 | - | - |
| Greece | Single | 25 g | - | - | - | - | 45 | 0 |
| Hungary | Single | 25 g | - | - | 71 | 0 | - | - |
| Italy | Single | - | 29 | 0 | - | - | 49 | 0 |
| Luxembourg | Single | 25 g | 48 | 0 | - | - | - | - |
| Netherlands | Single | 25 g | 667 | 0.7 | - | - | 265 | 0 |
| Romania | Batch | 25 g | - | - | - | - | 433 | 0 |
| | Single | 25 g | - | - | 38 | 2.6 | - | - |
| Slovenia | Single | 25 g | - | - | 135 | 0.7 | - | - |
| Spain | Single | 25 g | 88 | 2.3 | 161 | 0 | 172 | 1.2 |
| United Kingdom[11] | Single | - | - | - | - | - | 3,249 | 0.2 |
| **Sampling level not stated** | | | | | | | | |
| Hungary | Batch | 25 g | - | - | - | - | 213 | 2.3 |
| Italy | Batch | 25 g | 44 | 0 | - | - | 425 | 0.2 |
| | Single | - | 170 | 0 | 456 | 0.2 | - | - |
| | Batch | - | - | - | 64 | 1.6 | 188 | 0 |
| | Single | 25 g | - | - | - | - | 799 | 0 |
| Slovakia | Batch | 25 g | - | - | - | - | 53 | 0 |
| Sweden | Single | - | 87 | 0 | - | - | - | - |
| **Total (15 MSs in 2010)** | | | **34,236** | **0.2** | **44,359** | **0.2** | **44,240** | **0.2** |

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

1. Carcass swab.
2. Sample weight unspecified in 2010.
3. In Denmark, the majority of samples are tested in pools of five carcass swabs. At small slaughterhouses, carcass samples are tested individually. The prevalence of *Salmonella* in single swab samples is estimated from results of a pooled analysis. Carcasses are sampled 12 hours after chilling. The proportion of the positive units is a prevalence estimated by a specific Danish study.
4. Sample unit stated as 'animal' in 2008.
5. Sample weights in 2008 and 2010 was 25 g.
6. Samples of 400 $cm^2$ are carcass swabs.
7. In 2010, at slaughter, includes 515 carcass (4 swabs) samples (0 positives) and at processing, includes 21 carcass (4 swabs) samples (0 positives).
8. Sampling weight in 2009 was 10 g.
9. Surveillance in 2009.
10. Monitoring in 2009.
11. Swab samples of surface of red meat.
12. Samples come from a national survey.
13. Data from Norwegian *Salmonella* Control Programme.

***Table SA13.* Salmonella *in ready-to-eat minced meat, meat preparations and meat products from bovine meat, 2010***

| Country | Description | Sample unit | Sample weight | N | % pos |
|---|---|---|---|---|---|
| **At processing plant** | | | | | |
| Belgium | Meat preparation | Batch | 25 g | 33 | 0 |
| Czech Republic | Meat products | Batch | 25 g | 38 | 0 |
| Germany | Minced meat | Single | 25 g | 65 | 0 |
| Ireland | Meat products | Single | 25 g | 114 | 0 |
| **At retail** | | | | | |
| Belgium | Meat preparation | Batch | 25 g | 42 | 2.4 |
| Bulgaria | Meat products | Batch | - | 29 | 0 |
| | Minced meat | Batch | - | 38 | 0 |
| | Meat preparation | Batch | 25 g | 435 | 0.2 |
| Cyprus | Minced meat | Batch | 25 g | 25 | 0 |
| Germany | Meat products[1] | Single | 25 g | 43 | 0 |
| | Minced meat | Single | 25 g | 528 | 0.9 |
| Ireland | Meat products | Single | Various | 517 | 0 |
| Latvia | Meat products | Single | 25 g | 75 | 0 |
| Netherlands | Meat products | Single | 25 g | 95 | 0 |
| | Meat preparation | Single | 25 g | 1,222 | 0.4 |
| **Total (8 MSs)** | | | | **3,299** | **0.4** |

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

1. Only heat treated meat products.

### Meat from other or unspecified animal species

In several cases data are reported without an exact indication of the animal species from which the meat was derived. Italy reported 2.8 % *Salmonella* positive samples from 6,975 units of various types of 'meat from other animal species'. In Sweden, *Salmonella* was found at cutting plant level in one (0.02 %) of 6,083 samples of fresh meat from 'bovine animals and pigs'. In the Czech Republic, 5,083 samples from the processing plant were tested from 'mixed meat' used for meat preparations or minced meat intended to be eaten cooked, and 0.3 % were found positive, whereas no positives were detected in 1,792 samples from fermented sausages or cooked and RTE meat products. For additional information on *Salmonella* in other meat and meat products, refer to the level 3 tables.

### Milk and dairy products

As in previous years, very few *Salmonella* findings were reported from milk and milk products in 2010. Data from investigations of raw cow's milk intended for direct human consumption (25 samples or more) were reported by two MSs, the Czech Republic (425 batches) and Germany (221 single samples), and no *Salmonella* positive samples were detected in these. Three MSs reported investigations of raw cow's milk intended for manufacture of pasteurised/UHT products: the Czech Republic (343 batches), Germany (359 single samples) and Poland (30 batches). None of the samples tested positive. Two MSs reported investigations of raw cow's milk with no purpose specified: Hungary (161 single samples) and Slovakia (308 single samples). None of the samples was positive. Five MSs reported data from investigations of pasteurised or UHT-treated cow's milk: Austria (25 single samples), Bulgaria (34 batches), the Czech Republic (77 batches), Germany (1,009 single samples) and Spain (52 single samples). None of these was positive. Germany also reported 328 single samples (at farm; no positives) of raw milk intended for manufacture of pasteurised/ UHT products. However, Italy reported two positive samples from 542 single samples and no positive samples from 45 batches of cow's milk, and three positive samples out of 3,911 single samples and one positive from 102 batches of milk from other animal species/unspecified. No further information was given about these samples.

Fifteen MSs reported *Salmonella* investigations of cheeses, with a total of 0.1 % positive samples in 34,109 units tested. The number of MSs and number of investigated samples varied considerably depending on: animal species, type of cheese and intensity of heat treatment of the milk (if any). The vast majority of the investigations were negative. Germany reported two positives (3.3 %) from 61 samples of soft and semi-soft cheese, made from raw or low heat-treated cow's milk and Hungary one positive (1.2 %) from 84 samples of cheese from sheep's milk. Italy reported two positives (0.4 %) out of 454 samples from cheeses made from cow's milk and 16 positives (0.4 %) out of 4,496 samples with no further information. Furthermore, Portugal found three positives (0.6 %) out of 489 samples from soft and semi-soft cheese made from raw or low heat-treated sheep's milk) and Spain 10 positives (2.4 %) from 409 samples of soft and semi-soft cheese from cow's milk, and one positive (0.2 %) from 463 samples of unspecified types of cheese made from cow's milk.

Eight MSs reported investigations on butter with 25 samples or more. None of the 1,615 samples were positive.

The only other dairy product contributing to findings of *Salmonella* from investigations with 25 samples or more was from unspecified RTE milk products from Spain (one positive (0.5 %) from 211 samples).

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

### Vegetables, fruit and herbs

In 2010, fewer MSs (15 in 2010, from 18 MSs in 2009) reported data on investigations of different kinds of products of plant origin: fruit, vegetables and herbs. The results of all the investigations are summarised in Table SA14. The data provided show that *Salmonella* was detected in only four MSs and generally at very low levels (0.6 %), with the highest proportion of positive single samples from herbs and spices reported by Ireland (3.6 %). The Netherlands reported a large investigation of herbs and spices and found 1.6 % of samples positive. No positives were detected in the fruit, salads and nuts and nut products food categories.

Of most interest for consumers is contamination of RTE products at retail level. No positive samples were detected by MSs reporting retail level investigations, other than 0.9 % positive dried seeds samples in Ireland. However, in several cases information was incomplete regarding level of sampling or whether the objects were RTE products. In the case of samples with unspecified sampling stage, no positive samples were detected by MSs other than Italy and Germany.

***Table SA14.*** **Salmonella** ***in vegetables, fruit and herbs, 2010***

| Country | Description | Sample unit | Sample weight | N | % pos |
|---|---|---|---|---|---|
| **Fruit** | | | | | |
| Italy | - | Single | - | 29 | 0 |
| | At processing plant | Batch | - | 121 | 0 |
| | Products, at processing plant | Batch | - | 32 | 0 |
| | Products | Single | - | 45 | 0 |
| **Vegetables** | | | | | |
| Italy | At processing plant | Batch | - | 91 | 0 |
| | At retail | Single | - | 57 | 0 |
| | - | Single | - | 570 | 0.2 |
| | Products | Single | - | 94 | 2.1 |
| Sweden | - | Single | - | 45 | 0 |

Table continued overleaf.

### *Table SA14 (continued).* Salmonella *in vegetables, fruit and herbs, 2010*

| Country | Description | Sample unit | Sample weight | N | % pos |
|---|---|---|---|---|---|
| **Fruit and vegetables** | | | | | |
| Bulgaria | Pre-cut | Batch | - | 107 | 0 |
| Germany | Pre-cut | Single | 25 g | 622 | 0.2 |
| Hungary | Pre-cut, RTE | Single | 25 g | 134 | 0 |
| Ireland | At retail | Single | Various[2] | 222 | 0 |
| | Products, at retail | Single | Various[2] | 154 | 0 |
| Portugal | Pre-cut, RTE | Batch | 25 g | 165 | 0 |
| Romania | Pre-cut, RTE, at processing plant | Batch | 25 g | 76 | 0 |
| | Pre-cut, RTE, at retail | Batch | 25 g | 463 | 0 |
| Slovakia | Pre-cut, RTE, at retail | Batch | 25 g | 132 | 0 |
| Slovenia | - | Batch | 25 g | 30 | 0 |
| | Pre-cut, RTE, at retail | Single | 25 g | 100 | 0 |
| | Pre-cut, RTE | Batch | 25 g | 30 | 0 |
| **Seeds, dried** | | | | | |
| Ireland | At retail | Single | Various[2] | 341 | 0.9 |
| **Seeds, sprouting** | | | | | |
| Germany | RTE | Single | 25 g | 65 | 1.5 |
| Hungary | RTE | Single | 25 g | 65 | 0 |
| Salads | | | | | |
| Austria | RTE, at retail | Single | 25 g | 61 | 0 |
| | RTE, at retail, containing mayonnaise | Single | 25 g | 28 | 0 |
| Czech Republic | RTE, at processing plant | Batch | 25 g | 125 | 0 |
| | RTE, at retail | Batch | 25 g | 48 | 0 |
| Estonia | RTE, at processing plant | Single | 25 g | 38 | 0 |
| | RTE, at retail | Single | 25 g | 62 | 0 |
| Slovenia | RTE, at retail | Single | 25 g | 127 | 0 |
| Spain | RTE | Single | 25 g | 752 | 0 |
| **Herbs and spices** | | | | | |
| Austria | At processing plant | Single | 25 g | 36 | 0 |
| | At retail | Single | 25 g | 57 | 0 |
| Ireland | At retail | Single | Various[2] | 28 | 3.6 |
| Netherlands | At retail | Single | 2.5 g | 392 | 2.3 |
| Netherlands | At retail | Single | 25 g | 2,098 | 1.6 |
| Slovakia | At retail | Batch | 25 g | 47 | 0 |
| Slovenia[1] | Dried, non-irradiated, at retail | Single | 25 g | 44 | 0 |
| **Nuts and nut products** | | | | | |
| Ireland | At retail | Single | Various[2] | 579 | 0 |
| **Total (15 MSs)** | | | | **8,312** | **0.6** |

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

1. Convenience sample.

2. Sample weight varied from 10 g to 25.99 g.

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

Eleven MSs and Norway reported investigations of *Salmonella* in fish and fishery products with 25 samples or more. Four MSs (Belgium, Germany, Hungary and Italy) reported positive samples although generally at very low level. One exception, however, was Italy, which reported one national survey with 69 samples of unspecified fishery products, in which 11 samples were positive (15.9 %). Overall, 0.6 % of the tested samples were positive for *Salmonella*, which was an increase from the 0.3 % reported in 2008 and 2009.

A total of 2,171 samples (from nine MSs and Norway) of molluscan shellfish and live bivalve molluscs were tested in investigations with 25 samples or more, and 10 of these were positive (from Belgium, Greece and Spain). Not all reports on molluscan shellfish include information on whether the sampled items were cooked, raw and/or RTE.

Tests on crustaceans were reported by eight MSs (with 25 samples or more). Eight (0.5 %) out of a total of 1,455 samples were positive. The investigations generally found a low level of positive samples, although Greece detected two positives from 37 samples of raw crustaceans.

For detailed information refer to the level 3 tables.

### Other foodstuffs

In 2010, there were only a few reports of *Salmonella* in other foodstuffs. This group includes bakery products, beverages (non-alcoholic), cereals and meals, chocolate and other sweets, cocoa and cocoa preparations, foodstuffs intended for special nutritional uses, infant formula, juice, sauces and dressings and soups. There were also some undefined groups such as ‘other foods’, ‘other products of animal origin’ and ‘other processed food products and prepared dishes’.

Disregarding investigations with fewer than 25 samples, a total of 33,839 samples were tested, and 73 (0.2 %) of these contained *Salmonella*. In Spain, 9,357 of these samples (0.3 % positives) came from ‘other processed food products and prepared dishes’. The two highest proportions of positive samples came from the Czech Republic and were reported in the categories ‘other processed food products and prepared dishes’ (6.3 %) and ‘sweets’ (5.6 %). In most cases, it was not stated whether the sampled products were RTE.

A total of 1,795 samples of dried infant formulae and dried dietary foods intended for infants below 6 months of age were tested, including some investigations of fewer than 25 samples, and no positive samples were reported.

For detailed information refer to the level 3 tables.

### 3.1.3 *Salmonella* in animals

EU MSs have compulsory or voluntary *Salmonella* control or monitoring programmes in place for a number of farm animal species (see Appendix Tables SA2 - SA18 for further descriptions). An overview of the countries that reported data on *Salmonella* in animals for 2010 is presented in Table SA15. All MSs reported data from *Gallus gallus* breeding flocks, from flocks of laying hens or broilers. In the following chapter, only results based on 25 or more units tested are presented, except for data on breeders of *Gallus gallus*, laying hens, breeding turkeys and fattening turkeys which were included also for sample sizes below 25. Results from industry own-check programmes and HACCP sampling as well as specified import control, suspect sampling and clinical investigations have been excluded due to difficulties in interpretation of the data. These data are, however, presented in the level 3 tables.

***Table SA15. Overview of countries reporting data for* Salmonella *in animals, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| *Gallus gallus* (no further sampling level) | 4 | **MSs:** EE, IT, RO, SK<br>**Non-MS:** NO |
| Breeders of *Gallus gallus* | 25 | **All MSs** except LU, MT<br>**Non-MSs:** CH, NO |
| Laying hens | 27 | **All MSs**<br>**Non-MSs:** CH, NO |
| Broilers | 26 | **All MSs** except LU<br>**Non-MSs:** CH, NO |
| Turkeys | 20 | **All MSs** except BG, CY, DK, EE, LU, LV, MT<br>**Non-MSs:** CH, NO |
| Ducks | 10 | **MSs:** BE, BG, DE, DK, IE, LV, PL, PT, SE, SK<br>**Non-MS:** NO |
| Geese | 7 | **MSs:** DE, IE, IT, LV, PL, SE, SK<br>**Non-MS:** NO |
| Other poultry | 13 | **MSs:** BE, BG, DE, ES, GR, IE, IT, LV, PL, PT, RO, SK, UK |
| Pigs | 20 | **MSs:** BE, BG, DE, DK, EE, ES, FI, GR, HU, IE, IT, LU, LV, NL, PT, RO, SE, SI, SK, UK<br>**Non-MSs:** CH, NO |
| Cattle | 19 | **MSs:** BE, BG, CY, DE, EE, ES, FI, GR, HU, IE, IT, LU, LV, NL, PT, RO, SE, SK, UK<br>**Non-MSs:** CH, NO |
| Sheep and goats | 14 | **MSs:** BG, DE, EE, ES, GR, IE, IT, LV, NL, PT, RO, SE, SK, UK<br>**Non-MSs:** CH, NO |
| Other animal species | 20 | **All MSs** except BE, CZ, FI, FR, LU, MT, SI<br>**Non-MSs:** CH, NO |

Note: The overview table includes all data reported by MSs. However, in the following chapter, data reported as HACCP or own control are not included in the detailed tables, and, unless stated otherwise, data from imports, suspect sampling and outbreak or clinical investigations are also excluded. Also, only countries reporting investigations with 25 samples or more have been included for analysis, except for data on breeders of *Gallus gallus*, laying hens, breeding turkeys and fattening turkeys.

To protect human health against *Salmonella* infections transmissible between animals and humans, EU Regulation (EC) No 2160/2003[13] requires MSs to set up national control programmes for *Salmonella* serovars deemed to be of particular public health significance in animal species presenting a high potential risk of transmitting *Salmonella*, such as poultry and pigs. The animal populations that are specifically targeted currently include breeding flocks of *Gallus gallus*, laying hens, broilers and breeding and fattening turkeys. The national control programmes are established to achieve agreed EU reduction targets to reduce

13 Regulation (EC) No 2160/2003 of the European Parliament and of the Council and Regulation of 17 November 2003 on the control of *Salmonella* and other specified food-borne zoonotic agents. OJ L 325, 12.12.2003, p. 1–15.

*Salmonella* prevalence in animal populations at primary production level. EU targets for the reduction of *Salmonella* prevalence in MS animal populations have been set by the EC in consultation with MSs and except for breeding flocks of *Gallus gallus* this target setting followed EU wide prevalence surveys.

Both egg and broiler meat production lines involve a breeding pyramid so that genetic improvement, which mainly takes place through selection at the top of the production pyramids, can be rapidly distributed among both commercial poultry populations of laying hens and broilers. The top of the pyramid comprises elite flocks, great grandparent flocks and grandparent flocks, with parent flocks in the middle, and production flocks at the bottom of the pyramid. Hereafter in this report, elite flocks, great grandparent flocks, grandparent flocks, and parent flocks are generically referred to as breeding flocks.

In poultry, *Salmonella* may be transmitted both horizontally and vertically. The relevance of *Salmonella* infection in breeding flocks is mainly related to the potential for vertical transmission to production flocks, and the impact of the vertical route of transmission is amplified by the pyramidal structure of the egg and broiler meat production sectors and trade in grandparent, parent and commercial stock and hatching eggs.

Between 1993 and 2004, Council Directive 92/117/EEC[14] set the minimum level for *Salmonella* control in poultry within the EU, mainly focusing on the control of *S*. Enteritidis and *S*. Typhimurium in breeding flocks of *Gallus gallus*. Subsequently, the specific *Salmonella* control programmes and reduction targets were set, beginning with breeding flocks of *Gallus gallus* in 2007. Each specific population should achieve the transitional prevalence target within 3 years. In the case of laying hens, an annual reduction target has been set according to the initial prevalence found in the baseline survey conducted in 2005[15].

The national control programmes may vary to some extent between MSs due to different circumstances, while aiming to achieve the same goal. Detailed information on the main characteristics of the national control programmes is available in Appendix Tables SA2, SA3, SA5a, SA5b and SA7a. National control programmes have to be approved by the EC. Results of the programmes have to be reported to the EC and EFSA as part of the annual zoonoses report.

### Breeding flocks of *Gallus gallus* of the egg and broiler meat production lines

The year 2010 was the fourth year in which MSs were obliged to implement *Salmonella* control programmes in breeding flocks of *Gallus gallus* in accordance with Regulation (EC) No 2160/2003. In 2011 a final annual reduction target for breeding flocks of *Gallus gallus* came into force. This was due to the decision (Regulation (EC) No 200/2010[16] to extend the transitional target and the first three years' control programme (2007-2009) to continue the improvements and to meet a renewed, final annual target. The control programmes for breeding flocks aim to meet a reduction target for the following serovars: *S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow and *S.* Hadar, with targets set by Regulation (EC) No 200/2010. The target was set for all commercial scale adult breeding flocks, during the production period, comprising at least 250 birds. The final target was to reduce the maximum percentage of flocks remaining positive to 1 % or less, and MSs have to meet the target annually. However, MSs with fewer than 100 breeding flocks would attain the target if only one adult breeding flock remained positive.

The basic minimum requirements for *Salmonella* detection in breeding flocks laid down in the Regulation (No 2160/2003) include sampling three times during the rearing period and every two weeks during the production period. Test results have to be reported, as well as any relevant additional information, on a yearly basis to the Commission and EFSA as part of the annual report on trends and sources of zoonoses and zoonotic agents. A flock is reported positive if one or more of the samples have been found positive.

14 Council Directive 92/117/EEC of 17 December 1992 concerning measures for protection against specified zoonoses and specified zoonotic agents in animals and products of animal origin in order to prevent outbreaks of food-borne infections and intoxications. OJ L 62, 15.3.1993, p. 38–48.

15 EFSA (European Food Safety Authority), 2007. Report of the Task Force on Zoonoses Data Collection on the Analysis of the baseline study on the prevalence of *Salmonella* in holdings of laying hen flocks of *Gallus gallus.* The EFSA Journal, 97,1-85.

16 Commission Regulation (EC) No 200/2010 of 10 March 2010 implementing Regulation (EC) No 2160/2003 of the European Parliament and of the Council as regards a Union target for the reduction of the prevalence of *Salmonella* serotypes in adult breeding flocks of *Gallus gallus*. OJ L 61, 11.3.2010, p. 1-9.

In 2010, control programmes approved by the Commission were implemented in all MSs and Norway. For more detailed information see Appendix Table SA2. In total, 25 MSs and two non-MSs reported 2010 data within the framework of the programme. This is because two MSs, Luxembourg and Malta, do not have breeding flocks.

A number of MSs also utilise *Salmonella* vaccines. In Austria and Belgium, the vaccination of parent breeding flocks (not elite or grandparent flocks) to *S.* Enteritidis was mandatory in 2010, and vaccination for *S*. Typhimurium for parent flocks was recommended. In the Czech Republic, vaccination was mandatory against *S*. Enteritidis. Portugal cited the compulsory use of vaccination at restocking after detecting a positive flock, and Spain also applied this application of vaccination for meat production lines. However, vaccination was not in use or prohibited in the Nordic countries and Switzerland, and was forbidden for use for French breeders of the egg production line and grandparent or elite flocks of the meat production line. No information on vaccination was provided by Italy or Poland. The other MSs stated that vaccination was not mandatory but could be performed with no restrictions or with approval of a competent authority.

The following results from the sampling of breeding flocks include both broiler and egg production lines, in most cases reported at flock level.

The total *Salmonella* prevalence data for *Gallus gallus* breeding flocks during the production period in 2010 is presented in Table SA16. Overall during 2010, *Salmonella* was found in 2.0 % of breeding flocks in the EU at some stage during the production period, which is a reduction from the 2.7 % reported in 2009.

The prevalence of the five serovars (*S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow and *S.* Hadar) targeted in the control programmes in *Gallus gallus* breeding flocks during the production period in 2010 is presented in Table SA16 and Figures SA6, SA7, SA8 and SA9. For this reporting year, any reporting of monophasic *S*. Typhimurium was included within the *S*. Typhimurium total and was counted as a target serovar. The prevalence of the five targeted *Salmonella* serovars in adult breeding flocks tested under the mandatory *Salmonella* control programmes was 0.7 % in 2010 and decreased compared with 2009 (1.2 %) and 2008 (1.3 %), at EU level (Table SA16 and Figure SA6). However, the figures may not always be fully comparable as the number of flocks tested by each MS can differ substantially between the years.

In total, 20 MSs and the two non-MSs met the target of 1 % set for 2010, compared with 18 MSs and two non-MSs in 2009. The MSs that failed to meet the target were Poland, Denmark, Ireland, the Czech Republic, and Hungary, with the highest prevalence being 2.5 % in Poland (Figure SA8). A total of 10 MSs and two non-MSs reported no positive flocks for the targeted serovars, although four of these reported fewer than 50 flocks tested.

Figure SA7 presents the prevalence trends for the 23 MSs who reported data in all four years. The results show that 13 MSs maintained a prevalence below the 1 % threshold. Only Ireland and Denmark reported a recent increase in prevalence above the threshold, whereas Portugal's prevalence decreased consistently. The results from Poland, Greece, Hungary and Slovakia showed large fluctuations between prevalence increases and decreases in reporting years.

The geographical distribution of the targeted serovars shows that the Nordic and Baltic countries, except Denmark, did not detect any of the targeted serovars in 2010 (Figure SA9).

The most common of the targeted serovars in breeding flocks was *S.* Enteritidis, which was the most common serovar in most MSs, but there are differences between MSs as *S.* Typhimurium was the most common target serovar in Denmark, Ireland and the United Kingdom, *S*. Infantis was predominant in Bulgaria and Romania, although both MSs reported only one *S*. Infantis isolate, and *S*. Hadar was the most common in Greece and Italy. A total of 12 MSs reported findings of serovars other than the five target ones, generally at low levels. Romania reported the highest prevalence (12.5 %) of flocks positive with serovars other than the targeted ones (Table SA16).

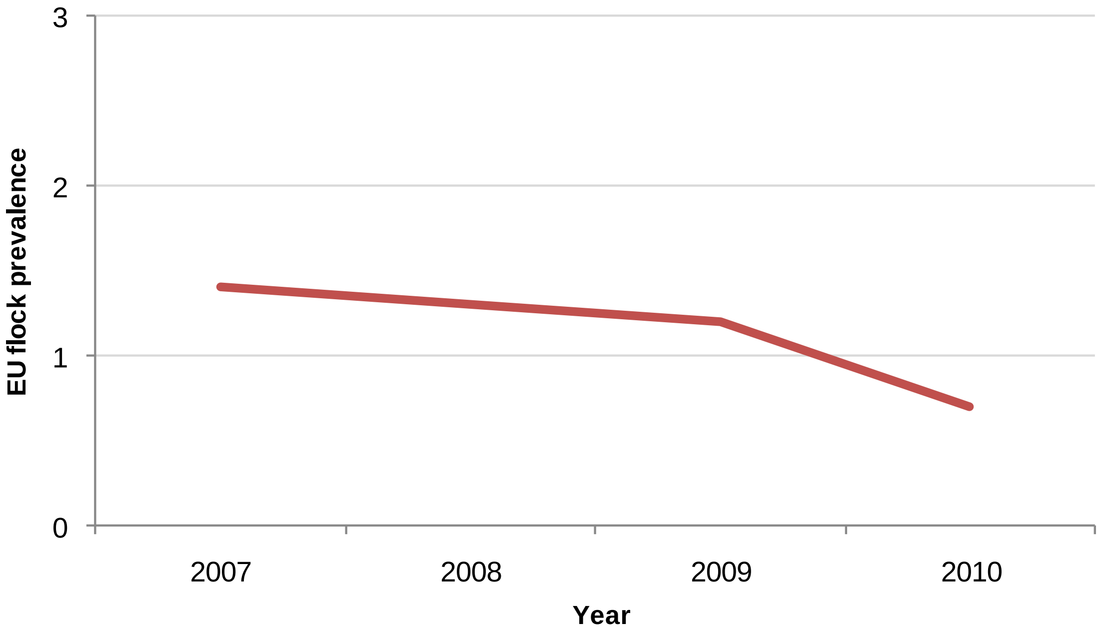
***Table SA16.* Salmonella spp. *in breeding flocks of* Gallus gallus *during the production period (all types of breeding flocks, flock-based data) in countries running control programmes in accordance with Regulation (EC) No 2160/2003, 2009-2010***

| Country | 2010 | | | | | | | | | 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Breeding flocks (elite, grandparent and parent) | | | | | | | | | | | |
| | N | % positive | | | | | | | | N | % positive | |
| | | pos (all) | 5 target serovars[1] | S. Enteritidis | S. Typhimurium | S. Infantis | S. Virchow | S. Hadar | Other serovars, non-typeable, and unspecified | | pos (all) | 5 target serovars[1] |
| Austria[2] | 124 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 120 | 1.7 | 0.8 |
| Belgium[3] | 568 | 3.9 | 0.5 | 0.2 | 0.2 | 0 | 0 | 0.2 | 3.5 | 526 | 3.0 | 0 |
| Bulgaria | 1,831 | 0.3 | <0.1 | 0 | 0 | <0.1 | 0 | 0 | 0.3 | 2,193 | 1.2 | 0.9 |
| Cyprus[4] | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55 | 1.8 | 1.8 |
| Czech Republic | 586 | 1.9 | 1.4 | 1.0 | 0.3 | 0 | 0 | 0 | 0.5 | 620 | 1.5 | 1.0 |
| Denmark | 227 | 2.2 | 2.2 | 0 | 1.3 | 0.9 | 0 | 0 | 0 | 249 | 1.6 | 1.2 |
| Estonia | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| Finland | 171 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 172 | 0 | 0 |
| France | 1,669 | 1.6 | 0.5 | 0.3 | 0.2 | 0 | <0.1 | 0 | 1.1 | 1,480 | 1.4 | 0.2 |
| Germany | 927 | 0.6 | 0.3 | 0.2 | 0.1 | 0 | 0 | 0 | 0.3 | 1,041 | 1.9 | 0.9 |
| Greece | 323 | 0.6 | 0.6 | 0 | 0 | 0 | 0 | 0.6 | 0 | 272 | 10.3 | 7.0 |
| Hungary | 1,187 | 1.3 | 1.3 | 0.9 | 0.4 | 0 | 0 | 0 | 0 | 714 | 6.3 | 2.7 |
| Ireland | 114 | 1.8 | 1.8 | 0 | 1.8 | 0 | 0 | 0 | 0 | 129 | 0 | 0 |
| Italy | 956 | 3.5 | 0.4 | 0 | 0.1 | 0 | 0.1 | 0.2 | 3.0 | 512 | 6.6 | 1.6 |
| Latvia | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 |
| Lithuania | 68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 73 | 0 | 0 |
| Netherlands | 925 | 0.6 | 0.6 | 0.5 | 0.1 | 0 | 0 | 0 | 0 | 850 | 0.6 | 0.5 |
| Poland | 1,366 | 3.2 | 2.5 | 2.0 | <0.1 | 0.2 | 0.2 | 0 | 0.7 | 1,056 | 3.5 | 2.7 |
| Portugal | 246 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 219 | 4.1 | 0.5 |
| Romania | 304 | 12.8 | 0.3 | 0 | 0 | 0.3 | 0 | 0 | 12.5 | 325 | 1.5 | 0.6 |
| Slovakia | 49 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 129 | 3.1 | 2.3 |
| Slovenia | 165 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 155 | 0 | 0 |
| Spain[2] | 1,385 | 3.8 | 0.7 | 0.4 | 0 | 0 | <0.1 | 0.2 | 3.0 | 1,266 | 6.6 | 3.3 |
| Sweden | 155 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 0 | 0 |
| United Kingdom[5] | 1,550 | 1.2 | <0.1 | 0 | <0.1 | 0 | 0 | 0 | 1.2 | 1,637 | 1.3 | 0.1 |
| **EU Total** | **14,975** | **2.0** | **0.7** | **0.4** | **0.1** | **<0.1** | **<0.1** | **<0.1** | **1.3** | **13,983** | **2.7** | **1.2** |
| Norway | 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 187 | 0 | 0 |
| Switzerland | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 93 | 0 | 0 |

Note: Luxembourg and Malta do not have breeding flocks.

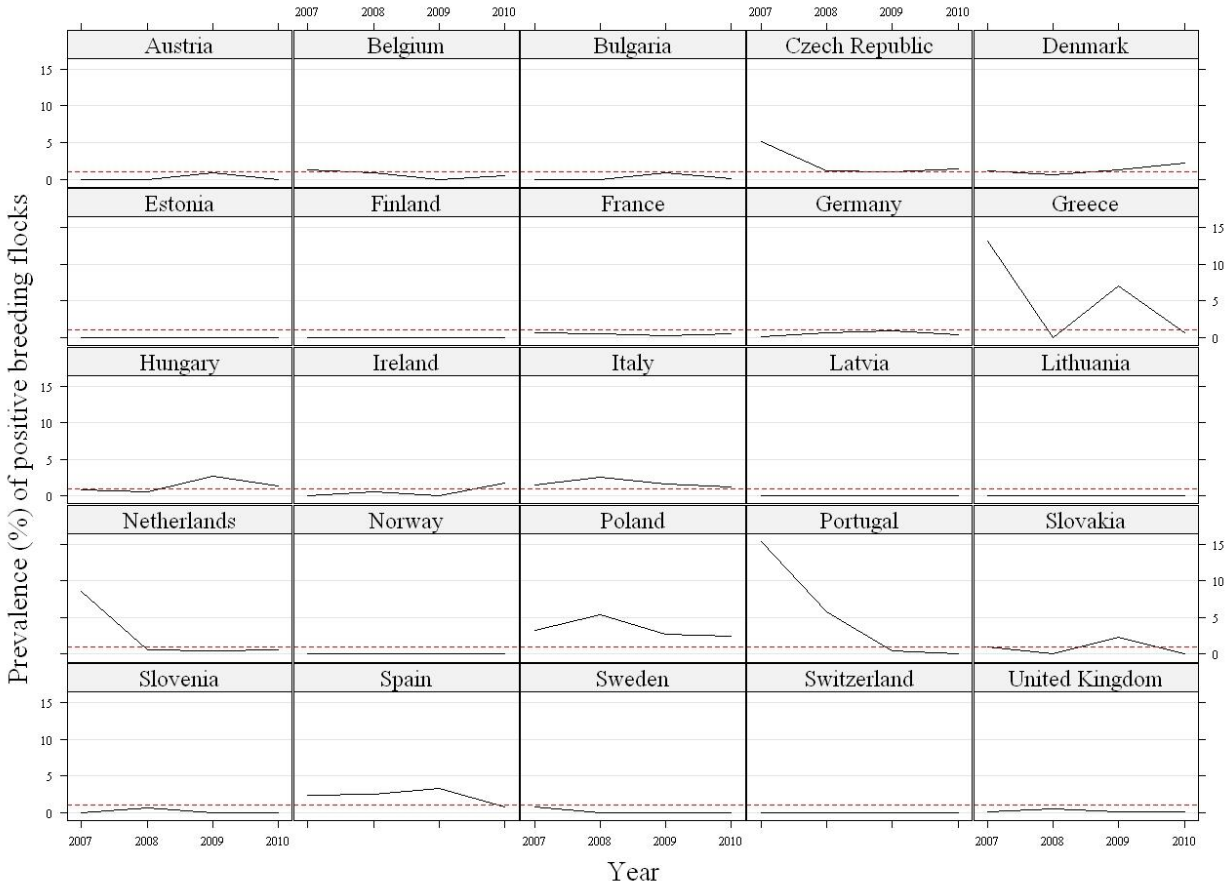
1. *S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow, *S.* Hadar.
2. Two serovars in one flock in 2009.
3. Two serovars in one flock in 2010.
4. One positive flock in 2009.
5. *S.* Typhimurium includes monophasic *S.* Typhimurium.

***Figure SA6. Prevalence of S. Enteritidis, S. Typhimurium, S. Infantis, S. Virchow and S. Hadar-positive breeding flocks of* Gallus gallus *during production in the EU[1], 2007-2010***




1. No data from Luxembourg and Malta as they have no breeding flocks.

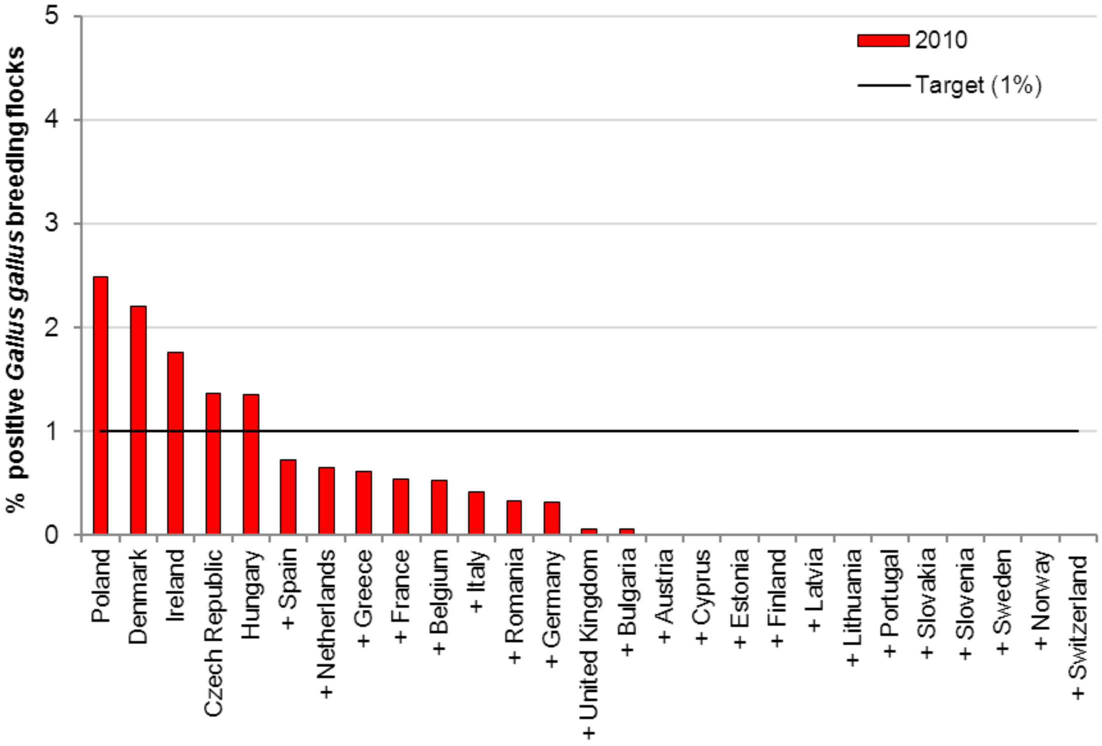
***Figure SA7. Prevalence of*** **S.** ***Enteritidis,*** **S.** ***Typhimurium,*** **S.** ***Infantis,*** **S.** ***Virchow and*** **S.** ***Hadar-positive breeding flocks of*** **Gallus gallus** ***during the production period in 23 Member States[1], Norway and Switzerland, 2007-2010***




1. No data from Luxembourg and Malta as they have no breeding flocks. Cyprus and Romania were not included because for some years they tested fewer than 100 adult flocks and reported only one positive flock leading to a proportion positive higher than 1 %. Based on the Regulation (EC) No 1003/2005[17] (Art. 1, point 1), these MSs met the EU target in all four years. Specifically, Cyprus tested fewer than 100 breeding flocks and reported 1 or less than 1 positive flock in all the three years, while this was the same for Romania in 2007 and 2008. In 2009 and 2010, Romania tested, respectively, 325 and 304 adult breeding flocks, and, of these, only two and one were positive (0.62 % and 0.33 %, respectively).

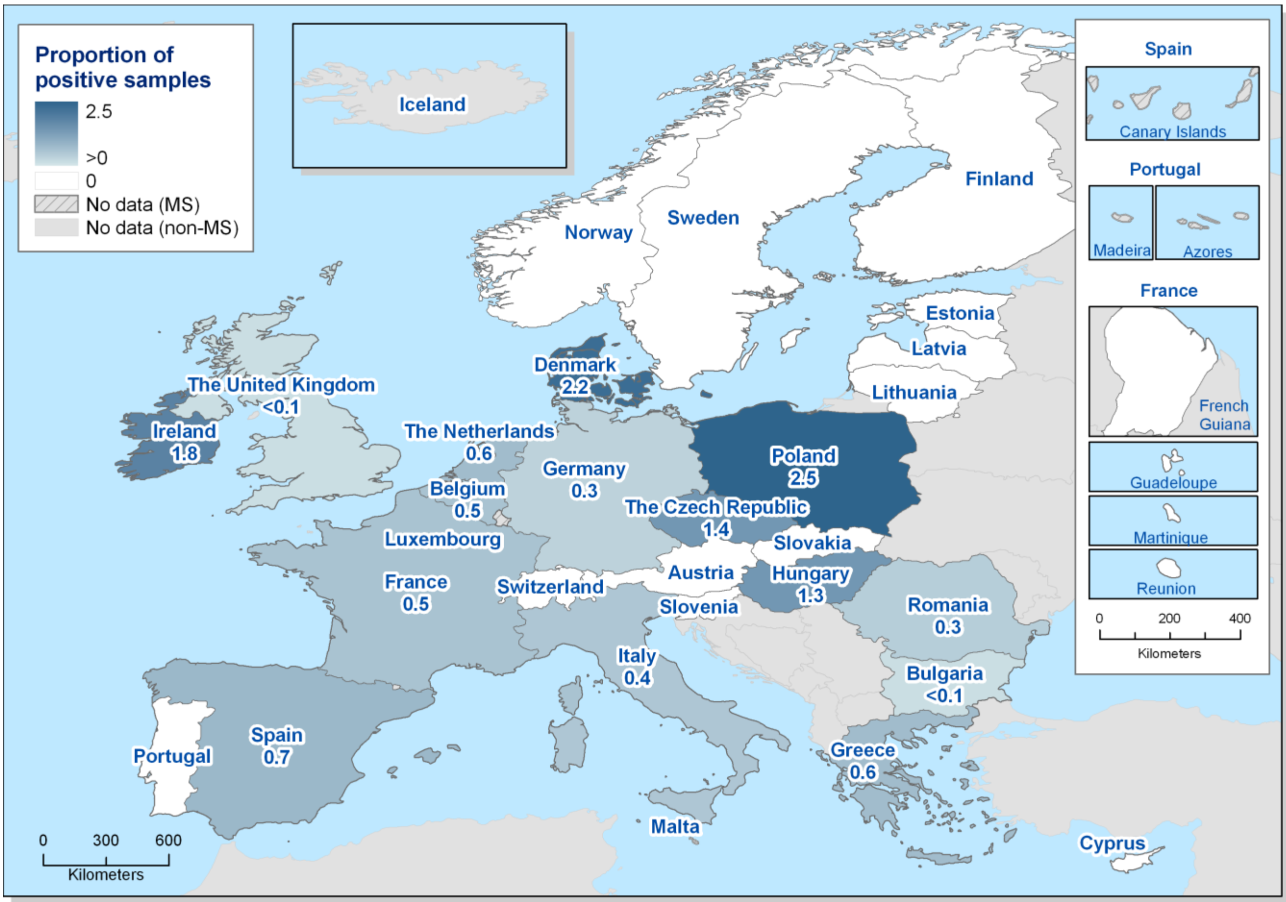
17 Commission Regulation (EC) No 1003/2005 of 30 June 2005 implementing Regulation (EC) No 2160/2003 as regards a Community target for the reduction of the prevalence of certain *Salmonella* serotypes in breeding flocks of *Gallus gallus* and amending Regulation (EC) No 2160/2003. OJ L170, 1.7.2005. p. 12-17.

***Figure SA8. Prevalence of S. Enteritidis, S. Typhimurium, S. Infantis, S. Virchow and S. Hadar-positive breeding flocks of* Gallus gallus *during the production period in EU*[1]*, Norway and Switzerland, 2010***




1. No data from Luxembourg and Malta as they have no breeding flocks. Twenty MSs and two non-MSs met the target in 2010, indicated with a '+'.

***Figure SA9. Prevalence of the five targeted serovars (S. Enteritidis, S. Typhimurium, S. Infantis, S. Virchow and S. Hadar)-positive breeding flocks of* Gallus gallus *during the production period*[1]*, 2010***




1. No breeding flocks on French Guiana, Guadeloupe, Martinique and Reunion.

The production of elite breeding flocks is concentrated in a limited number of MSs, although not all reported investigations in this reporting period. Out of the two MSs reporting sample results from such flocks, one (Poland) reported positive tests for *Salmonella* in 2010, with two elite breeding flocks positive for *S*. Enteritidis out of 47 flocks (Table SA17). Similarly, the production of grandparent breeding flocks occurs in a limited number of MSs. However, only one grandparent flock, from Italy, was reported positive from 10 MSs and Norway in 2010, which was a reduction from 2009, when two MSs reported positive flocks.

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

***Table SA17.* Salmonella *in elite and grandparent breeding flocks of* Gallus gallus *during the production period (flock-based data) in countries running control programmes in accordance with Regulation (EC) No 2160/2003, 2009-2010***

| Country | 2010 | | | | | | | | | 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % positive | | | | | | | | N | % positive | |
| | | pos (all) | 5 target serovars[1] | S. Enteritidis | S. Typhimurium | S. Infantis | S. Virchow | S. Hadar | Other serovars, non-typeable, and unspecified | | pos (all) | 5 target serovars[1] |
| **Elite breeding flocks** | | | | | | | | | | | | |
| Czech Republic | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| Hungary[2] | - | - | - | - | - | - | - | - | - | 12 | 0 | 0 |
| Poland | 47 | 4.3 | 4.3 | 4.3 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| **Total elite flocks (2 MSs)** | **53** | **3.8** | **3.8** | **3.8** | **0** | **0** | **0** | **0** | **0** | **19** | **0** | **0** |
| **Grandparent breeding flocks** | | | | | | | | | | | | |
| Belgium[2] | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 |
| Czech Republic | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 |
| Denmark | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 |
| Finland | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 |
| France[3] | 226 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 199 | 0.5 | 0.5 |
| Hungary[2] | - | - | - | - | - | - | - | - | - | 61 | 6.6 | 6.6 |
| Ireland | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 |
| Italy | 33 | 3.0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.0 | - | - | - |
| Netherlands[2] | 191 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 129 | 0 | 0 |
| Poland | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 |
| Sweden | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 |
| **Total grandparent flocks (10 MSs)** | **556** | **0.2** | **0** | **0** | **0** | **0** | **0** | **0** | **0.2** | **470** | **1.1** | **1.1** |
| Norway[2] | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |

1. *S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow, *S.* Hadar.
2. Period of sampling unspecified in 2009.
3. In France, elite and grandparent flocks are reported together.

## *Egg production line of* Gallus gallus

### Parent breeding flocks

Eighteen MSs and two non-MSs (Switzerland and Norway) reported *Salmonella* data specifically for parent breeding flocks in the egg production line for 2010 (Table SA18). The proportion of *Salmonella*-positive flocks in 2010 (1.8 %) was similar to the results in 2009 (1.7 %), and the proportion found positive for the five target serovars slightly increased from 0.6 % to 0.7 %. Eleven MSs and the two non-MSs reported no infected parent breeding flocks, while seven MSs reported between one and eleven parent breeding flocks positive for *Salmonella*. Four MSs reported flocks positive with *S.* Enteritidis, whereas *S*. Typhimurium was reported by only one MS and the other three target serovars were not reported in parent breeding flocks for egg production.

***Table SA18.* Salmonella *in adult parent breeding flocks for the egg production line during the production period* (Gallus gallus, *flock-based data) in countries running control programmes in accordance with Regulation (EC) No 2160/2003, 2009-2010***

| Country | 2010 | | | | | | | | | 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % positive | | | | | | | | N | % positive | |
| | | pos (all) | 5 target serovars[1] | S. Enteritidis | S. Typhimurium | S. Infantis | S. Virchow | S. Hadar | Other serovars, non typeable, and unspecified | | pos (all) | 5 target serovars[1] |
| Austria | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 3.3 | 0 |
| Bulgaria | 183 | 1.6 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 255 | 3.1 | 2.0 |
| Cyprus | 44 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 20.0 | 20.0 |
| Czech Republic | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 95 | 1.1 | 1.1 |
| Denmark | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| Finland | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 |
| France | 130 | 0.8 | 0.8 | 0.8 | 0 | 0 | 0 | 0 | 0 | 101 | 0 | 0 |
| Germany | 300 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 254 | 0.4 | 0 |
| Greece | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 5.9 | 0 |
| Italy | 297 | 3.7 | 0 | 0 | 0 | 0 | 0 | 0 | 3.7 | - | - | - |
| Netherlands | 46 | 2.2 | 2.2 | 2.2 | 0 | 0 | 0 | 0 | 0 | 59 | 0 | 0 |
| Poland | 207 | 4.3 | 3.4 | 3.4 | 0 | 0 | 0 | 0 | 1.0 | 103 | 1.0 | 1.0 |
| Portugal | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 |
| Slovakia | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52 | 0 | 0 |
| Slovenia | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 |
| Spain | 89 | 2.2 | 1.1 | 1.1 | 0 | 0 | 0 | 0 | 1.1 | 105 | 2.9 | 0 |
| Sweden | 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 |
| United Kingdom[2] | 131 | 1.5 | 0.8 | 0 | 0.8 | 0 | 0 | 0 | 0.8 | 90 | 4.4 | 0 |
| **Total (18 MSs in 2010)** | **1,601** | **1.8** | **0.7** | **0.6** | **0.1** | **0** | **0** | **0** | **1.1** | **1,232** | **1.7** | **0.6** |
| Norway | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 |
| Switzerland | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 39 | 0 | 0 |

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

2. *S.* Typhimurium includes monophasic *S.* Typhimurium.

## Laying hen flocks

Beginning in 2008, MSs have implemented *Salmonella* control programmes for *S.* Enteritidis and *S.* Typhimurium in laying hen flocks of *Gallus gallus* providing eggs intended for human consumption in accordance with Regulation (EC) No 2160/2003. The control programmes consist of effective measures of prevention, detection and control of *Salmonella* at all relevant stages of the egg production line, particularly at the level of primary production, in order to reduce *Salmonella* prevalence and the risk to public health. All MSs had control programmes approved by the EC in 2010. For more detailed information, see Appendix Table SA5a. Additionally, Austria, Belgium and the Czech Republic reported mandatory vaccination for *S.* Enteritidis in laying flocks, with Belgium also reporting a strong recommendation to vaccinate against *S.* Typhimurium. Portugal, Slovakia and Spain cited the use of vaccination programmes during rearing for all laying hens. The other MSs did not report any compulsory vaccination, although Romania, Slovenia and the United Kingdom reported that a large proportion of the laying flock population had been voluntarily vaccinated. Vaccination was not used or was prohibited in the Nordic countries, Malta or Switzerland. No information on the vaccination policy was provided by Italy.

Minimum detection requirements laid down in the Regulation include sampling flocks twice during the rearing period (day-old chicks and at the end of the rearing period before moving to the laying unit), as well as sampling every fifteenth week during the production period, starting at the latest when the birds are 26 weeks old. Test results have to be reported, as well as any relevant additional information, on a yearly basis to the Commission and EFSA as part of the annual report on trends and sources of zoonoses and zoonotic agents. As flocks may test positive at different stages and ages of their lifespan, positive flocks must be counted and reported once only during the production period, irrespective of the number of sampling and testing operations.

The EU target for laying hens referred to in Regulation (EC) No 2160/2003 is defined in Regulation (EC) No 1168/2006[18] as an annual minimum percentage of reduction in the number of adult laying hen flocks (i.e. in the production period) remaining positive by the end of the previous year. The annual targets are proportionate depending on the prevalence in the preceding year. The MS prevalence assessed in the framework of the EU-wide baseline survey in laying hens in 2004-2005 was used as the reference prevalence for the 2008 targets. The subsequent annual targets were based on the control programme results from the previous year. The final definitive EU target is defined as a maximum percentage of flocks remaining positive for *S.* Enteritidis and/or *S.* Typhimurium of 2 %. However, for MSs with fewer than 50 flocks of adult laying hens, not more than one adult flock may remain positive. The final achievement of the target is to be evaluated based on the results of three consecutive years by 31 December 2010.

The verification of the achievement of the target is based on the results of required testing in adult laying flocks. Based on Regulation (EC) No 1168/2006, the Commission and EFSA recommended that the results of the 2009 *Salmonella* testing programmes in adult laying hens, used for checking the target achievement, are to be reported in accordance with the following four categories:

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

Based on these categories, four indicators, set out in the following box, were established and the reported corresponding results are presented in Table SA19.

18 Commission Regulation (EC) No 1168/2006 of 31 July 2006 implementing Regulation (EC) No 2160/2003 as regards a Community target for the reduction of the prevalence of certain *Salmonella* serotypes in laying hens of *Gallus gallus* and amending Regulation (EC) No 1003/2005.OJ L 211, 1.8.2006, p. 4–8.

**Description of the four indicators for *Salmonella* in laying hens**

**1. Summary Indicator**

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

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

**2. Industry Sampling Indicator**

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

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

**3. Official Objective Sampling Indicator**

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

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

**4. Official Suspect Sampling Indicator**

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

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

In total, 27 MSs and two non-MSs reported data within the framework of the laying hen flock programme (Table SA19). All results presented are reported at flock level, apart from Bulgaria, which reported animal sampling units. A flock was reported as positive if one or more samples were positive during the production period. However, only flocks testing positive for *S.* Typhimurium and/or *S.* Enteritidis during the production period are taken into consideration when assessing whether MSs meet the target. The table shows that Austria, France, Germany, the Netherlands, Poland and the United Kingdom had large (>2,000) numbers of flocks under their control programmes, whereas relatively few flocks were reported from the Baltic States.

The prevalence of *Salmonella* spp. and of the two serovars (*S.* Enteritidis and *S.* Typhimurium) targeted in the control programmes for laying hen flocks during the production period are presented for production flocks of laying hens in Table SA20. The prevalence figures derive from indicator ➊ or from other indicators, used as proxy for indicator ➊, which is the case for Italy, Lithuania and Luxembourg. The prevalence of *S.* Enteritidis and *S.* Typhimurium and the target for production flocks of laying hens for MSs and non-MSs in 2010 are shown in Figure SA12, and the comparison between prevalence's for MSs and non-MSs in 2008-2010 is shown in Figure SA13. The geographical distribution of MS prevalence is presented in Figure SA14, which shows that the Nordic countries showed no positive samples, apart from Denmark.

For 2010, any reporting of monophasic *S*. Typhimurium was included within the *S*. Typhimurium total and was counted as a target serovar.

In 2010, 25 MSs and two non-MSs met their 2010 reduction targets. Lithuania achieved the target as there are fewer than 50 flocks in the MS and only one flock was found to be positive for the targeted serovars. In comparison, 17 MSs and two non-MSs had met the targets in 2009 and 21 MSs and one non-MS in 2008. Two MSs, did not achieved the reduction in *Salmonella* prevalence required to meet the 2010 target, although it should be noted that these MSs (Malta and Cyprus) reported relatively few flocks tested (121 and 63, respectively).

The MSs reported between 0 % and 13.2 % samples positive with *S.* Enteritidis and/or *S.* Typhimurium (Table SA20). Nine MSs and two non-MSs reported no positive flocks or very low prevalence, whereas Malta and Lithuania reported the highest prevalence (13.2 % and 6.3 %, respectively). The reported *S.* Enteritidis and *S.* Typhimurium prevalence has continued to decline from 3.5 % in 2008 and 3.2 % in 2009 to 1.9 % in 2010 and prevalence had declined in most MSs (Figures SA10 and SA11). In most MSs the prevalence of the two target serovars fell markedly over these three years. Only three MSs (Cyprus, Malta, Romania) and Switzerland reported an increase in prevalence of these two target serovars (higher than 0.1 %) from that stated in 2009, and the United Kingdom reported the same prevalence as in 2009. This indicates that continued progress has been made in combating these *Salmonella* serovars, and the prevalence has almost halved since 2008, which is an encouraging sign that control of these serovars is progressing.

The prevalence of *Salmonella* spp. in laying hens also showed a reduction during the production period, from 6.7 % in 2009 to 5.9 % in 2010. In 2010, Estonia, Finland and Luxembourg were the only MSs reporting no positive flocks, and Ireland and Sweden reported only serovars other than the two targeted ones. The highest prevalence *Salmonella*-positive flocks was reported by Malta and it increased from 41.7 % in 2009 to 66.1 % in 2010. Romania and Spain also reported high prevalences of *Salmonella*-positive productive laying hen flocks, respectively, of 40.2 % and 30.6 %.

In general, more MSs found *Salmonella* spp. in laying hen flocks (5.9 %) than in breeding flocks (1.8 %) in the egg production line (Tables SA18 and SA20). This difference may be due to higher levels of bio-security and all-in/all-out production at breeding flock level or possibly because there has been a mandatory control programme in breeding flocks since 1998.

***Table SA19.* Salmonella *in laying hen flocks* (Gallus gallus) *during the production period according to sampling context in accordance with Regulation (EC) No 1168/2006, 2010***

| Country | Control and eradication programmes | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Official and industry sampling | | Industry sampling | | Official sampling | | Official sampling | |
| | | | Census sampling | | Objective sampling | | Suspect sampling | |
| | N | Pos | N | Pos | N | Pos | N | Pos |
| Austria | 2,808 | 60 | 2,499 | 33 | 1,669 | 37 | 34 | 14 |
| Belgium | 810 | 55 | 765 | 40 | 287 | 13 | 12 | 2 |
| Bulgaria[1] | 272 | 13 | 25 | 6 | 247 | 12 | 17 | 2 |
| Cyprus | 63 | 12 | 33 | 0 | - | - | - | - |
| Czech Republic | 441 | 14 | 397 | 6 | 93 | 6 | 35 | 2 |
| Denmark | 455 | 8 | 455 | 5 | 455 | 1 | 30 | 2 |
| Estonia | 32 | 0 | 32 | 0 | 32 | 0 | - | - |
| Finland | 899 | 0 | 899 | 0 | 410 | 0 | 10 | 0 |
| France | 4,013 | 269 | 4,013 | 38 | 1,770 | 22 | 107 | 72 |
| Germany | 4,247 | 112 | 2,404 | 30 | 1,298 | 46 | 79 | 24 |
| Greece | 554 | 52 | 554 | 28 | - | - | - | - |
| Hungary | 1,256 | 68 | 2,748 | - | 1,105 | - | - | - |
| Ireland | 239 | 1 | 239 | 0 | 211 | 1 | - | - |
| Italy | - | - | - | - | 926 | 143 | 77 | 20 |
| Latvia | 68 | 3 | 68 | 0 | 28 | 3 | 3 | 1 |
| Lithuania | - | - | - | - | 16 | 1 | - | - |
| Luxembourg | - | - | - | - | 100 | 0 | - | - |
| Malta | 121 | 80 | - | - | - | - | - | - |
| Netherlands[2] | 2,411 | - | - | - | - | - | 45 | - |
| Poland[5] | 2,275 | 160 | 2,238 | - | 1,062 | 91 | 214 | 69 |
| Portugal | 262 | 22 | 202 | 10 | 146 | 10 | 4 | 3 |
| Romania | 393 | 158 | 393 | 97 | 393 | 61 | 3 | 3 |
| Slovakia | 158 | 1 | 349 | 12 | 55 | 3 | 3 | 0 |
| Slovenia | 202 | 9 | 202 | 4 | 66 | 5 | 4 | 0 |
| Spain | 1,503 | 460 | 1,375 | 216 | 836 | 290 | - | - |
| Sweden[3] | 614 | 2 | 614 | 1 | 423 | - | 1 | 1 |
| United Kingdom[4] | 4,368 | 48 | 4,368 | 23 | 1,566 | 20 | - | 5 |
| **EU Total** | **28,464** | **1,607** | **24,872** | **549** | **13,194** | **765** | **678** | **220** |
| Norway | 981 | 0 | 885 | 0 | 197 | 0 | - | - |
| Switzerland | 642 | 1 | 319 | 0 | 365 | 1 | 11 | 0 |

1. For Bulgaria, the sample unit is a single animal.
2. For the Netherlands, only flocks positive for *S.* Enteritidis and/or *S.* Typhimurium were reported.
3. Numbers tested are estimated, and the total number of units positive for official/objective sampling is unknown.
4. For the United Kingdom the total number of flocks tested under the official suspect sampling category is unknown.
5. For industry sampling, the total units positive is empty because confirmation of whether or not the flock is considered to be infected at this stage is not complete.

***Table SA20.* Salmonella *in laying hen flocks of* Gallus gallus *during the production period (flock-based data) in countries running control programmes, 2008-2010***

| Country | 2010 | | | | | | | 2009 | | | 2008 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Target (production period) | % positive | | | | | N | % positive | | N | % positive | |
| | | | pos (all) | S. Enteritidis and/or S. Typhimurium | S. Enteritidis | S. Typhimurium | Other serovars, non-typeable, and unspecified | | pos (all) | S. Enteritidis and/or S. Typhimurium | | pos (all) | S. Enteritidis and/or S. Typhimurium |
| Austria[1] | 2,808 | 2.3 | 2.1 | 1.2 | 0.8 | 0.4 | 1.0 | 2,578 | 3.3 | 2.5 | 1,966 | 2.5 | 1.4 |
| Belgium[2] | 810 | 3.4 | 6.8 | 3.2 | 3.0 | 0.2 | 3.6 | 763 | 7.1 | 3.8 | 649 | 11.7 | 3.7 |
| Bulgaria[3] | 272 | 8.0 | 4.8 | 1.1 | 1.1 | 0 | 3.7 | 101 | 19.8 | 8.9 | 119 | 0 | 0 |
| Cyprus | 63 | 3.9 | 19.0 | 4.8 | 4.8 | 0 | 14.3 | 92 | 17.4 | 4.3 | 40 | 12.5 | 0 |
| Czech Republic | 441 | 8.7 | 3.2 | 2.3 | 2.3 | 0 | 0.9 | 467 | 12.8 | 10.9 | 449 | 8.9 | 7.6 |
| Denmark | 455 | 2.0 | 1.8 | 1.1 | 0.9 | 0.2 | 0.7 | 454 | 1.8 | 1.8 | 508 | 0.6 | 0.4 |
| Estonia[5] | 32 | 3.1 | 0 | 0 | 0 | 0 | 0 | 48 | 0 | 0 | 52 | 7.7 | 1.9 |
| Finland | 899 | 2.0 | 0 | 0 | 0 | 0 | 0 | 900 | 3.2 | 0.2 | 950 | 0.1 | 0.1 |
| France[8] | 4,013 | 2.0 | 6.7 | 1.8 | 1.2 | 0.6 | 4.9 | 3,657 | 4.8 | 2.0 | 3,067 | 6.1 | 3.2 |
| Germany | 4,247 | 4.3 | 2.6 | 1.9 | 1.7 | 0.2 | 0.7 | 4,399 | 6.6 | 4.8 | 6,304 | 3.5 | 2.7 |
| Greece[7] | 554 | 3.0 | 9.4 | 1.8 | 1.1 | 0.7 | 9.6 | 327 | 12.5 | 3.4 | 112 | 31.3 | 14.3 |
| Hungary | 1,256 | 3.4 | 5.4 | 2.1 | 1.5 | 0.6 | 3.3 | 887 | 8.9 | 3.8 | 866 | 11.7 | 8.7 |
| Ireland | 239 | 2.0 | 0.4 | 0 | 0 | 0 | 0.4 | 375 | 0.3 | 0 | 326 | 0.9 | 0.3 |
| Italy | 926 | 5.1 | 15.4 | 2.6 | 2.4 | 0.2 | 12.9 | 921 | 17.9 | 5.6 | 821 | 20.5 | 6.8 |
| Latvia[4] | 68 | 8.9 | 4.4 | 2.9 | 2.9 | 0 | 1.5 | 71 | 9.9 | 9.9 | 69 | 20.3 | 14.5 |
| Lithuania[6] | 16 | 5.6 | 6.3 | 6.3 | 6.3 | 0 | 0 | 81 | 6.2 | 6.2 | 13 | 0 | 0 |
| Luxembourg[5] | 100 | 2.0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 7 | 14.3 | 14.3 |
| Malta | 121 | 2.0 | 66.1 | 13.2 | 9.9 | 3.3 | 52.9 | 48 | 41.7 | 0 | - | - | - |
| Netherlands | 2,411 | 2.0 | - | 1.1 | 1.1 | 0 | - | 2,240 | - | 1.5 | 2,346 | 2.6 | 2.6 |
| Poland[5] | 2,275 | 8.4 | 7.0 | 4.5 | 4.1 | 0.4 | 2.5 | 1,718 | 12.9 | 9.4 | 1,533 | 12.5 | 10.6 |
| Portugal | 262 | 5.7 | 8.4 | 2.3 | 1.9 | 0.4 | 6.1 | 251 | 18.3 | 6.4 | 227 | 31.7 | 10.6 |
| Romania | 393 | 2.0 | 40.2 | 0.8 | 0.8 | 0 | 39.4 | 420 | 1.4 | 0.2 | - | - | - |
| Slovakia | 158 | 5.9 | 0.6 | 0.6 | 0.6 | 0 | 0 | 155 | 8.4 | 6.5 | 138 | 7.2 | 7.2 |
| Slovenia | 202 | 3.0 | 4.5 | 0.5 | 0.5 | 0 | 4.0 | 209 | 9.1 | 3.3 | 172 | 10.5 | 8.7 |
| Spain | 1,503 | 6.5 | 30.6 | 5.9 | 5.4 | 0.5 | 24.7 | 1,511 | 29.2 | 7.2 | 845 | 34.9 | 15.6 |
| Sweden | 614 | 2.0 | 0.3 | 0 | 0 | 0 | 0.3 | 904 | 0.3 | 0.1 | 724 | 0.7 | 0.4 |
| United Kingdom | 4,368 | 2.0 | 1.1 | 0.3 | 0.1 | 0.1 | 0.8 | 4,466 | 1.7 | 0.3 | 5,523 | 1.2 | 1.0 |
| **EU Total** | **29,506** | | **5.9** | **1.9** | **1.6** | **0.3** | **4.2** | **28,050** | **6.7** | **3.2** | **27,826** | **5.9** | **3.5** |
| Norway | 981 | 2.0 | 0 | 0 | 0 | 0 | 0 | 1,031 | 0 | 0 | 1,080 | 0 | 0 |
| Switzerland | 642 | 2.0 | 0.2 | 0.2 | 0.2 | 0 | 0 | 380 | 0 | 0 | 306 | 0.7 | 0.7 |

Note: Target (production period) is calculated from the prevalence rate reported in 2009.

1. Two serovars in six flocks in 2009 and more than one serovar detected in a flock in 2010.
2. Two serovars in four flocks in 2009.
3. For Bulgaria, the sample unit is a single animal.
4. For Latvia, data also account for flocks providing a direct supply of small quantities of table eggs to the final consumer. Among the 7 laying hen flocks testing positive for *S.* Enteritidis and *S.* Typhimurium in 2009, four flocks supplied directly small quantities of table eggs to the final consumer.
5. Estonia, Luxembourg and Poland did not provide information on sampling stage in 2008.
6. For Lithuania, official sampling only in 2009 and 2008.
7. More than one serovar detected in seven flocks.
8. *S.* Typhimurium includes monophasic *S.* Typhimurium.

***Figure SA10. Prevalence of S. Enteritidis and S. Typhimurium-positive laying hen flocks of* Gallus gallus *during the production period in the EU, 2008-2010***

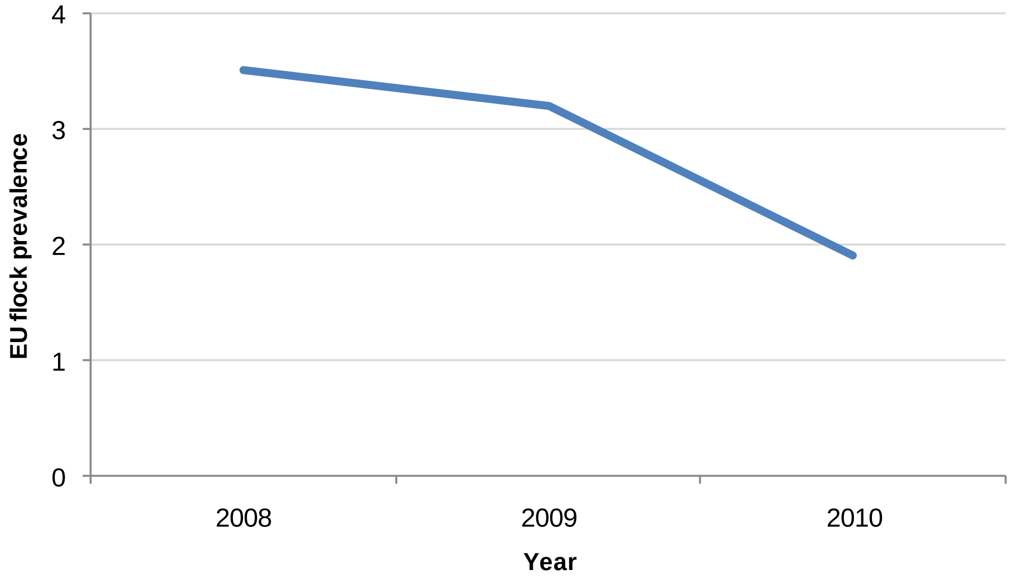



***Figure SA11. Prevalence of S. Enteritidis and S. Typhimurium-positive laying hen flocks of* Gallus gallus *during the production period in Member States, Norway and Switzerland, 2008-2010***

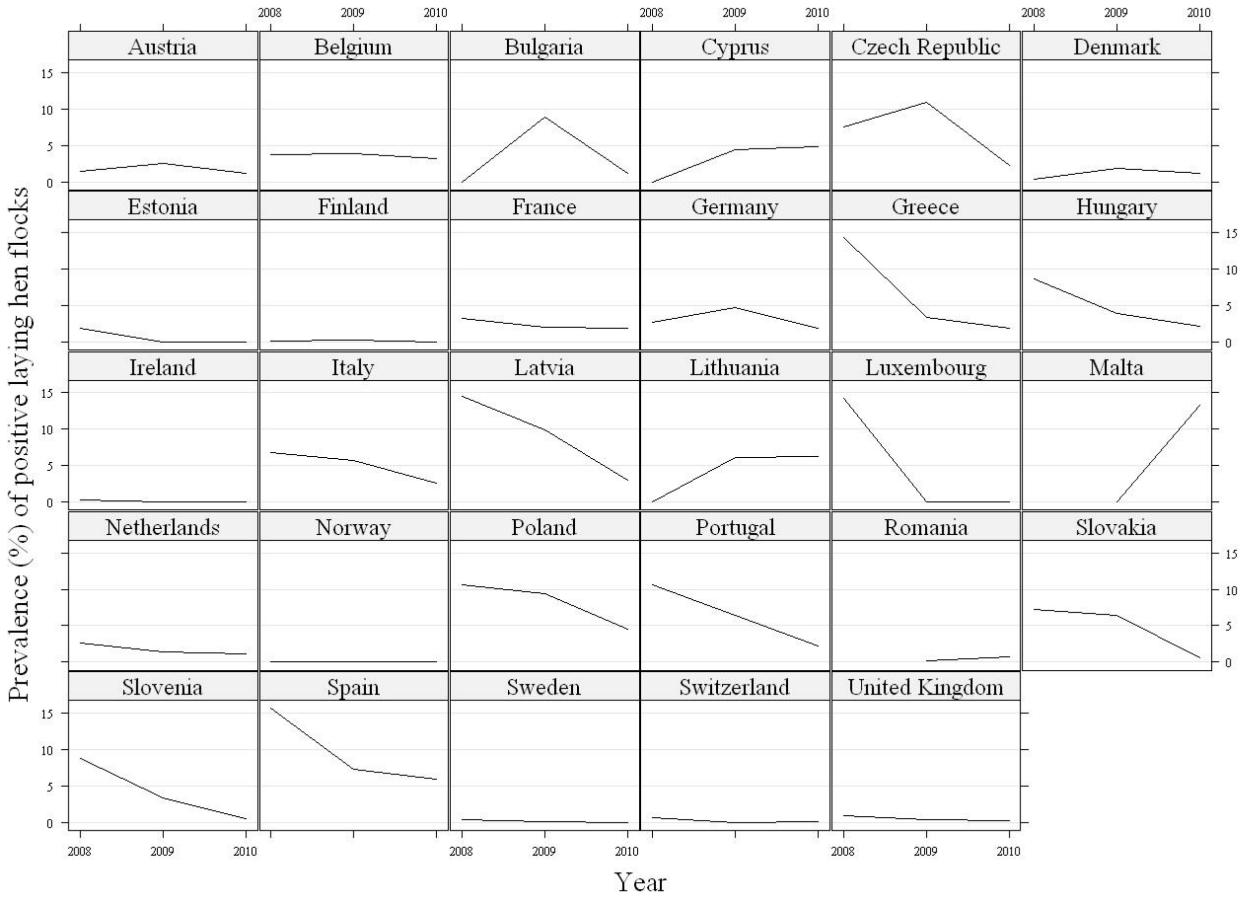
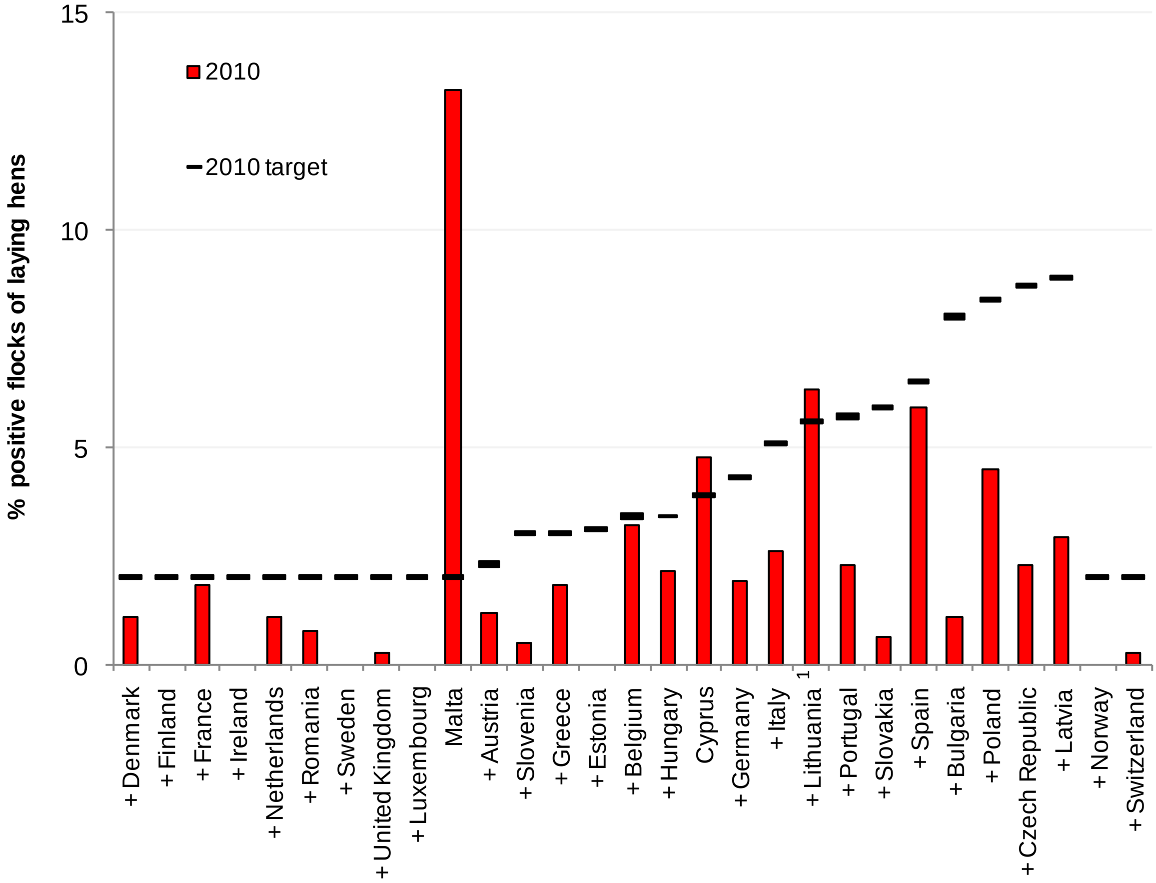


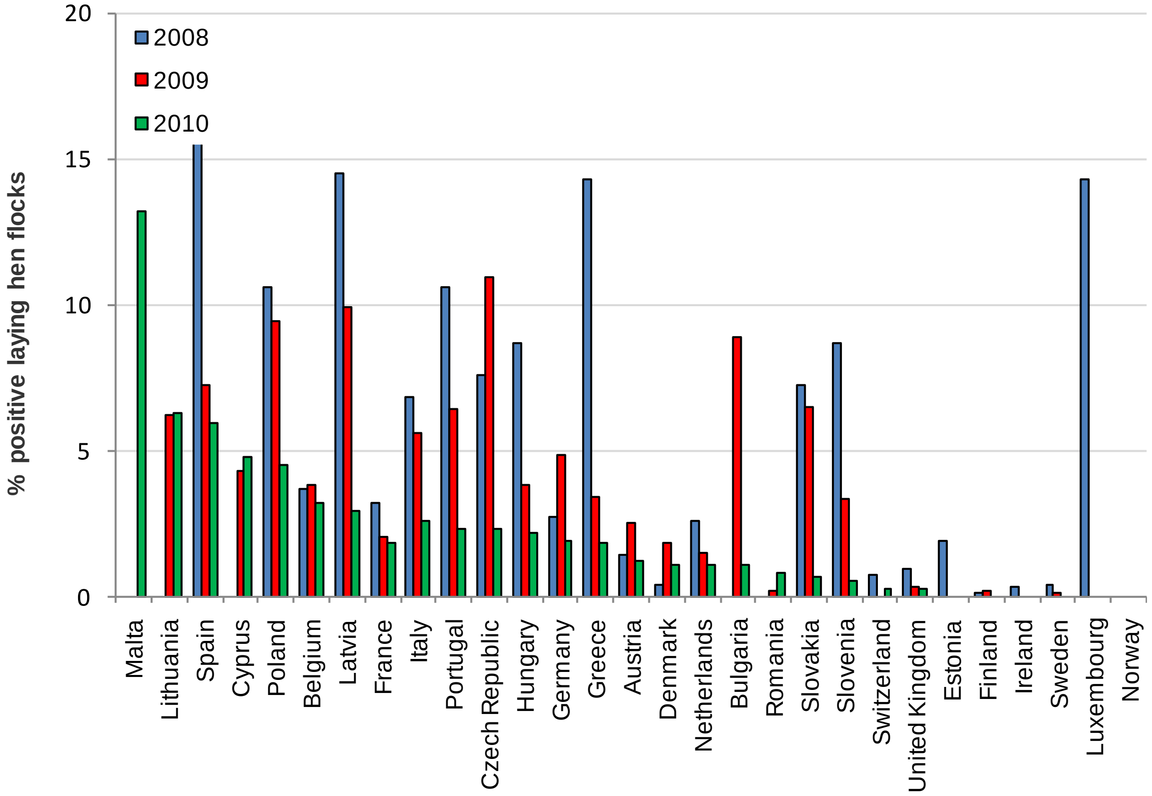
***Figure SA12. Prevalence of S. Enteritidis and/or S. Typhimurium-positive laying hen flocks of* Gallus gallus *during the production period and targets for Member States, Norway and Switzerland, 2010***




Note: MSs are ordered by target level. The 25 MSs and two non-MSs have met the 2010 targets, indicated with a '+'.

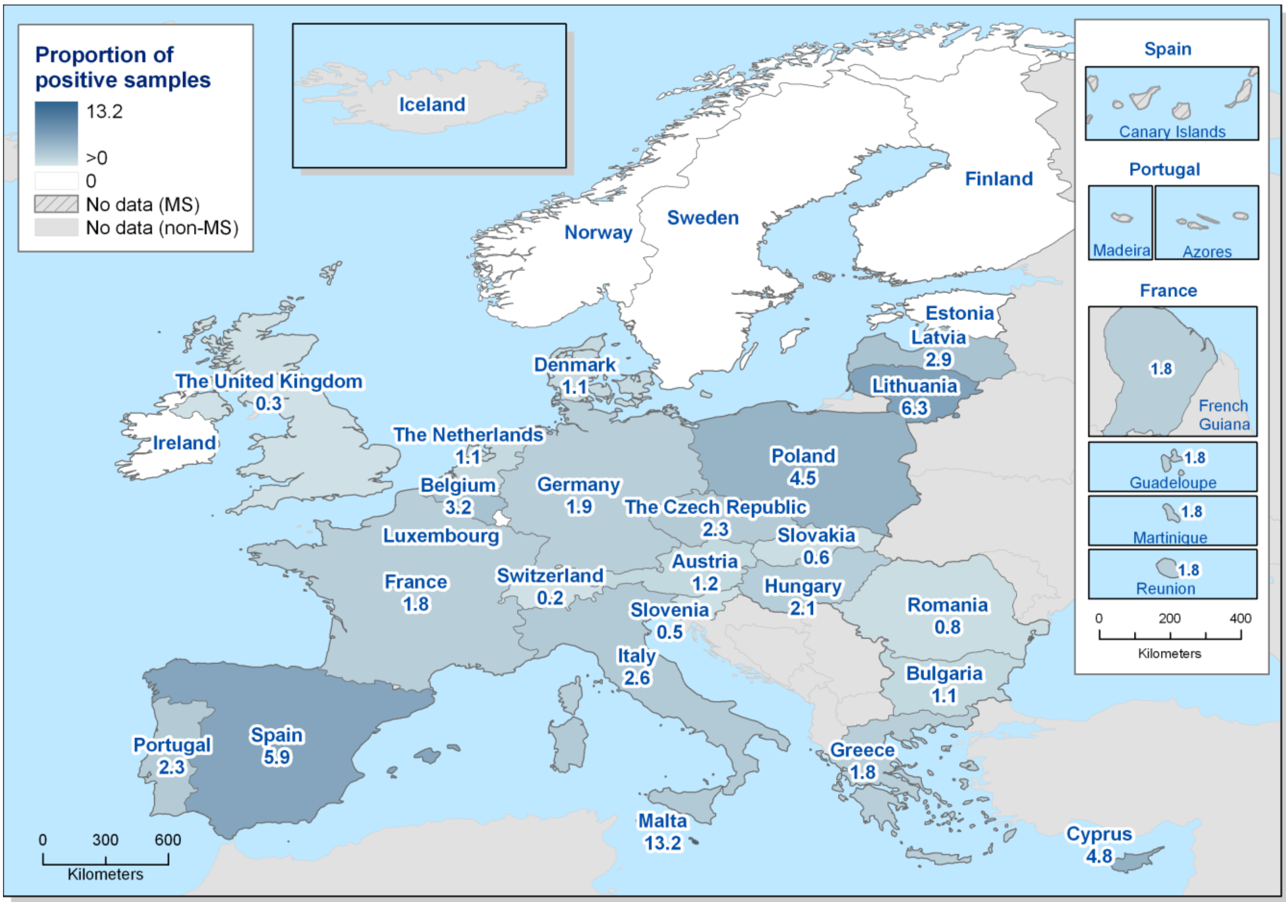
1. Lithuania achieved the target as there are fewer than 50 flocks in the MS and only one flock was found to be positive for the targeted serovars.

***Figure SA13. Prevalence of S. Enteritidis and/or S. Typhimurium-positive laying hen flocks of* Gallus gallus *during the production period for Member States, Norway and Switzerland, 2008-2010***




Note: in Luxembourg 2008, one of seven adult laying hen flocks was found to be *Salmonella*-positive. No data were reported from Malta and Romania in 2008.

***Figure SA14. Prevalence of the two targeted serovars, S. Enteritidis and S. Typhimurium-positive laying hen flocks of* Gallus gallus *during the production period, 2010***




### *Broiler production line of* Gallus gallus

#### Parent breeding flocks

Nineteen MSs and two non-MSs reported data on *Salmonella* prevalence in parent breeding flocks in the meat production line in 2010 (Table SA21). Five MSs, Norway and Switzerland did not report any positive flocks, whereas the 14 other MSs reported *Salmonella* prevalence between 0.2 % and 3.9 %. In 2010, the total proportion of *Salmonella*-positive flocks observed in MSs was 1.6 %, compared with 2.4 % in 2009.

The total proportion of flocks positive for the five target serovars in 2010 was 0.7 %, compared with 1.3 % in 2009. *S.* Enteritidis (0.3 %) was the most frequently isolated serovar and was reported from five MSs with positive parent breeding flocks. Three MSs with positive results reported only serovars other than the five target serovars.

In 2010, the prevalence of *Salmonella* spp. (including the five target serovars) and the prevalence of the five target serovars was similar between the reported results for parent breeding flocks for the meat production line (1.6 % and 0.7 %, respectively) (Table SA21) and parent breeding flocks for the egg production line (1.8 % and 0.7 %, respectively) (Table SA18).

***Table SA21.* Salmonella *in adult parent breeding flocks in the broiler meat production line* (Gallus gallus, *flock-based data) in countries running control programmes in accordance with Regulation (EC) No 2160/2003, 2009-2010***

| Country | 2010 | | | | | | | | | 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % positive | | | | | | | | N | % positive | |
| | | pos (all) | 5 target serovars[1] | S. Enteritidis | S. Typhimurium | S. Infantis | S. Virchow | S. Hadar | Other serovars, non typeable, and unspecified | | pos (all) | 5 target serovars[1] |
| Austria | 97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 90 | 1.1 | 1.1 |
| Bulgaria | 1,579 | 0.2 | 0.1 | 0 | 0 | 0.1 | 0 | 0 | 0.1 | 1,865 | 0.9 | 0.8 |
| Cyprus | - | - | - | - | - | - | - | - | - | 50 | 0 | 0 |
| Czech Republic | 562 | 2.0 | 1.4 | 1.1 | 0.4 | 0 | 0 | 0 | 0.5 | 515 | 1.6 | 1.0 |
| Denmark | 200 | 2.5 | 2.5 | 0 | 1.5 | 1.0 | 0 | 0 | 0 | 225 | 1.8 | 1.3 |
| Estonia | - | - | - | - | - | - | - | - | - | 3 | 0 | - |
| Finland | 137 | 0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 145 | 0 | 0 |
| France | 1,313 | 0.6 | 0.6 | 0.3 | 0.2 | 0 | 0.1 | 0 | 0 | 1,180 | 1.7 | 0.2 |
| Germany | 448 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 647 | 2.0 | 0.8 |
| Greece | 292 | 3.4 | 0.7 | 0 | 0 | 0 | 0 | 0.7 | 2.7 | 255 | 10.6 | 7.5 |
| Ireland | 105 | 1.9 | 1.9 | 0 | 1.9 | 0 | 0 | 0 | 0 | 117 | 0 | 0 |
| Italy | 626 | 3.5 | 0.6 | 0 | 0.2 | 0 | 0.2 | 0.3 | 2.9 | - | - | - |
| Latvia | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 |
| Netherlands | 688 | 0.7 | 0.7 | 0.6 | 0.1 | 0 | 0 | 0 | 0 | 662 | 0.8 | 0.6 |
| Poland | 983 | 3.2 | 2.3 | 1.6 | 0.1 | 0.3 | 0.3 | 0 | 0.8 | 925 | 3.8 | 2.9 |
| Portugal[2] | 231 | 0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 204 | 4.4 | 0.5 |
| Slovakia[3] | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 151 | 2.6 | 0 |
| Slovenia | 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 149 | 0 | 0 |
| Spain | 1,296 | 3.9 | 0.7 | 0.4 | 0 | 0 | 0.1 | 0.2 | 3.2 | 1,161 | 6.9 | 3.6 |
| Sweden | 121 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 123 | 0 | 0 |
| United Kingdom[4] | 1,419 | 1.2 | 0.1 | 0 | 0.1 | 0 | 0 | 0 | 1.2 | 1,547 | 1.2 | 0.1 |
| **Total (19 MSs in 2010)** | **10,311** | **1.6** | **0.7** | **0.3** | **0.1** | **0.1** | **0.1** | **0.1** | **1.0** | **10,039** | **2.4** | **1.3** |
| Norway | 136 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 157 | 0 | 0 |
| Switzerland | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |

1. *S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow, *S.* Hadar.
2. Sampling period unspecified in 2010.
3. Sampling period unspecified in 2009.
4. The United Kingdom reported results amalgamated as elite, grandparent and parent. *S.* Typhimurium includes monophasic *S.* Typhimurium.

## Broiler flocks

Since 2009, MSs have been obliged to implement national control programmes for *Salmonella* in broiler flocks in accordance with Regulation (EC) No 2160/2003. The Regulation requires that effective measures are taken to prevent, detect and control *Salmonella* at all relevant stages of production, processing and distribution, particularly in primary production, in order to reduce the prevalence and the risk to public health.

Minimum detection requirements in broiler flocks laid down in the Regulation include the sampling of flocks within the 3 weeks before the birds are moved to the slaughterhouse, taking at least two pairs of boot/sock swabs per flock. Test results have to be reported as Food Chain Information to abattoirs and to EFSA and the EC, along with any relevant additional information, on a yearly basis as part of the annual report on trends and sources of zoonoses and zoonotic agents. Positive flocks have to be counted and reported once only, irrespective of the number of sampling and testing operations. For more detailed information see Appendix Table SA7a.

The EU target for broiler flocks, referred to in Regulation (EC) No 2160/2003, was set in Regulation (EC) No 646/2007 [19] as a maximum percentage of broiler flocks remaining positive for *S.* Enteritidis and/or *S*. Typhimurium to be 1 % or less by 31 December 2011.

For 2010, any reporting of monophasic *S*. Typhimurium was included within the *S*. Typhimurium total and was counted as a target serovar.

The prevalences of *Salmonella* spp. and of the two serovars (*S.* Enteritidis and *S.* Typhimurium) targeted in the national control programmes for broilers are presented in Table SA22; 26 MSs and the two non-MSs reported data on broiler flocks before slaughter. Overall for 2010, the MSs reported 4.1 % of the tested broiler flocks as *Salmonella*-positive and 0.4 % positive for the two target serovars compared with 5.0 % and 0.7 %, respectively, in 2009. Most MSs reported a very low prevalence or no positive flocks for the two target serovars. The highest prevalence for all serovars was detected in Malta (32.9 %).

In 2010, 22 MSs and two non-MSs had met the target of 1 % or less of the broiler flocks positive for *S.* Enteritidis and/or *S*. Typhimurium (Figure SA15), which was an increase of four MSs since 2009. Four MSs and one non-MS reported no findings for the two target serovars, while 22 MSs and one non-MSs reported prevalence of the two serovars ranging from <0.1 % to 4.1 %. Malta and the Czech Republic reported the highest prevalences (4.1 % and 3.9 %, respectively), while the other MSs reported prevalence of less than 1.6 %. A number of MSs reported large reductions in prevalence of the target serovars, in particular Slovakia and Latvia (Figure SA16).

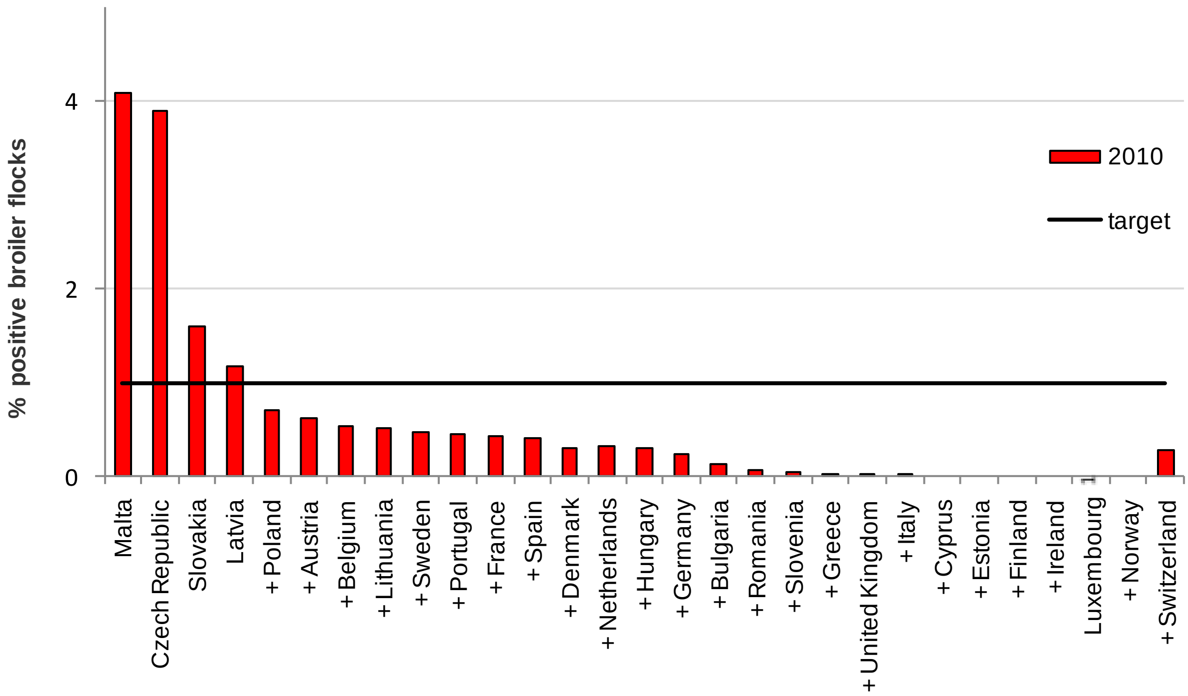
19 Commission Regulation (EC) No 646/2007 of 12 June 2007 implementing Regulation (EC) No 2160/2003 of the European Parliament and of the Council as regards a Community target for the reduction of the prevalence of *Salmonella* Enteritidis and *Salmonella* Typhimurium in broilers and repealing Regulation (EC) No 1091/2005. OJ L 151, 13.6.2007, p. 21–25.

***Table SA22.* Salmonella *in broiler flocks of* Gallus gallus *before slaughter (flock-based data) in countries running control programmes, 2010***

| Country | 2010 | | | | | | 2009 | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | % positive | | | | | N | % positive | |
| | | pos (all) | S. Enteriditis and/or S. Typhimurium | S. Enteritidis | S. Typhimurium | Other serovars, non-typeable, and unspecified | | pos (all) | S. Enteridis and S. Typhimurium |
| Austria | 3,402 | 2.9 | 0.6 | 0.4 | 0.2 | 2.3 | 3,302 | 3.4 | 1.1 |
| Belgium[1] | 8,481 | 3.7 | 0.5 | <0.1 | 0.5 | 3.3 | 8,049 | 3.1 | 0.5 |
| Bulgaria[2] | 769 | 3.3 | 0.1 | 0 | 0.1 | 3.1 | 1,152 | 1.4 | 0.4 |
| Cyprus | 643 | 19.3 | 0 | 0 | 0 | 19.3 | 239 | 7.9 | 0 |
| Czech Republic | 5,591 | 6.5 | 3.9 | 3.9 | <0.1 | 2.6 | 6,035 | 7.4 | 4.0 |
| Denmark[6] | 3,773 | 1.1 | 0.3 | <0.1 | 0.3 | 0.9 | 3,767 | 0.9 | 0.3 |
| Estonia | 434 | 0 | 0 | 0 | 0 | 0 | 414 | 0 | 0 |
| Finland | 3,070 | 0.2 | 0 | 0 | 0 | 0.2 | 2,972 | 0.4 | 0 |
| France[4,5] | 49,024 | 7.1 | 0.4 | 0.1 | 0.3 | 6.7 | 35,913 | 8.1 | 0.5 |
| Germany | 4,354 | 4.4 | 0.2 | 0.1 | <0.1 | 4.2 | 4,339 | 7.0 | 0.4 |
| Greece | 8,319 | 0.3 | <0.1 | <0.1 | <0.1 | 0.3 | 6,577 | 0.3 | 0 |
| Hungary | 6,515 | 13.7 | 0.3 | 0.2 | 0.1 | 13.4 | 4,491 | 32.4 | 0.4 |
| Ireland | 600 | 0.5 | 0 | 0 | 0 | 0.5 | 665 | 0 | 0 |
| Italy | 13,895 | 7.3 | <0.1 | <0.1 | 0 | 7.3 | 2,072 | 19.2 | 1.0 |
| Latvia | 593 | 1.2 | 1.2 | 1.2 | 0 | 0 | 566 | 7.1 | 5.3 |
| Lithuania | 198 | 0.5 | 0.5 | 0.5 | 0 | 0 | 218 | 2.3 | 2.3 |
| Luxembourg | - | - | - | - | - | - | 4 | 25 | 0 |
| Malta | 587 | 32.9 | 4.1 | 3.6 | 0.5 | 28.8 | 87 | 31.0 | 2.3 |
| Netherlands | 18,036 | 3.1 | 0.3 | 0.2 | 0.1 | 2.8 | 29,193 | 2.7 | 0.2 |
| Poland | 26,801 | 0.9 | 0.7 | 0.7 | <0.1 | 0.2 | 20,665 | 3.2 | 1.7 |
| Portugal | 7,981 | 1.8 | 0.4 | 0.4 | <0.1 | 1.3 | 654 | 5.4 | 1.8 |
| Romania | 6,040 | 6.4 | <0.1 | <0.1 | 0 | 6.3 | 3,160 | 4.8 | 0.1 |
| Slovakia | 2,801 | 1.6 | 1.6 | 1.3 | 0.3 | 0 | 544 | 14.0 | 7.7 |
| Slovenia[1] | 2,153 | 1.1 | <0.1 | 0 | <0.1 | 1.2 | 3,080 | 0.7 | 0 |
| Spain | 18,344 | 3.6 | 0.4 | 0.4 | <0.1 | 3.2 | 13,620 | 6.7 | 1.6 |
| Sweden | 3,702 | 0.5 | 0.5 | 0 | 0.5 | 0 | 2,713 | 0.1 | 0 |
| United Kingdom[3,4] | 33,611 | 1.6 | <0.1 | 0 | <0.1 | 1.5 | 27,780 | 1.3 | 0 |
| **EU Total** | **229,717** | **4.1** | **0.4** | **0.3** | **0.1** | **3.7** | **182,271** | **5.0** | **0.7** |
| Norway | 4,549 | <0.1 | 0 | 0 | 0 | <0.1 | 4,243 | 0 | 0 |
| Switzerland | 368 | 2.7 | 0.3 | 0.3 | 0 | 2.4 | 740 | 1.6 | 0.5 |

1. More than one serovar found in several samples.
2. For Bulgaria, the sample unit is a single animal.
3. For the United Kingdom, the number of existing flocks and number of flocks tested is derived from the number of samples submitted to private and Government veterinary laboratories.
4. *S*. Typhimurium includes monophasic *S*. Typhimurium.
5. The number of flocks tested is an underestimate as all flocks are tested but not all negative flocks are recorded.
6. More than one serovar found in two flocks in 2010.

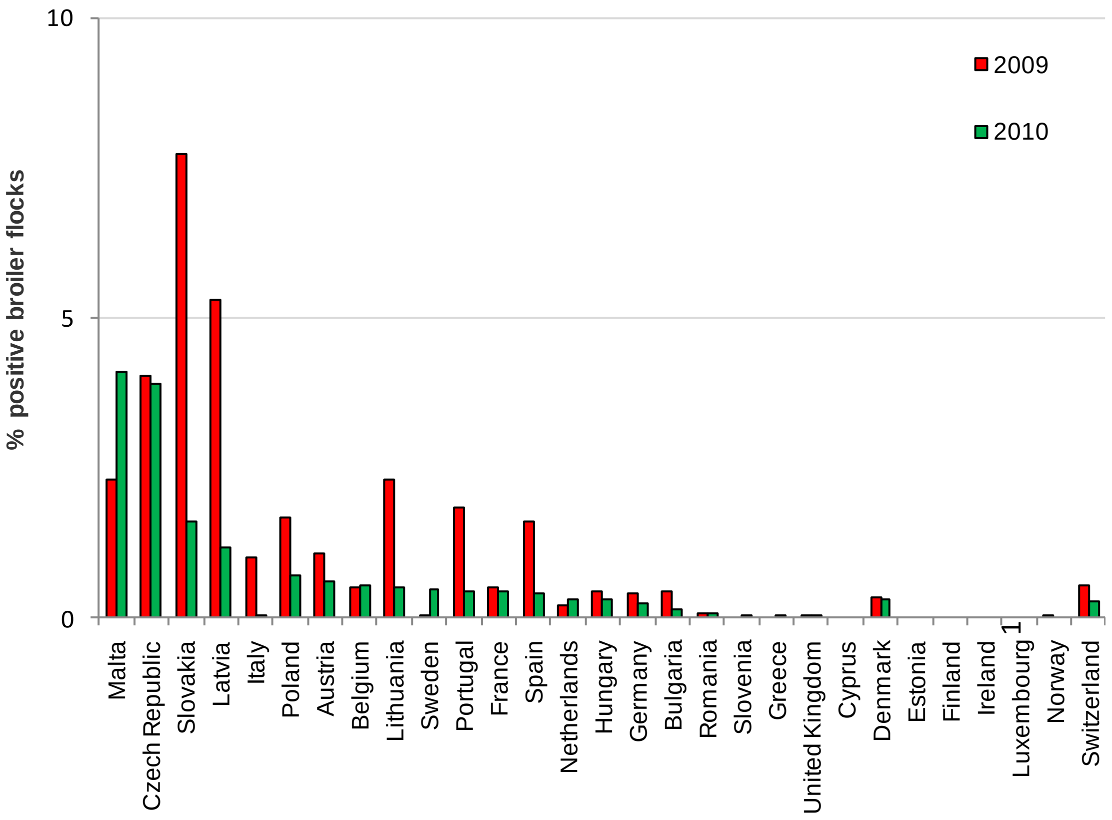
***Figure SA15. Prevalence of S. Enteritidis and/or S. Typhimurium-positive broiler flocks before slaughter for Member States, Norway and Switzerland, 2010***




Note: In 2010, 22 MSs and two non-MSs met the target, indicated with a '+'.

1. No data were supplied by Luxembourg.

***Figure SA16. Prevalence of S. Enteritidis and/or S. Typhimurium-positive broiler flocks before slaughter for Member States, Norway and Switzerland, 2009-2010***




1. No data were supplied by Luxembourg in 2010

## Breeding and fattening turkeys

The mandatory National Control Programme for *Salmonella* in breeding and fattening turkeys came into effect on 1 January 2010 and has been implemented to comply with Regulation (EC) No 2160/2003 and Regulations (EC) No 584/2008[20] and 213/2009[21]. All flocks of 250 or more breeding turkeys and 500 or more fattening turkeys are to be included in the national control programme unless exempted in Regulation (EC) No 2160/2003 under Article 1.3, that is birds produced for private domestic consumption, or where there is a direct supply of small quantities of products to the final consumer or to local retail establishments directly supplying the primary products to the final consumer. For MSs with fewer than 100 flocks of adult breeding or fattening turkeys, the EU target shall be that no more than one flock of adult breeding or fattening turkeys may remain positive by 31 December 2012. Following the successful completion of the EU baseline survey for the prevalence of *Salmonella* in commercial turkey holdings in 2006-2007 (Decision 2006/662/EC[22] and 2007/208/EC[23]), a target was set for the reduction of *S.* Enteritidis and *S.* Typhimurium in turkey flocks.

20 Commission Regulation (EC) No 584/2008 of 20 June 2008 implementing Regulation (EC) No 2160/2003 of the European Parliament and of the Council as regards a Community target for the reduction of the prevalence of *Salmonella* Enteritidis and *Salmonella* Typhimurium in turkeys. OJ L 162, 21.6.2008, p 3-8.

21 Commission Regulation (EC) No 213/2009 of 18 March 2009 amending Regulation (EC) No 2160/2003 of the European Parliament and of the Council and Regulation (EC) No 1003/2005 as regards the control and testing of *Salmonella* in breeding flocks of *Gallus gallus* and turkeys. OJ L73,19.3.2009. p. 5-11.

22 Commission Decision 2006/662/EC of 29 September 2006 concerning a financial contribution from the Community towards a baseline survey on the prevalence of *Salmonella* in turkeys to be carried out in the Member States. OJ L 27, 03.10.2006. p.22-26.

23 Commission Decision 2007/208/EC of 30 March 2007 concerning a Community financial contribution towards a baseline survey on the prevalence of *Salmonella* in turkeys to be carried out in Bulgaria and in Romania. OJ L 92, 03.04.2007. p. 18-22.

According to Regulation (EC) No 584/2008, no more than 1 % of fattening and adult breeding turkey flocks are to remain positive for *S.* Enteritidis and *S.* Typhimurium by 31 December 2012.

For **breeding turkeys**, samples for the detection of *Salmonella* should be taken by the operator from rearing turkey breeding flocks at one day of age, at four weeks of age and two weeks before moving to the laying phase or laying unit. In adult breeding flocks, samples shall be taken at least every three weeks during the laying period at the holding or at the hatchery. The samples in adult breeding flocks, either at the holding or at the hatchery, shall be taken in accordance with the provisions laid down in point 2.2.2 of the Annex to Regulation (EC) No 1003/2005.

Official control samples are required to be taken from all flocks on 10 % of holdings with at least 250 adult breeding turkeys between 30 and 45 weeks of age but including in any case all holdings in which *S.* Enteritidis or *S.* Typhimurium was detected during the previous 12 months and all holdings with elite, great grandparents and grandparent breeding turkeys; this sampling may also take place at the hatchery.

For **fattening turkeys,** samples must be taken by the operator within the three weeks before the birds are moved to the slaughterhouse. The results remain valid for up to six weeks after sampling. The samples in fattening turkey flocks shall be taken in accordance with the provisions laid down in point 2 of the Annex to Regulation (EC) No 584/2008.

In addition, each year, official control samples are taken from all flocks on 10 % of holdings with at least 500 fattening turkeys.

For 2010, any reporting of monophasic *S*. Typhimurium was included within the *S*. Typhimurium total and was counted as a target serovar.

Thirteen MSs and a non MS reported data from *Salmonella* testing in adult turkey breeding flocks in 2010 (Table SA23). Six MSs reported *Salmonella* spp. in their flocks, ranging from 2.8 % (the United Kingdom) to 52.9 % (Spain). The average prevalence of *Salmonella* was 6.9 %, although it should be noted that the number of flocks tested by each MS varied considerably and so the average figure was more influenced by MSs that reported larger numbers of flocks. The two target serovars, *S.* Enteritidis and *S.* Typhimurium, were detected only in France (four flocks) and Spain (one flock), and all 13 MSs and Norway met the target prevalence of *S.* Enteritidis and/or *S.* Typhimurium set for this year (Figure SA17). Spain achieved the target as there are fewer than 100 adult breeding flocks in the MS and only one flock was found to be positive for the targeted serovars. France reported four breeding turkey flocks positive for a monophasic *S*. Typhimurium variant (S. 1,4,[5],12:i), which was included in the prevalence of the two target serovars.

Three MSs also reported investigations of breeding flocks during the rearing period in which 25 or more samples were collected. France reported 26 flock samples from grandparent flocks (zero positive) and 429 flock samples from parent breeding flocks (one *S*. Typhimurium positive). Poland and Spain sampled unspecified breeding flocks, with 43 flocks (five non-target serovars detected) and 29 flocks (two *S*. Typhimurium and two non-target serovars) sampled, respectively.

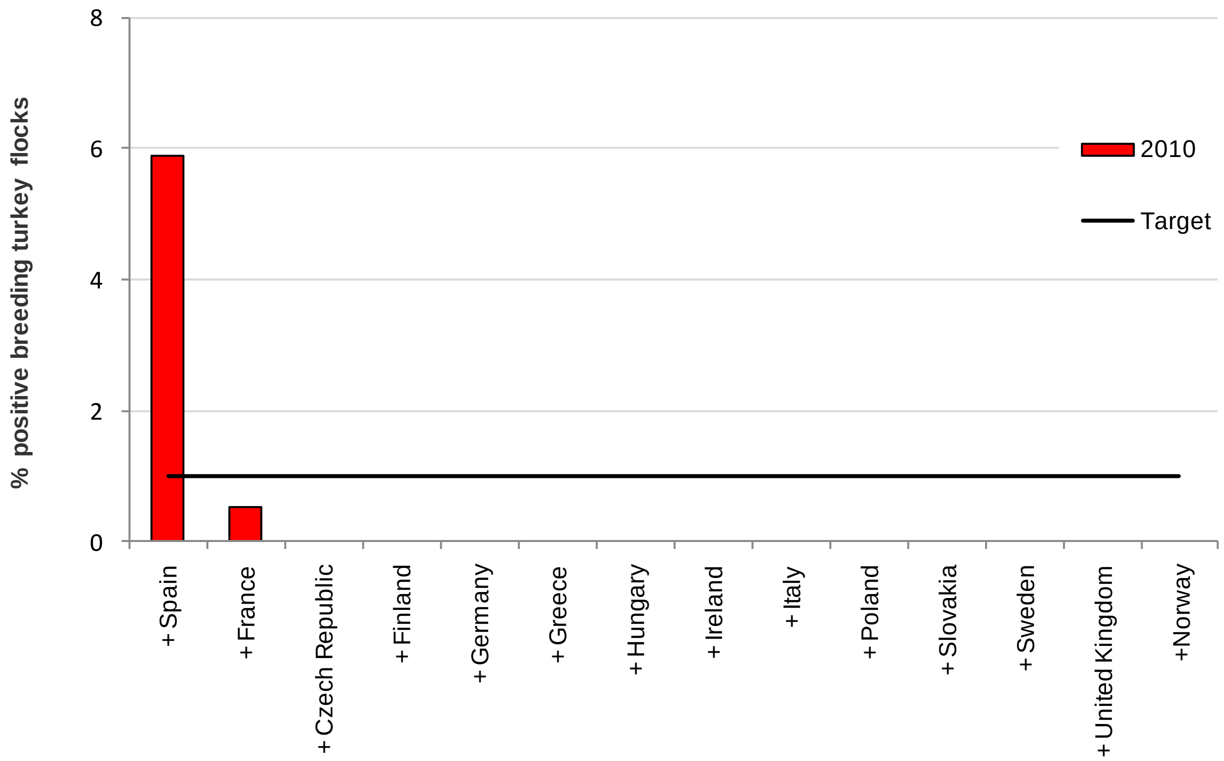
In addition, 21 MSs and two non-MSs provided data from turkey fattening flocks before slaughter. Finland, Portugal, Slovakia, Sweden and Norway did not report any flocks positive for *Salmonella*. The overall *Salmonella* prevalence was 12.1 %, with a maximum of 29.9 % reported by Hungary (Table SA24). Nine MSs reported *S.* Enteritidis and/or *S.* Typhimurium infection, with an average prevalence of 0.5 % from all the MSs. In total 20 MSs and two non-MSs reported below the 1 % prevalence target, and only Spain (1.7 %) reported a prevalence above 1 % (Figure SA18).

*Table SA23.* **Salmonella** *in breeding flocks of turkeys (adults, flock-based data), 2010*

| Country | N | % positive | | | | |
|---|---|---|---|---|---|---|
| | | pos (all) | S. Enteriditis and/or S. Typhimurium | S. Enteritidis | S. Typhimurium | Other serovars, non-typeable, and unspecified |
| Czech Republic | 12 | 50.0 | 0 | 0 | 0 | 50.0 |
| Finland | 10 | 0 | 0 | 0 | 0 | 0 |
| France[1] | 785 | 4.3 | 0.5 | 0 | 0.5 | 3.8 |
| Germany | 141 | 0 | 0 | 0 | 0 | 0 |
| Greece | 4 | 0 | 0 | 0 | 0 | 0 |
| Hungary | 118 | 0 | 0 | 0 | 0 | 0 |
| Ireland | 14 | 0 | 0 | 0 | 0 | 0 |
| Italy | 177 | 26.6 | 0 | 0 | 0 | 26.6 |
| Poland | 66 | 13.6 | 0 | 0 | 0 | 13.6 |
| Slovakia | 21 | 0 | 0 | 0 | 0 | 0 |
| Spain | 17 | 52.9 | 5.9 | 0 | 5.9 | 47.1 |
| Sweden | 4 | 0 | 0 | 0 | 0 | 0 |
| United Kingdom | 249 | 2.8 | 0 | 0 | 0 | 2.8 |
| **Total (13 MSs)** | **1,618** | **6.9** | **0.3** | **0** | **0.3** | **6.6** |
| Norway | 15 | 0 | 0 | 0 | 0 | 0 |

1. *S.* Typhimurium result includes the reporting of monophasic variants.

***Figure SA17. Prevalence of S. Enteritidis and/or S. Typhimurium-positive breeding flocks of turkeys (all age groups) and targets for Member States and Norway, 2010***



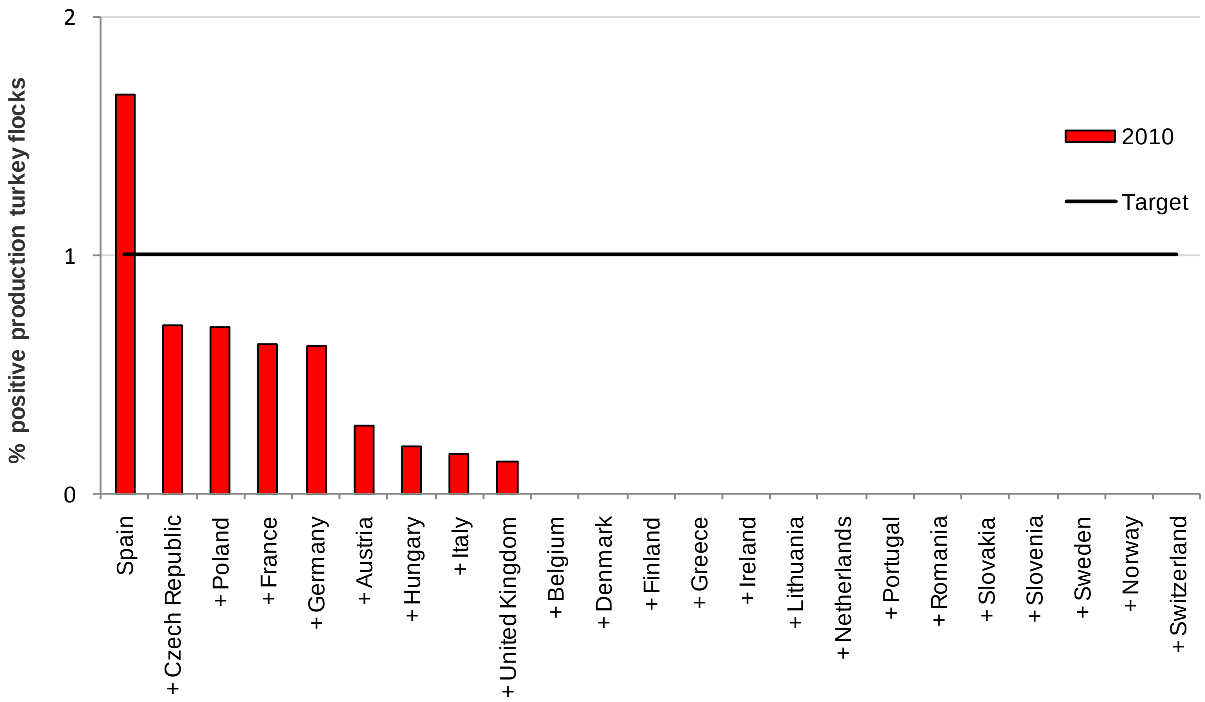

Note: In 2010, 13 MSs and Norway met the target, indicated with a '+'. France includes reporting of monophasic *S*. Typhimurium. Spain achieved the target as there are fewer than 100 adult breeding flocks in the MS and only one flock was found to be positive for the targeted serovars.

*Table SA24.* **Salmonella** *in fattening flocks of turkeys before slaughter (flock-based data), 2010*

| Country | N | % positive | | | | |
|---|---|---|---|---|---|---|
| | | pos (all) | S. Enteriditis and/or S. Typhimurium | S. Enteritidis | S. Typhimurium | Other serovars, non-typeable, and unspecified |
| Austria[1] | 355 | 8.5 | 0.3 | 0.3 | 0 | 8.2 |
| Belgium | 146 | 0.7 | 0 | 0 | 0 | 0.7 |
| Czech Republic[1] | 283 | 19.1 | 0.7 | 0.4 | 0.4 | 18.4 |
| Denmark | 24 | 4.2 | 0 | 0 | 0 | 4.2 |
| Finland | 348 | 0 | 0 | 0 | 0 | 0 |
| France[2,3] | 9,394 | 7.7 | 0.6 | 0.1 | 0.5 | 7.1 |
| Germany[2] | 971 | 1.0 | 0.6 | 0.1 | 0.5 | 0.4 |
| Greece | 14 | 7.1 | 0 | 0 | 0 | 7.1 |
| Hungary | 2,997 | 29.9 | 0.2 | <0.1 | 0.2 | 29.7 |
| Ireland | 103 | 1.0 | 0 | 0 | 0 | 1.0 |
| Italy | 2,468 | 17.7 | 0.2 | 0 | 0.2 | 17.6 |
| Lithuania | 6 | 16.7 | 0 | 0 | 0 | 16.7 |
| Netherlands | 229 | 2.6 | 0 | 0 | 0 | 2.6 |
| Poland | 3,434 | 5.2 | 0.7 | 0.3 | 0.4 | 4.5 |
| Portugal | 25 | 0 | 0 | 0 | 0 | 0 |
| Romania | 54 | 13.0 | 0 | 0 | 0 | 13.0 |
| Slovakia | 24 | 0 | 0 | 0 | 0 | 0 |
| Slovenia | 112 | 0.9 | 0 | 0 | 0 | 0.9 |
| Spain | 1,316 | 19.8 | 1.7 | 0 | 1.7 | 18.2 |
| Sweden | 155 | 0 | 0 | 0 | 0 | 0 |
| United Kingdom | 3,078 | 15.4 | 0.1 | 0 | 0.1 | 15.3 |
| **Total (21 MSs)** | **25,536** | **12.1** | **0.5** | **0.1** | **0.4** | **11.6** |
| Norway | 385 | 0 | 0 | 0 | 0 | 0 |
| Switzerland | 60 | 3.3 | 0 | 0 | 0 | 3.3 |

1. One flock positive for two serovars.
2. *S.* Typhimurium result includes the reporting of monophasic variants.
3. The number of flocks tested is an underestimate as all flocks are tested but not all negative flocks are recorded.

***Figure SA18. Prevalence of S. Enteritidis and/or S. Typhimurium-positive fattening flocks of turkeys and targets for Member States, Norway and Switzerland, 2010***




Note: In 2010, 20 MSs and 2 non-MSs met the target, indicated with a '+'. Results from Germany and France include reporting of monophasic *S*. Typhimurium.

## Ducks and geese

Poland and Bulgaria reported small numbers of samples from *Salmonella* testing in duck breeding flocks. *Salmonella* was detected in nine Polish flocks and in none of the Bulgarian animal samples. With regards to production flocks of ducks, two MSs provided data with 25 or more samples. The overall *Salmonella* prevalence was 36.8 % of the tested flocks, and 6.9 % positive for *S*. Enteritidis and/or *S*. Typhimurium (Table SA25).

Poland also reported small numbers of samples from *Salmonella* testing in geese breeding flocks, and 6 positive flocks were detected. Two MSs reported data with 25 or more samples on *Salmonella* in production flocks of geese. An overall prevalence of 4.1 % for *Salmonella* and 4.1 % for *S*. Enteritidis and/or *S*. Typhimurium was reported (Table SA25). The flock prevalence in Germany decreased from 20.7 % to 4.3 % for both *Salmonella* spp. and for *S*. Enteritidis and/or *S*. Typhimurium. For further information on reported data, refer to the level 3 tables.

***Table SA25.* Salmonella *in production flocks of ducks and geese (flock-based data), 2008-2010***

| Country | 2010 | | | 2009 | | | 2008 | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | % positive | | N | % positive | | N | % positive | |
| | | pos (all) | *S.* Enteridis and *S.* Typhimurium | | pos (all) | *S.* Enteridis and *S.* Typhimurium | | pos (all) | *S.* Enteridis and *S.* Typhimurium |
| **Ducks** | | | | | | | | | |
| Austria | - | - | - | 30 | 16.7 | 0 | 66 | 22.7 | 4.5 |
| Bulgaria | - | - | - | - | - | - | 74 | 0 | 0 |
| Denmark | 108 | 56.5 | 9.3 | 85 | 63.5 | 0 | 61 | 70.5 | 6.6 |
| Germany | 66 | 4.5 | 3.0 | 95 | 4.2 | 4.2 | - | - | - |
| **Total ducks (2 MSs in 2010)** | **174** | **36.8** | **6.9** | **210** | **30.0** | **1.9** | **201** | **28.9** | **3.5** |
| Norway | - | - | - | 68 | 0 | 0 | - | - | - |
| **Geese** | | | | | | | | | |
| Austria | - | - | - | - | - | - | 62 | 6.5 | 3.2 |
| Germany | 46 | 4.3 | 4.3 | 29 | 20.7 | 20.7 | 25 | 8.0 | 8.0 |
| Sweden | 27 | 3.7 | 3.7 | - | - | - | - | - | - |
| **Total geese (2 MSs in 2010)** | **73** | **4.1** | **4.1** | **29** | **20.7** | **20.7** | **87** | **6.9** | **4.6** |

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

The United Kingdom reported 83 positive duck samples (18 *S.* Typhimurium and 65 other serovars) and 4 positive geese samples (2 *S.* Typhimurium and 2 other serovars), without reporting the total number of tested flocks.

Poland reported 96 positive duck flocks and 108 positive geese flocks without reporting the total number of tested flocks.

## Pigs

Data on the prevalence of *Salmonella* at farm level from the bacteriological monitoring of pigs were reported by Estonia (3.1 % at animal level), Italy (0.6 % at animal level and 0 % at herd level), Finland and Norway (both 0 % at herd level) (Table SA26). The results from Estonia represented an increase in prevalence from that reported in 2009 (0.9 %). Four MSs and Norway reported data on the occurrence of *Salmonella* from the bacteriological monitoring of lymph nodes at slaughter. Estonia reported the highest prevalence (8.2 %), which was an identical prevalence reported from the last two years. Slovenia reported 4.7 %, while Sweden and Finland reported no positive findings or very low numbers of positive results. The Nordic countries included in the table reported data from both breeding and fattening pigs, although very little difference was seen between the prevalence reported from these.

Additional reporting from sampling at slaughter, from either faecal samples or unspecified sample types, was provided by two MSs and Norway. Slovakia reported 3.1 % of fattening animals positive, and Slovenia reported 5.5 % of fattening pigs carrying *Salmonella,* but Norway had less than 1 % positive tests from unspecified types of pigs. Italy reported no positive herds out of 31 tested, in which the level of sampling was not specified.

Data from national surveys of the occurrence of *Salmonella* in pigs, were reported by Italy and Spain (table SA26). Italy reported two investigations on farm, with a prevalence of 0.6 % at the animal level and 0 % at the herd level, and one investigation of animals in which the sampling level was unspecified with a prevalence of 14.5 %. Spain reported 35.9 % out of 217 slaughter batches positive at the slaughterhouse. For further information on reported data, refer to the level 3 tables.

*Table SA26.* **Salmonella** *in pigs from bacteriological monitoring programmes, 2008-2010*

| Country | Sample level | Sample unit | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| Estonia | Farm | Animal, faeces | 1,095 | 3.1 | 1,372 | 0.9 | 810 | 0 |
| Finland | Farm | Herd (breeding), faeces | 840 | 0 | - | - | 45 | 0 |
| Italy[1] | Farm | Animal | 1,272 | 0.6 | - | - | - | - |
| | | Herd | 37 | 0 | - | - | - | - |
| Estonia | Slaughter | Animal (fattening), lymph nodes | 146 | 8.2 | 146 | 8.2 | 146 | 8.2 |
| Finland | Slaughter | Animal (breeding), lymph nodes | 3,207 | <0.1 | 3,143 | 0.1 | 3,040 | <0.1 |
| | | Animal (fattening), lymph nodes | 3,332 | <0.1 | 3,344 | <0.1 | 3,112 | <0.1 |
| Slovakia | Slaughter | Animal (breeding) | - | - | 122 | 5.7 | - | - |
| | | Animal (fattening) | 98 | 3.1 | - | - | - | - |
| Slovenia | Slaughter | Animal (fattening), lymph nodes | 384 | 4.7 | - | - | - | - |
| | | Animal (fattening), faeces | 384 | 5.5 | - | - | - | - |
| Spain[1] | Slaughter | Slaughter batch | 217 | 35.9 | - | - | - | - |
| Sweden | Slaughter | Animal (breeding), lymph nodes | 2,396 | 0.1 | 2,739 | 0.1 | 2,625 | 0.3 |
| | | Animal (fattening), lymph nodes | 3,562 | 0.2 | 3,415 | <0.1 | 3,187 | 0.3 |
| Czech Republic | Unspecified | Animal (breeding) | - | - | 87 | 1.1 | - | - |
| | | Animal (fattening) | - | - | 837 | 2.6 | - | - |
| | | Animal (piglets) | - | - | 635 | 1.3 | - | - |
| Italy | Unspecified | Animal[1] | 69 | 14.5 | 44 | 6.8 | - | - |
| | | Herd | 31 | 0 | - | - | - | - |
| **Total (8 MSs)** | | **Animal** | **15,945** | **0.7** | **15,884** | **0.5** | **12,920** | **0.2** |
| | | **Batch/Herd/ Holding** | **1,125** | **6.9** | **-** | **-** | **45** | **0** |
| Norway | Farm | Herd (breeding), faeces | 117 | 0 | 116 | 0 | - | - |
| | Slaughter | Animal (unspecified) | 2,226 | <0.1 | - | - | - | - |
| | | Animal (breeding), lymph nodes | - | - | 859 | 0 | 651 | 0 |
| | | Animal (fattening), lymph nodes | - | - | 1,620 | 0 | 1,475 | 0 |

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

1. Samples are from a national survey.

## Cattle

Data from the bacteriological monitoring of *Salmonella* in cattle were reported by 10 MSs and Norway in 2010 (Table SA27). Overall, as in 2009 and 2008, the prevalence was very low at the animal-level (0.9 %). The reported occurrence of *Salmonella* in cattle at slaughter was mostly very low or not detected. At the holding-level it was moderate (8.4 %) as compared with low previously. In addition, Sweden reported 80 % of 30 tested herds positive at the farm level, although this was from an investigation where there had been clinical suspicion and may not be representative of the true situation in cattle, especially as the prevalence at slaughter was only 0.1 %.

Survey data on the occurrence of *Salmonella* in cattle were also reported by Italy and Spain. Italy reported a prevalence of *Salmonella*-positive cattle at the farm-level of 0.6 %, whereas Spain reported a prevalence of *Salmonella*-positive cattle slaughter batches of 15.0 %. For further information on reported data, refer to the level 3 tables.

***Table SA27.* Salmonella *in cattle from bacteriological monitoring programmes, 2008-2010***

| Country | Sample level | Sample unit | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| Estonia | Farm | Animal, faeces | 1,467 | 0.5 | 1,550 | 0.6 | 1,607 | 0.2 |
| Finland[1,2] | Farm | Herd, faeces | 159 | 0 | 235 | 0 | 246 | 0.4 |
| Italy[2] | Farm | Animal, faeces | 101 | 12.9 | - | - | 707 | 5.4 |
| Italy[3] | Farm | Animal | 493 | 0.6 | - | - | - | - |
| Netherlands | Farm | Herd, faeces | - | - | 330 | 5.5 | 1,716 | 2.0 |
| Italy | Prior to slaughter | Animal, organ/tissue | - | - | - | - | 89 | 0 |
| Slovenia | Prior to slaughter | Animal, faeces | - | - | - | - | 386 | 0.3 |
| Finland | Slaughter | Animal, lymph nodes | 3,097 | 0.2 | 3,097 | 0 | 2,988 | <0.1 |
| Italy | Slaughter | Animal | 770 | 0 | - | - | 553 | 0.4 |
| Slovakia | Slaughter | Animal | 61 | 0 | 95 | 0 | - | - |
| Spain[3] | Slaughter | Slaughter batch | 200 | 15.0 | - | - | - | - |
| Sweden | Slaughter | Animal, lymph nodes | 3,522 | 0.1 | 3,487 | 0.2 | 3,320 | 0.1 |
| Bulgaria | Unspecified | Animal | - | - | 477 | 0.6 | - | - |
| Czech Republic | Unspecified | Animal | - | - | 696 | 3.4 | - | - |
| Italy | Unspecified | Animal | 609 | 4.4 | 1,438 | 1.0 | - | - |
| **Total (10 MSs)** | | **Animal** | **10,120** | **0.9** | **10,840** | **0.5** | **9,650** | **0.5** |
| | | **Batch/Herd/ Holding** | **359** | **8.4** | **565** | **3.2** | **1,962** | **1.8** |
| Norway | Slaughter | Animal, lymph nodes | 1,854 | 0 | 2,441 | 0 | 1,831 | 0 |

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

1. In Finland, herds producing AI bulls.
2. Sample type not specified in 2010.
3. Samples from a national survey.

## Other animal species

Other poultry species, such as guinea fowl, ostriches, partridges, quails and pheasants, as well as wild birds, were tested for *Salmonella* in some countries. The results show that all types of poultry can be infected with *Salmonella* and several different serovars may be present.

Of note was the prevalence of *Salmonella* in pigeons reported by five MSs from investigations with 25 or more samples. The highest prevalences were reported by Portugal, with 18 positives from 52 animal samples (34.6 %), and Germany with 136 positives from 1,484 (9.2 %) animal samples. The remaining MSs reports detected 32 positives from 526 (6.1 %) flock samples in Poland; nine positives from 418 animal samples (2.2 %) in Italy; and four positives from 65 animal samples (6.2 %) in Slovakia. Italy also reported national survey data on pigeons, which recorded two positive out of 61 animal samples (3.3 %).

In several countries, *Salmonella* was detected in sheep (Estonia, Germany, Italy, Portugal, Romania and Sweden), goats (Germany, Latvia and Romania) and solipeds (Bulgaria, the Netherlands, Romania and Sweden).

For further information on reported data, refer to the level 3 tables.

### 3.1.4. *Salmonella* in feedingstuffs

Data on *Salmonella* in feedingstuffs collected by MSs are generated from different targeted surveillance programmes as well as from unbiased reporting of random sampling of domestic and imported feedingstuffs (Appendix Table SA1). The presentation of single sample and batch-based data from the different monitoring systems has therefore been summarised, and includes both domestic and imported feedingstuffs. Owing to differences in monitoring and reporting strategy, data are not necessarily comparable among MSs or among reporting years. There are also very large differences in the number of samples tested among MSs, which can limit comparisons among investigations.

Table SA28 shows the EU proportion of *Salmonella*-positive samples in animal and vegetable derived feed material reported by MSs in 2008-2010. In 2010, in animal derived feed material, the overall level of *Salmonella* contamination decreasedin meat and bone meal (0.6 % in 2010 compared with 1.4 % in 2009). It should be noted that the positive findings in meat and bone meal are not relevant to food-producing animals for which this kind of feed is prohibited. A marked increase was observed in reports of *Salmonella* contaminated fish meal (9.1 % in 2010 compared with 0.7 % in 2009), making this the highest proportion of positive samples of all the feed material categories. This rise in contamination is related to the reporting of 108 positive batch samples out of 431 analysed in Germany.

Increases in the proportion of positive samples were also reported in cereals in 2010 (0.9 % in 2010, 0.4 % in 2009) and in oil seeds and products thereof (1.5 % in 2010, 1.3 % in 2009), meaning that meat and bone meal had the lowest reported *Salmonella* contamination among the feed materials in 2010.

From feed materials from oil seeds and oil seed products Poland reported 23 positive batch samples (4.6 %) out of 497 batches tested from soya derived feed material; Denmark reported 15 positive batch samples (6.1 %) out of 247 tested for soya derived feed from feedmills; and the Czech Republic detected 15 positive batch samples (4.4 %) out 340 tested of rapeseed derived feed material.

In compound feedingstuffs, the finished feed for animals, the proportion of *Salmonella*-positive findings in 2010 ranged from 0 % to 9.1 % in cattle feed, from 0 % to 3.6 % in pig feed and from 0 % up to 1.6 % in poultry feed among the reporting MSs (Table SA29). The largest reported proportion of positive samples was 9.1 % from compound feeds for cattle from Luxembourg. The overall proportion of positive samples in compound feedingstuffs for cattle and pigs in reporting MSs remained relatively stable from 2008 to 2010, with on average 0.4 %-0.7 % positive samples in cattle feedingstuffs and 0.5 %-0.7 % positive samples in pig feedingstuffs. The encouraging development was that contamination of poultry feedingstuffs reduced from 1.0 % in 2009 to 0.5 % in 2010.

The Netherlands reported large numbers of units tested for all three compound feedingstuffs and a very low proportion of contamination (≤0.3 %), with the highest reported in compound feedingstuffs for pigs (0.3 %). Poland reported a decrease in contamination in all three compound feedingstuffs types, although it remained at relatively high levels, with contamination of cattle feedingstuffs reducing from 3.5 % in 2009 to 1.5 % in 2010, pig feedingstuffs declining from 1.0 % to 0.9 % and poultry feedingstuffs reducing from 1.4 % to 1.2 %.

It should be highlighted that the reported percentages of positive single samples/batches might not always be representative of feedingstuffs on the national markets, as reports might reflect intensive sampling of high risk products or skewed sampling amongst commercial organisations. The national reports include only limited information regarding the sampling strategy.

There were few reports on the occurrence of *S*. Enteritidis and *S*. Typhimurium in feedingstuffs. *S*. Enteritidis was detected in compound feedingstuffs for poultry in the Czech Republic (one batch sample, final product), compound feedingstuffs for cattle in Luxembourg (four batch samples, final product) and compound feedingstuffs for pigs in Slovakia (one batch sample, final product). *S*. Enteritidis was also detected in Norway in samples from unspecified compound feedingstuffs (two single samples, process control). In feed material, *S*. Enteritidis was found in barley derived feed materials (Luxembourg, one batch sample), meat meal (Spain, two single samples), offal meal (Slovakia, one batch sample), fish meal (Spain, two single samples), soya derived feed (Netherlands, one batch sample; Luxembourg, one batch sample), rape seed derived feed (Czech Republic, one batch sample) and ‘other feed material’ (the United Kingdom, one batch sample).

*S*. Typhimurium was not detected in compound feedingstuffs for poultry, but was detected in cattle compound feedingstuffs in Finland (one single sample, final product) and Latvia (one batch sample, final product), and compound feedingstuffs for pigs from France (one batch sample, final product). Further reporting of *S*. Typhimurium from compound feedingstuffs came from the Czech Republic (one single sample of unspecified type) and Norway (two single process control samples for fish feed and one single process control sample of unspecified type). In other feedingstuffs, *S*. Typhimurium was detected in cereal grain derived feed materials (one from Spain and seven from Finland, single samples), feather meal (Latvia, one single sample), offal meal (Slovakia, one batch sample), oil seed derived feed materials (three from the Netherlands, one from Sweden and one from France, all batch samples) and forages and roughages (Germany, one single sample).

The serovar distribution of the reported *Salmonella* findings in feedingstuffs is presented in section 3.1.6.

For more information on reported data, refer to the level 3 tables.

***Table SA28.* Salmonella *in animal and vegetable derived feed material, 2008-2010***

| EU Totals | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|
| | N | % pos | N | % pos | N | % pos |
| Fish meal | 1,818 | 9.1 | 1,362 | 0.7 | 1,688 | 2.1 |
| Meat and bone meal | 5,436 | 0.6 | 6,015 | 1.4 | 8,399 | 1.0 |
| Cereals | 3,035 | 0.9 | 3,633 | 0.4 | 5,262 | 0.2 |
| Oil seeds and products | 11,683 | 1.5 | 10,720 | 1.3 | 18,786 | 1.8 |

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

***Table SA29.* Salmonella *in compound feedingstuffs, 2008-2010***

| Feedingstuff | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|
| | N | % pos | N | % pos | N | % pos |
| **Cattle feed** | | | | | | |
| Austria | - | - | - | - | 30 | 0 |
| Belgium | 34 | 0 | 38 | 0 | 55 | 3.6 |
| Bulgaria | - | - | - | - | 162 | 0 |
| Czech Republic | - | - | 67 | 0 | 75 | 0 |
| Estonia | 53 | 3.8 | 86 | 0 | - | - |
| Finland | 317 | 0.3 | 281 | 0 | 287 | 0 |
| France | 350 | 0 | - | - | - | - |
| Germany | 351 | 0.6 | 230 | 0 | 412 | 0.2 |
| Hungary | 49 | 4.1 | 41 | 4.9 | - | - |
| Ireland | 44 | 0 | 34 | 0 | 46 | 0 |
| Italy | - | - | - | - | 51 | 0 |
| Luxembourg | 44 | 9.1 | - | - | 35 | 0 |
| Netherlands | 1,111 | 0.2 | 2,287 | 0.1 | 2,229 | 0.5 |
| Poland | 406 | 1.5 | 260 | 3.5 | 465 | 0.6 |
| Portugal | 38 | 0 | 35 | 0 | 53 | 0 |
| Slovakia | 50 | 0 | 261 | 0.4 | 413 | 0.5 |
| Spain | 56 | 0 | - | - | 77 | 2.6 |
| **Total cattle feed (13 MSs in 2010)** | **2,903** | **0.7** | **3,620** | **0.4** | **4,390** | **0.5** |
| Switzerland | 138 | 0 | 165 | 0 | 119 | 0 |

Table continued overleaf.

***Table SA29 (continued).* Salmonella *in compound feedingstuffs, 2008-2010***

| Feedingstuff | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|
| | N | % pos | N | % pos | N | % pos |
| **Pig feed** | | | | | | |
| Austria | 48 | 0 | - | - | 63 | 1.6 |
| Belgium | 84 | 2.4 | 79 | 2.5 | 56 | 3.6 |
| Czech Republic | 120 | 0 | 372 | 0 | 446 | 0 |
| Denmark | 350 | 0 | - | - | - | - |
| Estonia | 27 | 0 | - | - | - | - |
| Finland | 237 | 0 | 834 | 2.3 | 231 | 0 |
| France | 732 | 0.3 | 76 | 1.3 | - | - |
| Germany | 508 | 0.8 | 219 | 1.8 | 412 | 0.2 |
| Hungary | 186 | 1.1 | 210 | 1.4 | 159 | 0 |
| Italy | - | - | - | - | 176 | 2.3 |
| Latvia | 66 | 3.0 | - | - | - | - |
| Luxembourg | 40 | 0 | - | - | 32 | 3.1 |
| Netherlands | 2,080 | 0.3 | 2,842 | 0.2 | 2,543 | 0.3 |
| Poland | 876 | 0.9 | 577 | 1.0 | 851 | 1.2 |
| Portugal | 57 | 1.8 | 27 | 0 | 78 | 2.6 |
| Romania | 45 | 0 | - | - | - | - |
| Slovakia | 64 | 1.6 | 208 | 0 | 353 | 0.3 |
| Spain | 28 | 3.6 | 35 | 2.9 | 71 | 1.4 |
| **Total pig feed (17 MSs in 2010)** | **5,548** | **0.5** | **5,479** | **0.7** | **5,471** | **0.6** |
| Norway | 34 | 0 | - | - | 58 | 0 |
| Switzerland | 43 | 0 | 31 | 0 | - | - |
| **Poultry feed** | | | | | | |
| Austria | 97 | 0 | 64 | 0 | 204 | 0.5 |
| Belgium | 357 | 1.1 | 372 | 2.2 | 334 | 2.1 |
| Bulgaria | - | - | - | - | 25 | 0 |
| Czech Republic | 259 | 1.5 | 1,291 | 0 | 699 | 0.1 |
| Finland | 128 | 0 | 492 | 4.5 | 83 | 0 |
| France | 2,206 | 0.6 | 283 | 0 | 4,462 | 1.2 |
| Germany | 642 | 1.1 | 2,170 | 1.4 | 1,611 | 2.1 |
| Hungary | 303 | 0.3 | 279 | 0.7 | 200 | 0.5 |
| Ireland | 27 | 0 | - | - | 29 | 0 |
| Italy | - | - | 104 | 4.8 | 259 | 1.2 |
| Latvia | 124 | 1.6 | 52 | 0 | 55 | 5.5 |
| Luxembourg | 28 | 0 | - | - | 29 | 0 |
| Netherlands | 4,797 | 0.1 | 8,411 | 0 | 6,547 | 0.2 |
| Poland | 1,643 | 1.2 | 1,169 | 1.4 | 1,151 | 1.1 |
| Portugal | - | - | 35 | 0 | 48 | 0 |
| Romania | 28 | 0 | - | - | 33 | 0 |
| Slovakia | 73 | 0 | 200 | 3.5 | 499 | 2.0 |
| Slovenia | 30 | 0 | 38 | 10.5 | 35 | 2.9 |
| Spain | 96 | 1.0 | 289 | 18.0 | 36 | 8.3 |
| **Total poultry feed (16 MSs in 2010)** | **10,838** | **0.5** | **15,249** | **1.0** | **16,339** | **0.9** |
| Norway | 44 | 0 | 100 | 0 | 76 | 0 |
| Switzerland | 61 | 0 | 57 | 0 | 39 | 0 |

Note: Data are presented only for sample sizes ≥25. They include results from final products, at process control and unspecified.

### 3.1.5 Evaluation of the impact of *Salmonella* control programmes in poultry

EU MSs have been under the legal obligation to implement *Salmonella* control programmes in breeding flocks of *Gallus gallus* since 1993. For the years 1993 to 2006 these mandatory national control programmes targeted two *Salmonella* serovars: *S.* Enteritidis and *S*. Typhimurium. Starting from 2007, three more serovars, *S.* Infantis, *S.* Virchow and *S.* Hadar, were added to the control programme for breeding flocks of *Gallus gallus*. Regulation (EC) No 2160/2003 laid down similar mandatory *Salmonella* control programmes for flocks of laying hens and broilers, which have been implemented since 2008 and 2009, respectively, and covering the two serovars *S.* Enteritidis and *S*. Typhimurium. Additionally, in 2010, *Salmonella* control programmes were introduced for breeding and fattening turkey flocks. The results from these control programmes have been presented earlier in the Chapter 3.1.3.

Eggs are considered to be the most important source of human salmonellosis cases in the EU, particularly of those caused by *S*. Enteritidis, which is by far the most frequently occurring serovar in the EU and in most MSs. The Biological Hazard panel's recent opinion[24] estimated that around 65 % of human salmonellosis cases in the EU could be attributed to laying hens (eggs). Therefore, in order to evaluate the impact of these control programmes on public health, the incidence of human salmonellosis cases caused by *S*. Enteritidis, the numbers of *Salmonella* food-borne outbreaks caused by eggs and egg products and the prevalence of *S*. Enteritidis in laying hen flocks were examined. However, it should be taken into account that the *Salmonella* control programmes now in place in MSs are intended to have an impact on the whole food chain from farm-to-fork, so a reduction in *Salmonella* at farm level is expected to reduce the risk of salmonellosis in humans, but other control measures along the food chain, during slaughter, processing, distribution, retail and food preparation, are also important in reducing the risk.

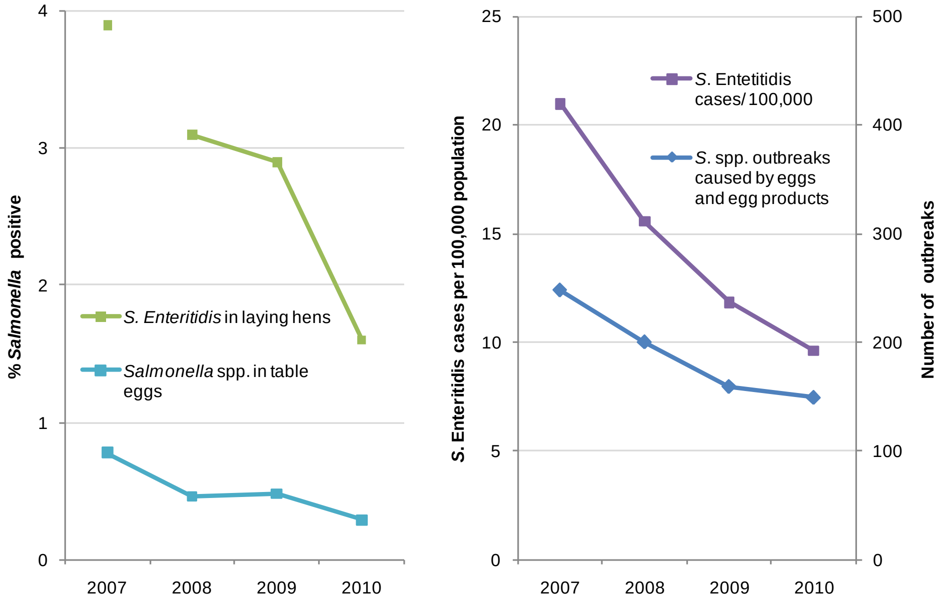
At EU level, the proportion of laying hen flocks sampled during the production period that were infected with *S*. Enteritidis decreased steadily from 3.9 % in 2007 (19 MSs reporting) to 1.6 % in 2010 (27 MSs reporting). During the same period the proportion of table eggs positive for *Salmonella* spp. decreased from 0.8 % in 2007 (16 MSs reporting) to 0.5 % in 2008 and 2009 (15 and 14 MSs reporting, respectively) and further decreased to 0.3 % in 2010 (13 MSs reporting) (Figure SA19). The majority of individual MSs reported a decrease in 2010 in the prevalence of *S*. Enteritidis in laying hen flocks, as compared with 2009, and only four MSs that are mostly small countries or not major egg producers/exporters, reported an increase (Cyprus Lithuania, Malta and Romania) (Figure SA20). In the same period, a 54.3 % drop in the notification rate of human *S*. Enteritidis cases per 100,000 population was observed (from 21.0 to 9.6), with only two MSs (Italy and Luxembourg) reporting an increase in rate (from 0.48 in 2008 to 0.55 in 2010, and from 11.4 to 14.1, respectively). A corresponding 39.9 % reduction in the number of *Salmonella* spp. food-borne outbreaks caused by eggs and egg products was reported in the EU from 2007 to 2010 (a decrease from 248 to 149 outbreaks) (Figure SA19).

An examination of the reporting of notified human *S*. Enteritidis cases between 2009 and 2010 showed a decrease in cases in 16 MSs, and in 10 of them the reduction was statistically significant ($p<0.001$). As shown in the 2009 report, Germany again accounted for about half of the total reduction in reported *S*. Enteritidis cases in the EU (49.2 %). The largest drop (21.1 %) in the reporting rate was seen in the Czech Republic, where the notification rate decreased from 89.4 cases per 100,000 population in 2009 to 68.4 cases per 100,000 population in 2010 (Figure SA21). Despite a general decreasing trend in reported *S*. Enteritidis cases, 10 countries reported more cases in 2010 than in 2009, with five of them reporting a statistically significant increase ($p<0.001$). Slovakia, which had halved the notification rate in 2009, now accounted for the largest increase (41.3 %) in the number of *S*. Enteritidis cases. Differences in reporting over time may have accounted for some of these observed changes in notification rate.

The results above indicate that the reduction of *S.* Enteritidis in laying hen flocks and of *Salmonella* spp. in table eggs is likely to have contributed to the decline of *S.* Enteritidis cases in humans, since eggs are regarded to be the most important source of these infections. Increased voluntary and compulsory vaccination of laying hens, as well as other hygiene-based control measures, are likely to have contributed to this, driven by the economic consequences of egg restrictions and the requirement to heat treat eggs from positive flocks.

24 EFSA, (European Food Safety, Authority), 2010. Scientific Opinion of EFSA Panel on Biological Hazards (BIOHAZ) on a quantitative estimation of the public health impact of setting a new target for the reduction of *Salmonella* in laying hens. EFSA Journal, 8(4):1546, 86 pp.

***Figure SA19.* Salmonella *in human cases, eggs and laying hens and the number of* Salmonella *outbreaks caused by eggs within the EU, 2007-2010***




Note: Data for laying hens and table eggs are presented only for sample sizes ≥25. For laying hens only data from sampling during the production period were included.

***Figure SA20.* *Prevalence of S. Enteritidis-positive laying hen flocks of* Gallus gallus *during the production period for Member States, Norway and Switzerland, 2009-2010***

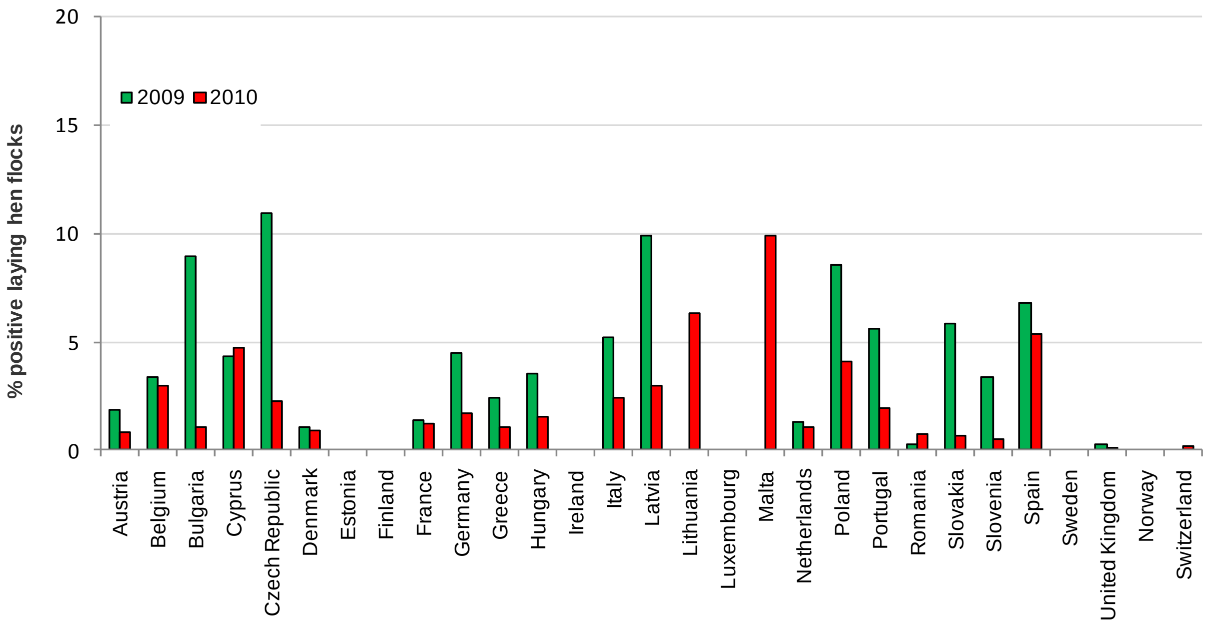
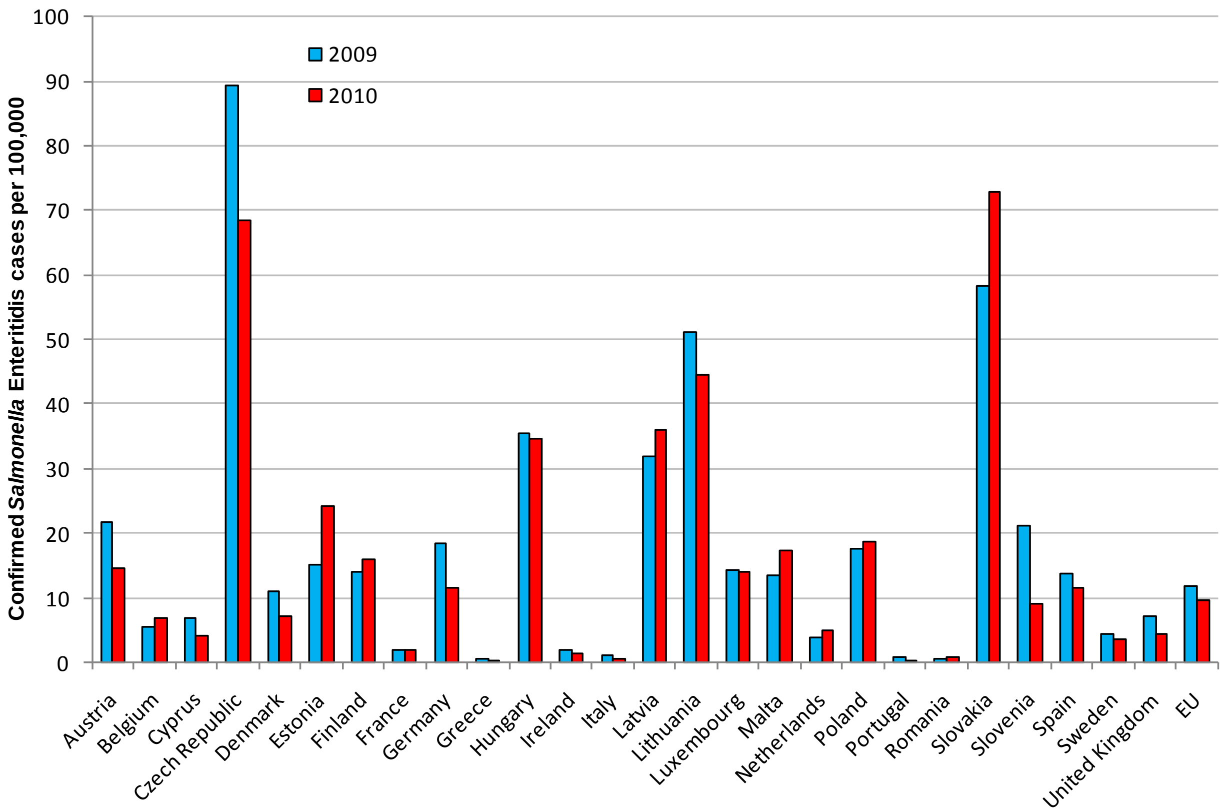


***Figure SA21. Change in S. Enteritidis notification rate (confirmed cases per 100,000) by Member States and EU, 2009-2010. TESSy data for 26 Member States***




## 3.1.6. *Salmonella* serovars

As in previous years, in 2010, the information available on the distribution of *Salmonella* serovars along the food chain varied greatly between countries. In all MSs, the serotyping of *Salmonella* isolates from food, animals and feed is carried out according to the White-Kaufmann-Le Minor Scheme but in some MSs only a proportion of isolates are fully serotyped, and are just reported to species or group level after initial screening to identify possible regulated serovars.

In the following paragraphs, data relating to the 10 most frequently reported serovars among isolates from humans, food, animal species and feedingstuffs are presented. Also reported are the most common phage types of *S.* Enteritidis and *S.* Typhimurium serovars for human cases. For the non-human data, information on serovar distribution is presented from a food chain perspective by comparing serovar distribution in compound feed for specific animal species with serovars from relevant animals and foodstuffs. However, it should be noted that in some categories data are scarce and conclusions should therefore be drawn with great caution. Most MSs reported a subset designated as ‘other serotypes’. For some MSs this may include isolates belonging to the 10 most common serovars in the EU and the relative EU occurrence of some serovars may therefore be underestimated. It should also be noted that, according to EU regulations, the method of analysis for poultry samples is as described in annex D of ISO 6579:2002, which uses a single selective enrichment medium and does not easily allow the identification of non-motile strains, but zoonotic non-motile *Salmonella* strains are not common. In some MSs two selective enrichment media are used, which does facilitate the identification of non-motile strains (e.g. AFNOR standard NF U 47-100). The differences in testing, typing and reporting across the EU, as well as the large differences in the number of serotyped isolates reported between MSs, highlight that comparisons should be made with caution and that MSs reporting large numbers of serovar results will have more influence on the ranking of the common serovars than MSs reporting few results.

For detailed data on serovars in foodstuffs, animals, and feedingstuffs, refer to the level 3 tables.

### Serovars in humans

Information on *Salmonella* serovars in humans was available from 26 MSs (Bulgaria reported no case-based serovar data). The distribution of the 10 most common serovars in humans in the EU is shown in Table SA30 and in Figure SA22. The reporting of monophasic *S.* Typhimurium 1,4,[5],12:i:- was harmonised in 2010, and six countries reported cases according to the new agreed serotype code. As a result of harmonising the reporting, monophasic *S.* Typhimurium entered the top 10 group as the fourth most commonly reported serotype.

As in previous years, the two most commonly reported *Salmonella* serovars in 2010 were *S*. Enteritidis and *S*. Typhimurium, representing 45.0 % and 22.4 %, respectively, of all reported serovars in human confirmed cases (N=96,745) (Table SA30). The decrease in *S*. Enteritidis serovars continued with 9,819 fewer cases (18.4 %) reported in the EU in 2010 than in 2009. A reduction of 8.8 % in reported cases was also seen for *S*. Typhimurium serovars with a total decrease of 2,088 cases. At the EU level, the impact of reduction in notification rates was -2.1 per 100,000 population (from 11.7 in 2009 to 9.6 in 2010) for *S*. Enteritidis and -0.4 per 100,000 population (from 5.1 in 2009 to 4.7 in 2010) for *S*. Typhimurium. For a more detailed description of *S.* Enteritidis in human population see section 3.1.5 (Evaluation of the impact of *Salmonella* control programmes in poultry).

In 2010, the number of reported *S*. Typhimurium cases decreased in 12 MSs and the reduction was statistically significant (p<0.01) in five MSs (Austria, Denmark, France, Italy and Poland). The most remarkable drop in terms of number of reported *S*. Typhimurium cases was detected in Italy (667 cases, 30.9 %). A total of 12 MSs reported more *S*. Typhimurium cases in 2010 compared to 2009, and two of them presented a significant increase in the reported *S*. Typhimurium cases (Luxembourg and Spain).

*Salmonella* Infantis has been the third most common serovar in the EU since 2006, with the relative proportion steadily increasing from 1.0 % (from 2006 to 2007) through 1.1 % (2008) and 1.6 % (2009) to 1.8 % in 2010. In 2010, *S*. Kentucky cases increased by 69.6 %, while *S*. Virchow cases decreased by 6.9 % from 736 to 685 cases (Table SA30).

The two most frequently reported phage types of *S*. Enteritidis in 2010 were PT4 (16.9 %) and PT8 (15.8 %) although both phage types decreased by 23.7 % and 28.7 % respectively in 2010 compared with 2009 (Table SA31). Two new phage types, PT14 and PT15a entered the list of top 10 *S*. Enteritidis phage types.

For *S*. Typhimurium, DT193 (DT=definitive phage type) was the most common phage type (N=1,243, 21.0 %). This phage type has increased in humans in the EU over the past 10 years and is associated with the dominant clone of monophasic *S*. Typhimurium which is frequently found in pigs and also cattle in Europe. Definitive phage type, DT8 was a new entry on the list with 194 cases reported in 2010 (Table SA31).

***Figure SA22. Distribution of the 10 most common* Salmonella *serovars in humans, TESSy data from 26 Member States, 2010***

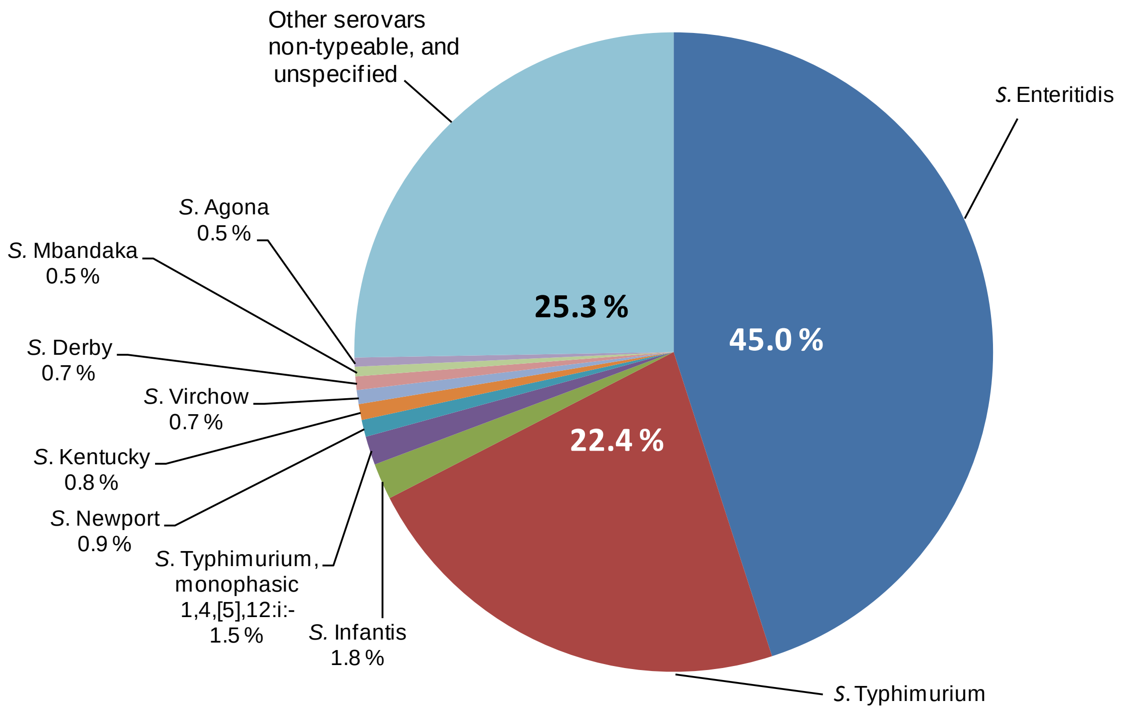



***Table SA30. Distribution of confirmed salmonellosis cases in humans by serovar (10 most frequent serovars), TESSy data, 2009-2010***

| Top Ten TESSy | | | | | |
|---|---|---|---|---|---|
| **2010** | | | **2009** | | |
| **Serotype** | **N** | **%** | **Serotype** | **N** | **%** |
| *S.* Enteritidis | 43,563 | 45.0 | *S.* Enteritidis | 53,382 | 52.3 |
| *S.* Typhimurium | 21,671 | 22.4 | *S.* Typhimurium | 23,759 | 23.3 |
| *S.* Infantis | 1,776 | 1.8 | *S.* Infantis | 1,616 | 1.6 |
| *S.* Typhimurium, monophasic 1,4,[5],12:i:- | 1,407 | 1.5 | *S.* Newport | 760 | 0.7 |
| *S.* Newport | 831 | 0.9 | *S.* Virchow | 736 | 0.7 |
| *S.* Kentucky | 780 | 0.8 | *S.* Derby | 671 | 0.7 |
| *S.* Virchow | 685 | 0.7 | *S.* Hadar | 507 | 0.5 |
| *S.* Derby | 665 | 0.7 | *S.* Kentucky | 460 | 0.5 |
| *S.* Mbandaka | 470 | 0.5 | *S.* Saintpaul | 452 | 0.4 |
| *S.* Agona | 444 | 0.5 | *S.* Bovismorbificans | 433 | 0.4 |
| Other | 24,453 | 25.3 | Other | 19,225 | 18.8 |
| **Total** | **96,745** | **100** | **Total** | **102,001** | **100** |

Source 26 MSs: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

***Figure SA23. Change in S. Typhimurium notification rate (confirmed cases per 100,000) by Member State and EU, 2009-2010. TESSy data from 26 Member States***

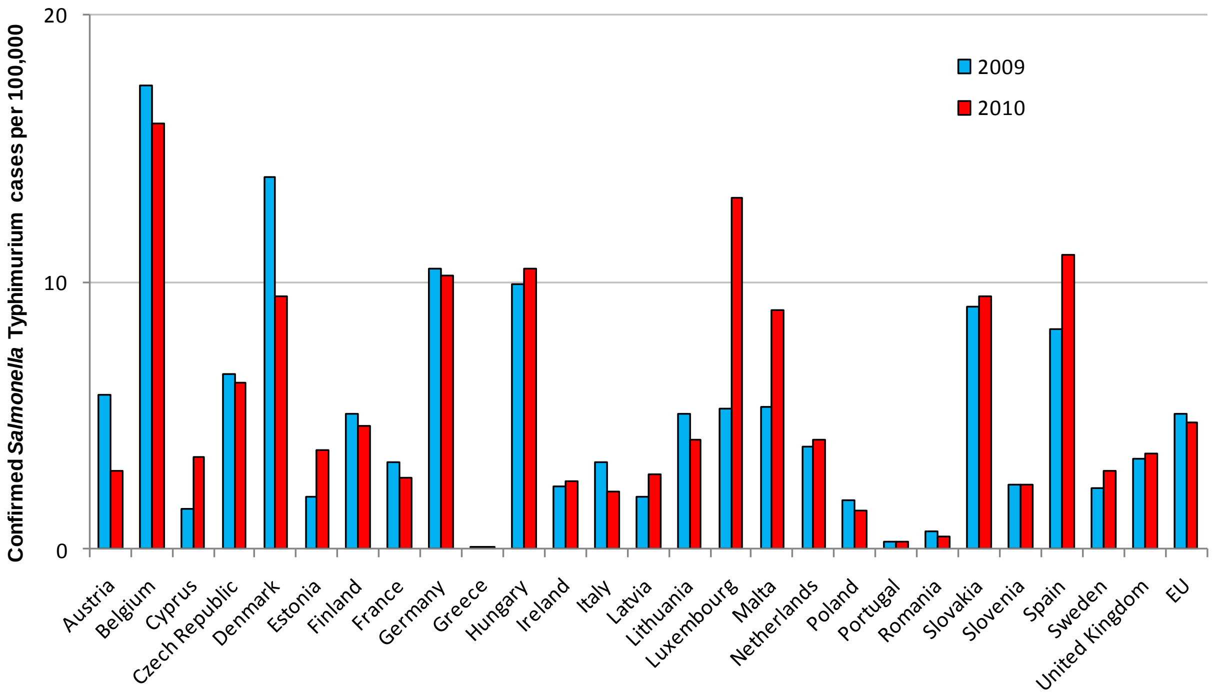



***Table SA31. Distribution of confirmed salmonellosis cases in humans by phage type for S. Enteritidis and S. Typhimurium, 2009-2010, TESSy data***

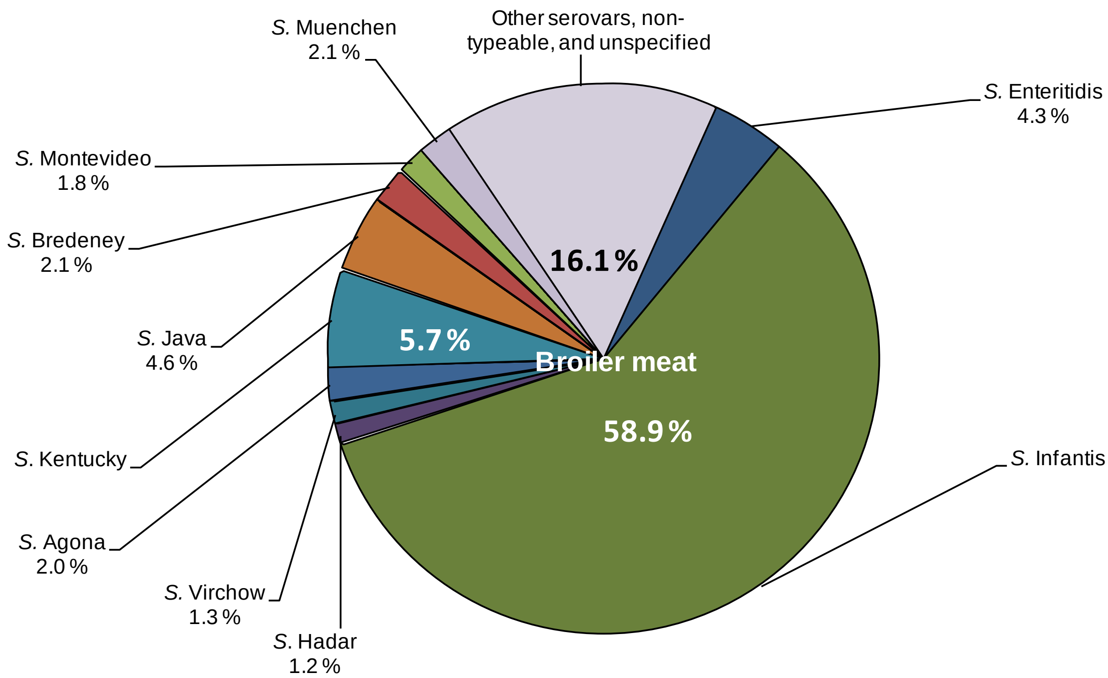
| Top Ten TESSy | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | | | | | | 2009 | | | | | |
| *S.* Enteritidis | | | *S.* Typhimurium | | | *S.* Enteritidis | | | *S.* Typhimurium | | |
| Phage type | N | % | Phage type | N | % | Phage type | N | % | Phage type | N | % |
| PT4 | 1,242 | 16.9 | DT193 | 1,243 | 21.0 | PT8 | 1,632 | 16.4 | DT193 | 1,370 | 20.3 |
| PT8 | 1,164 | 15.8 | DT120 | 583 | 9.9 | PT4 | 1,628 | 16.3 | DT120 | 673 | 10.0 |
| PT1 | 914 | 12.4 | RDNC | 555 | 9.4 | PT1 | 1,285 | 12.9 | DT104 | 589 | 8.7 |
| PT21 | 557 | 7.6 | DT104 | 547 | 9.2 | PT14b | 953 | 9.6 | DT104b | 425 | 6.3 |
| RDNC | 463 | 6.3 | U302 | 319 | 5.4 | PT21 | 890 | 8.9 | RDNC | 376 | 5.6 |
| PT14b | 451 | 6.1 | DT104b | 273 | 4.6 | PT6 | 833 | 8.3 | U302 | 361 | 5.3 |
| PT2 | 450 | 6.1 | DT195 | 264 | 4.5 | RDNC | 484 | 4.9 | U311 | 343 | 5.1 |
| PT6 | 434 | 5.9 | NT | 234 | 4.0 | PT2 | 226 | 2.3 | DT195 | 315 | 4.7 |
| PT14 | 143 | 1.9 | U311 | 232 | 3.9 | PT13a | 192 | 1.9 | NT | 305 | 4.5 |
| PT15a | 141 | 1.9 | DT8 | 194 | 3.3 | PT51 | 181 | 1.8 | DT191 | 237 | 3.5 |
| Other | 1,394 | 19.0 | Other | 1,471 | 24.9 | Other | 1,675 | 16.8 | Other | 1,769 | 26.2 |
| **Total** | **7,353** | **100** | **Total** | **5,915** | **100** | **Total** | **9,979** | **100** | **Total** | **6,763** | **100** |

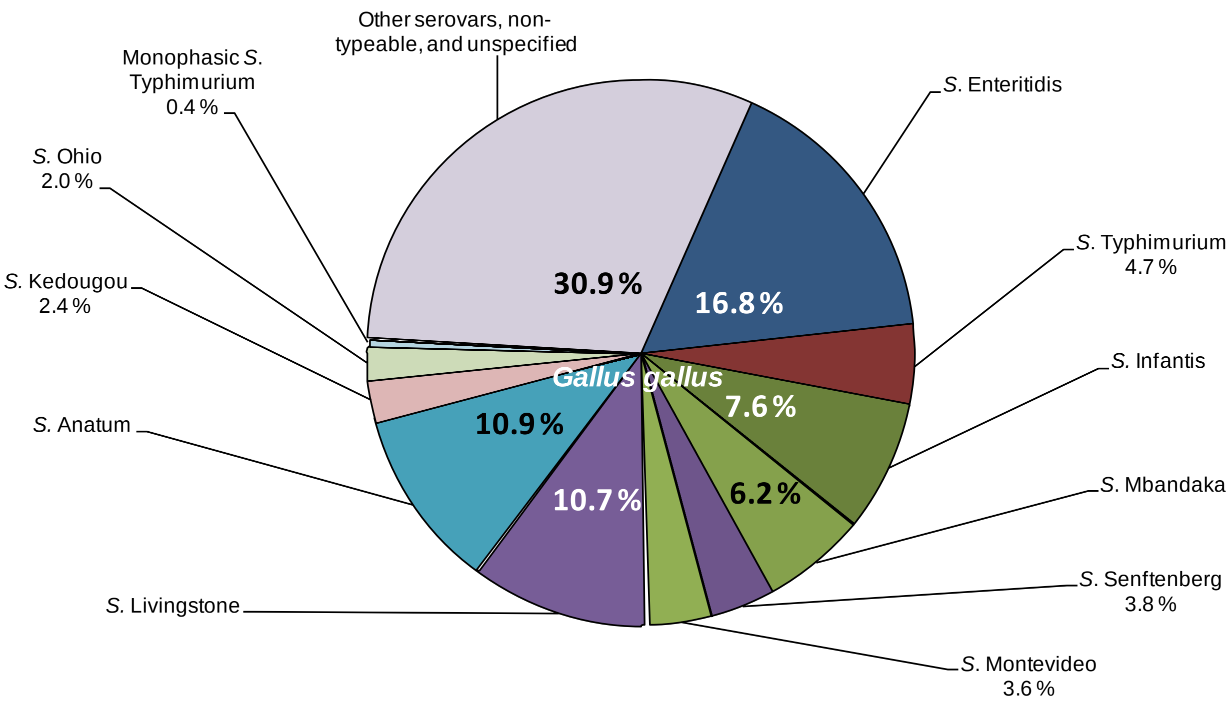
NT: not typeable; RDNC: reacts but does not conform.

Source 14 MSs: Austria, Cyprus, Denmark, Estonia, Germany, Hungary, Ireland, Italy, Netherlands, Romania, Spain, Slovakia, Sweden and United Kingdom.

### Serovars in poultry production

***Figure SA24. Distribution of the 10[1] most common* Salmonella *serovars in broiler meat and* Gallus gallus*, 2010***




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

1. For *Gallus gallus* 11 serovars have been included to show also data on monophasic *S*. Typhimurium.

Graph on broiler meat includes data from 10 MSs (Austria, Czech Republic, France, Germany, Hungary, Ireland, Italy, Netherlands, Poland and Romania), N=2,189.

Graph on *Gallus gallus* includes data from 16 MSs (Austria, Czech Republic, Denmark, France, Germany, Greece, Italy, Latvia, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom), N=8,968.

## Broiler meat

In 2010, 10 MSs reported data on *Salmonella* serovar distribution in broiler meat. As in 2008 and 2009, *S*. Infantis was by far the most frequently reported serovar from broiler meat in the EU (58.9 %) (Figure SA24 and Table SA32). However, as in 2008 and 2009, this result was mainly due to a high number of isolates from Hungary where this serovar is dominant (96.0 % of all isolates), but also in Austria and Romania more than 70 % of all reported findings of *Salmonella* in broiler meat were *S*. Infantis. *S*. Kentucky (5.7 %) was the second most common serovar owing to a high prevalence among isolates from Ireland (69.6 %). *S*. Java (4.6 %) was the third most frequently reported serovar, as a result of a very high prevalence in the Netherlands (53.5 %) and a high prevalence in Germany (20.7 %). *S*. Enteritidis (4.3 %) was the fourth most frequently reported serovar, and was isolated in all but two of the reporting MSs. The Czech Republic reported the highest proportion for *S*. Infantis and *S*. Agona (21.8 %), whereas Italy reported 16.4 % of isolates of *S*. Muenchen and 14.2 % isolates of *S*. Montevideo.

*S*. Typhimurium was the fifth most common serovar in 2009 but was not present in the top 10 in 2010. This change may be due to the reduction in the reporting of *S*. Typhimurium by Germany, which reported the majority of *S*. Typhimurium isolates in 2009 (32 isolates) but only one isolate in 2010. In Germany, an active monitoring programme on *Salmonella* in broiler meat was run in 2009 and isolates reported were included in the overall figure. As no similar programme was run in 2010, the number of *Salmonella* isolates reported by Germany in 2010 was lower. The number of MSs reporting serovar information was very similar between the years, with 13 of the 14 MSs reporting in 2009 present in 2010.

The number of reported serotyped isolates from broiler meat in 2010 increased to 2,189 from 1,349 in 2009.

New serovars among the 10 most common serovars in broiler meat in 2010 were *S*. Kentucky (5.7 %), *S*. Muenchen (2.1 %), *S*. Montevideo (1.8 %) and *S*. Virchow (1.3 %) replacing *S*. Senftenberg, *S*. 1,4,5,12:i:-, *S*. Typhimurium and *S*. Coeln.

***Table SA32. Distribution[1] of the 10 most common* Salmonella *serovars in broiler meat, 2010***

| Country | No of isolates serotyped | % positive | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | S. Infantis | S. Kentucky | S. Java [2] | S. Enteritidis | S. Bredeney | S. Muenchen | S. Agona | S. Montevideo | S. Virchow | S. Hadar | Other serovars, non-typeable, and unspecified |
| **Total no of isolates** | **2,189** | **1,289** | **124** | **100** | **95** | **45** | **45** | **44** | **39** | **29** | **27** | **352** |
| Austria | 36 | 75.0 | - | - | 2.8 | - | - | - | - | - | - | 22.2 |
| Czech Republic | 124 | 21.8 | - | - | 10.5 | - | - | 21.8 | 0.8 | 7.3 | - | 37.9 |
| France | 16 | - | - | 6.3 | 6.3 | - | 6.3 | - | - | - | - | 81.3 |
| Germany | 184 | 8.7 | 0.5 | 20.7 | 17.4 | 0.5 | - | - | - | 1.6 | 0.5 | 50.0 |
| Hungary | 1,156 | 96.0 | 0.3 | - | - | 0.5 | - | - | - | 0.2 | - | 2.9 |
| Ireland | 168 | 0.6 | 69.6 | - | - | 0.6 | - | 8.3 | - | 4.2 | - | 16.7 |
| Italy | 268 | 5.2 | - | - | 11.6 | 13.1 | 16.4 | - | 14.2 | - | 9.0 | 30.6 |
| Netherlands | 114 | 7.9 | 0.9 | 53.5 | 7.0 | - | - | 2.6 | - | - | - | 28.1 |
| Poland | 27 | 51.9 | 3.7 | - | 11.1 | - | - | - | - | 3.7 | 3.7 | 25.9 |
| Romania | 96 | 74.0 | - | - | 6.3 | 2.1 | - | - | - | 7.3 | 1.0 | 9.4 |
| **Proportion of serotyped isolates** | | **58.9** | **5.7** | **4.6** | **4.3** | **2.1** | **2.1** | **2.0** | **1.8** | **1.3** | **1.2** | **16.1** |

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

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all serovars reported by countries with more than 10 isolates.
2. *S*. Paratyphi B var. Java

### *Gallus gallus*

Sixteen MSs provided information on *Salmonella* serovars in *Gallus gallus* flocks in 2010 (Table SA33). This covers information from breeding flocks, laying hen flocks and broiler flocks. In 2010, *S*. Enteritidis (16.8 %) replaced *S*. Infantis as the most frequently reported serovar, as it had been in 2008. The decrease in *S*. Infantis to the fourth most reported serovar is likely to have been due to Hungary not reporting data for this table in 2010. *S*. Enteritidis was reported in an extremely high proportion in Latvia (97.2 %), although in a limited number of isolates (36), and in a very high proportion in the Czech Republic (59.5 %). Seven MSs reported a high proportion (between 20 % and 50 %) of *S*. Enteritidis, while Sweden was the only MS not reporting the serovar. The second most frequently reported serovar was *S*. Anatum (10.9 %) which was the predominant serovar in France (25.3 %), which reported the most serovar results in 2010. *S*. Livingstone and *S*. Infantis were the third and fourth most frequently reported serovars (10.7 % and 7.6 % respectively). *S*. Mbandaka was the fifth most reported serovar (6.2 %) and was reported as a high proportion of isolates from Portugal (24.2 %), whereas the sixth most common serovar, *S*. Typhimurium (4.7 %), was reported by all but one MS and was the predominant serovar in Sweden (17 out of 19 isolates) and Denmark (11 out of 53 isolates).

Of additional interest was that monophasic *S*. Typhimurium constituted 0.4 % of total isolates serotyped and was reported from five MSs.

The top 10 most common serovars in 2010 were almost identical to 2009, with the only difference being that *S*. Ohio replaced *S*. Hadar. This is associated with persistent sources of infection in feed production, hatcheries or holdings.

For further information of reported data, refer to the level 3 tables.

***Table SA33. Distribution[1] of the 10 most[2] common* Salmonella *serovars in* Gallus gallus*, 2010***

| Country | No of isolates serotyped | % positive | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *S.* Enteritidis | *S.* Anatum | *S.* Livingstone | *S.* Infantis | *S.* Mbandaka | *S.* Typhimurium | *S.* Senftenberg | *S.* Montevideo | *S.* Kedougou | *S.* Ohio | Monophasic *S.* Typhimurium | Other serovars, non-typeable, and unspecified |
| **Total no of isolates** | **8,968** | **1,507** | **980** | **957** | **686** | **556** | **420** | **344** | **326** | **212** | **176** | **37** | **2,767** |
| Austria | 279 | 40.9 | - | 0.4 | 10.8 | 3.2 | 10.0 | 0.7 | 8.2 | 0.4 | - | - | 25.4 |
| Czech Republic | 393 | 59.5 | - | - | 18.8 | - | 1.0 | - | 1.0 | - | 2.0 | - | 17.6 |
| Denmark | 53 | 9.4 | - | 1.9 | 17.0 | 1.9 | 20.8 | 1.9 | - | - | - | 3.8 | 43.4 |
| France | 3,803 | 3.0 | 25.3 | 18.1 | 1.1 | 6.9 | 5.0 | 5.5 | 3.2 | 1.9 | 0.5 | 0.6 | 29.0 |
| Germany | 503 | 41.7 | 2.2 | 3.2 | 3.2 | 1.6 | 7.4 | 5.6 | 1.2 | - | 1.0 | 1.2 | 31.8 |
| Greece | 95 | 23.2 | - | 3.2 | 6.3 | 3.2 | 9.5 | - | - | 1.1 | - | 1.1 | 52.6 |
| Italy | 860 | 12.8 | - | 11.7 | - | 7.0 | 4.5 | - | 3.5 | - | - | - | 60.5 |
| Latvia | 36 | 97.2 | - | - | 2.8 | - | - | - | - | - | - | - | - |
| Poland | 677 | 48.2 | - | - | 14.3 | 7.2 | 5.8 | 2.1 | - | - | - | - | 22.5 |
| Portugal | 178 | 27.0 | - | - | - | 24.2 | 1.7 | 1.7 | 1.1 | 0.6 | 0.6 | - | 43.3 |
| Romania | 658 | 10.9 | - | 8.2 | 41.8 | 1.5 | 0.9 | 2.3 | 7.4 | - | - | - | 26.9 |
| Slovakia | 201 | 36.8 | - | - | 33.3 | - | 5.5 | - | 1.0 | - | - | - | 23.4 |
| Slovenia | 66 | 3.0 | - | - | 28.8 | - | 1.5 | - | 12.1 | - | 1.5 | - | 53.0 |
| Spain | 472 | 28.4 | 0.8 | 1.7 | 10.0 | 3.4 | 2.8 | 1.9 | 0.8 | 0.4 | 9.5 | - | 40.3 |
| Sweden | 19 | - | - | 10.5 | - | - | 89.5 | - | - | - | - | - | - |
| United Kingdom | 675 | 1.0 | 0.6 | 12.3 | 0.4 | 13.8 | 1.6 | 9.2 | 11.6 | 20.1 | 14.2 | 1.0 | 14.1 |
| **Proportion of serotyped isolates** | | **16.8** | **10.9** | **10.7** | **7.6** | **6.2** | **4.7** | **3.8** | **3.6** | **2.4** | **2.0** | **0.4** | **30.9** |

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

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all serovars reported by countries with more than 10 isolates.
2. Monophasic *S.* Typhimurium has been also included for *Gallus gallus*.

### Compound feed for *Gallus gallus*

In total, two MSs provided data on the serovar distribution in compound feed for poultry, with only 12 isolates reported. The most common serovar in compound feed for poultry was *S.* Livingstone (9 of 12 isolates) which was also the third most prevalent serovar in *Gallus gallus* (10.7 %). However, the MSs reporting serovar distributions in broiler meat, fowl and feed are not the same, so a meaningful comparison is not possible.

### Serovars in turkey meat production

***Figure SA25. Distribution of the 10 most common* Salmonella *serovars in turkey meat, fattening turkeys and all turkeys (fattening and breeding), 2010***

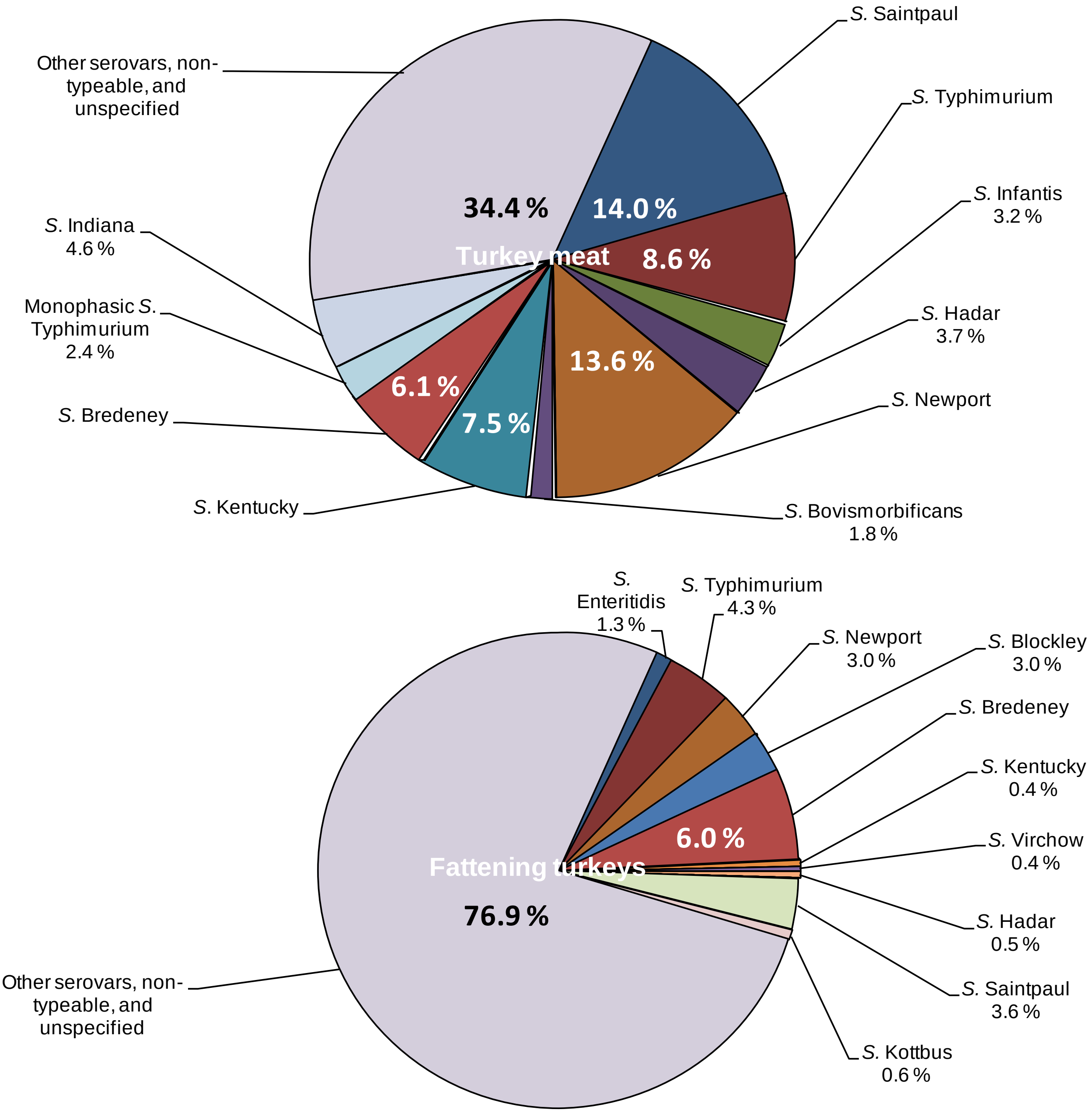
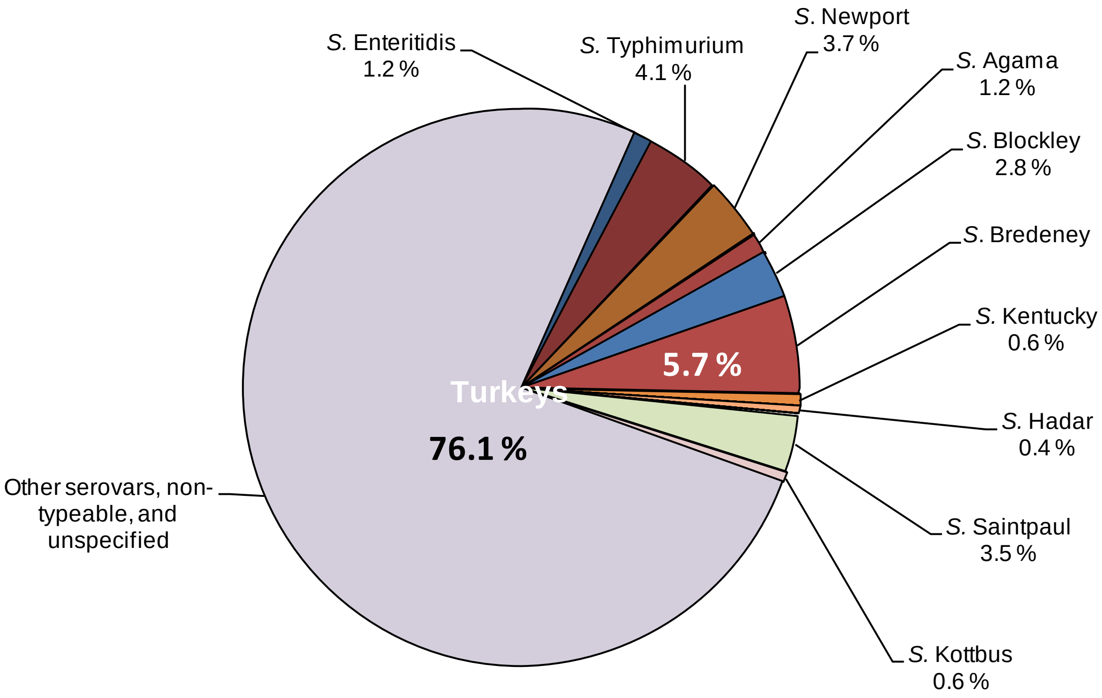



Chart continued overleaf.

***Figure SA25 (continued). Distribution of the 10 most common* Salmonella *serovars in turkey meat, fattening turkeys and all turkeys (fattening and breeding), 2010***




Note: Data are included only for MS sample sizes ≥10.
Graph on turkey meat includes data from 7 MSs (Austria, Czech Republic, France, Germany, Hungary, Italy and Poland), N= 947.
Graph on fattening turkeys includes data from 17 MSs (Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Poland, Romania, Slovenia, Spain and United Kingdom) and one non-MS (Switzerland), N=2,199.
Graph on turkeys includes data from 17 MSs (Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Poland, Romania, Slovenia, Spain and United Kingdom) and one non-MS (Switzerland), N=2,315.

## Turkey meat

Seven MSs reported on the serovar distribution in turkey meat in 2010. *S*. Saintpaul was the most common single serovar (14.0 %), being present in all but one of the reporting MSs, although this serovar was predominant only in Austria (Figure SA25 and Table SA34). *S*. Newport was the second most commonly reported (13.6 %) and was the predominant serovar for two of the MSs (the Czech Republic and Italy). *S*. Typhimurium and *S*. Kentucky were the third and fourth most common serovars (8.6 % and 7.5 %, respectively). *S*. Typhimurium was the predominant serovar in Germany, and *S*. Kentucky was predominant in Hungary. Of specific interest, monophasic *S*. Typhimurium was the ninth most common serovar reported (2.4 %) and was found in Germany and France.

### *Table SA34. Distribution[1] of the 10 most common* Salmonella *serovars in turkey meat, 2010*

| Country | No of isolates serotyped | % positive | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *S.* Saintpaul | *S.* Newport | *S.* Typhimurium | *S.* Kentucky | *S.* Bredeney | *S.* Indiana | *S.* Hadar | *S.* Infantis | Monophasic *S.* Typhimurium | *S.* Bovismorbificans | Other serovars, non-typeable, and unspecified |
| **Total no of isolates** | **947** | **133** | **129** | **81** | **71** | **58** | **44** | **35** | **30** | **23** | **17** | **326** |
| Austria | 35 | 40.0 | - | 8.6 | 8.6 | 11.4 | - | - | 2.9 | - | - | 28.6 |
| Czech Republic | 27 | 40.7 | 59.3 | - | - | - | - | - | - | - | - | - |
| France | 45 | 4.4 | - | 4.4 | - | 8.9 | 37.8 | 6.7 | - | 2.2 | - | 35.6 |
| Germany | 316 | 18.7 | 7.6 | 19.0 | 4.7 | 5.4 | 8.5 | 4.1 | 0.6 | 7.0 | 0.9 | 23.4 |
| Hungary | 176 | 12.5 | - | 1.1 | 30.1 | 14.8 | - | 8.5 | 15.3 | - | 8.0 | 9.7 |
| Italy | 163 | 15.3 | 54.6 | 8.6 | | 4.3 | - | 2.5 | - | - | - | 14.7 |
| Poland | 185 | - | - | - | - | - | - | - | - | - | - | 100 |
| **Proportion of serotyped isolates** | | **14.0** | **13.6** | **8.6** | **7.5** | **6.1** | **4.6** | **3.7** | **3.2** | **2.4** | **1.8** | **34.4** |

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all serovars reported by countries with more than 10 isolates.

## Turkeys

In 2010, information on the serovar distribution in turkeys was provided in the prevalence tables by 17 MSs, with 17 MSs reporting data on fattening flocks and six MSs reporting on breeding flocks (Figure SA25 and Table SA35). As opposed to the serotyping and investigation of the serovar distribution for food and non-turkey animal species, according to Regulation (EC) No 584/2008, all *Salmonella* isolates from turkeys originating from the official control programmes were to be serotyped and reported. The most commonly reported serovar was *S*. Bredeney (5.7 %, found in only two MSs), which was the predominant serovar detected in Italy. *S*. Typhimurium was the second serovar (4.1 %), reported by eight MSs. The third and fourth most commonly isolated serovars were *S*. Newport (3.7 %) and *S*. Saintpaul (3.5 %), reported by five and six MSs, respectively. *S*. Blockley was the fifth serovar (2.8 %) and was reported by only one country. *S*. Enteritidis was the seventh most common serovar (1.2 %) and was reported by six MSs. *S*. Agama was reported at the same level as *S*. Enteritidis, but reported by only one country.

### *Table SA35. Distribution[1] of the 10 most common* Salmonella *serovars in turkeys, 2010*

| Country | Flock type | No of isolates serotyped | % positive | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *S.* Bredeney | *S.* Typhimurium | *S.* Newport | *S.* Saintpaul | *S.* Blockley | *S.* Agama | *S.* Enteriditis | *S.* Hadar | *S.* Kentucky | *S.* Kottbus | Other serovars, non-typeable, and unspecified |
| **Total no. of isolates** | | **2,315** | **133** | **74** | **107** | **80** | **65** | **28** | **28** | **10** | **14** | **14** | **1,762** |
| Czech Republic | breeding flocks | 10 | - | - | 50.0 | - | - | - | - | - | 50.0 | - | - |
| France | breeding flocks | 34 | - | - | - | - | - | - | - | - | - | - | 100 |
| Italy | breeding flocks | 47 | - | - | 29.8 | - | - | 59.6 | - | - | - | - | 10.6 |
| Poland | breeding flocks | 9 | - | - | - | - | - | - | - | - | - | - | 100 |
| Spain | breeding flocks | 9 | - | 11.1 | - | - | - | - | - | - | - | - | 88.9 |
| United Kingdom | breeding flocks | 7 | - | - | - | - | - | - | - | - | - | - | 100 |
| Austria | fattening flocks | 31 | 3.2 | - | - | 35.5 | - | - | 3.2 | - | - | 41.9 | 16.1 |
| Belgium | fattening flocks | 1 | - | - | - | - | - | - | - | - | - | - | 100 |
| Czech Republic | fattening flocks | 54 | - | 1.9 | 57.4 | 13.0 | - | - | 1.9 | 1.9 | 16.7 | 1.9 | 5.6 |
| Denmark | fattening flocks | 1 | - | - | - | 100 | - | - | - | - | - | - | - |
| France | fattening flocks | 726 | - | 5.8 | - | - | - | - | 1.9 | - | - | - | 92.3 |
| Germany | fattening flocks | 10 | - | 40.0 | - | - | - | - | 10.0 | - | - | - | 50.0 |
| Greece | fattening flocks | 1 | - | - | 100 | - | - | - | - | - | - | - | - |
| Hungary | fattening flocks | 6 | - | 66.7 | - | - | - | - | 16.7 | - | - | - | 16.7 |
| Ireland | fattening flocks | 1 | - | - | - | - | - | - | - | - | - | - | 100 |
| Italy | fattening flocks | 438 | 30.1 | 0.9 | 6.8 | 13.2 | 14.8 | - | - | 1.6 | - | - | 32.4 |
| Lithuania | fattening flocks | 1 | - | - | - | - | - | - | - | - | - | - | 100 |
| Netherlands | fattening flocks | 6 | - | - | - | - | - | - | - | - | - | - | 100 |
| Poland | fattening flocks | 177 | - | 7.9 | - | - | - | - | 5.6 | 1.1 | - | - | 85.3 |
| Romania | fattening flocks | 7 | - | - | 57.1 | 28.6 | - | - | - | - | - | - | 14.3 |
| Slovenia | fattening flocks | 1 | - | - | - | 100 | - | - | - | - | - | - | - |
| Spain | fattening flocks | 261 | - | - | 8.4 | - | - | - | - | - | - | - | 91.6 |
| United Kingdom | fattening flocks | 475 | - | 0.8 | - | - | - | - | - | - | - | - | 99.2 |
| Switzerland | fattening flocks | 2 | - | - | - | - | - | - | - | - | - | - | 100 |
| **Proportion of serotyped isolates** | | | **5.7** | **4.1** | **3.7** | **3.5** | **2.8** | **1.2** | **1.2** | **0.4** | **0.6** | **0.6** | **76.1** |

1. The serovar distribution (% isolates) was based on the number of all isolates serotyped, including non-typeable isolates. Ranking was based on the sum of all serovars reported by countries.
Note: Data from the prevalence table were used.
Note: Austria and the Czech Republic reported more than one serotype found in the same flock.

### *Monophasic* S. Typhimurium *and* S. Typhimurium-like *strains detected in poultry flocks and poultry meat*

Seven MSs reported monophasic *S*. Typhimurium (*S*. 1,4,[5],12:i:-, *S*. 1,4,5,12:i:-, *S*. 4,5,12:i:-, *S*. 1,4,12:i:- or *S*. 4,12:i:-) and/or *S*. Typhimurium-like strainsin poultry flocks and/or poultry meat (Table SA36). Germany reported the greatest number of isolates (56), followed by France (25). The highest number of monophasic *S*. Typhimurium cases was reported by Germany in meat from turkeys (22 isolates) and by France in broiler flocks of *Gallus gallus* (21 flocks), although isolates were detected in a diverse range of sources from broilers, laying hens, turkeys and ducks. The differences in reported number of isolates between MSs may be a result of differences in typing, or reporting or monitoring activities between countries, or may be real differences.

The MSs not included in this table did not detect any *S*. Typhimurium-like strains or monophasic *S*. Typhimurium in poultry flocks and poultry meat.

***Table SA36. Distribution of S. Typhimurium-like strains and monophasic S. Typhimurium detected in poultry flocks and poultry meat, 2010.***

| Country | Poultry species | Flock description | No of isolates serotyped | Monophasic *S.* Typhimurium* | *S.* 4,[5],12:-:1,2 | *S.* 4,[5], 12:-:- | *S.* 1,4,5,12:-:1,2 | *S.* 1, 4,5, 12:-:- |
|---|---|---|---|---|---|---|---|---|
| Denmark | *Gallus gallus* (fowl) | broiler flocks | 45 | 2 | - | - | - | - |
| France | *Gallus gallus* (fowl) | broiler flocks | 3,498 | 21 | - | - | 10 | 2 |
| France | Turkeys | breeding flocks | 35 | 4 | - | - | - | - |
| France | Turkeys | fattening flocks | 714 | - | - | - | 2 | 3 |
| Germany | *Gallus gallus* (fowl) | | 257 | 4 | - | - | - | - |
| Germany | *Gallus gallus* (fowl) | laying hens | 145 | 2 | - | - | 1 | - |
| Germany | Meat from broilers (*Gallus gallus*) | | 184 | 7 | - | - | - | - |
| Germany | Other poultry | | 208 | 10 | - | - | - | - |
| Germany | Meat from turkeys | | 316 | 22 | - | - | - | - |
| Germany | Turkeys | | 152 | 10 | - | - | - | - |
| Germany | Turkeys | meat production flocks | 11 | 1 | - | - | - | - |
| Greece | *Gallus gallus* (fowl) | | 95 | 1 | - | - | - | - |
| Ireland | Meat from broilers (*Gallus gallus*) | | 168 | 2 | - | - | - | - |
| Netherlands | Meat from broilers (*Gallus gallus*) | | 114 | 4 | - | - | - | - |
| United Kingdom | Ducks | | 83 | 1 | - | - | - | - |
| United Kingdom | *Gallus gallus* (fowl) | | 675 | 7 | - | - | - | - |
| **Total (7 MSs)** | | | **6,700** | **98** | | | **13** | **5** |

**S.* 1,4,[5],12:i:- / *S.* 1,4,5,12:i:- / *S.* 4,5,12:i:- / *S.* 1,4,12:i:- / *S.* 4,12:i:-
Note: Results present the likely and possible monophasic *S.* Typhimurium strains.
These data originate from prevalence tables as well as from serovar distribution tables. See section 6.3.1 in the 'Materials and methods' chapter.

Monophasic *S.* Typhimurium

An EFSA BIOHAZ Panel assessment[25] informed that strains defined as *S.* Typhimurium possess two phases of H-antigens: in phase 1 this is H-antigen 'i' and in phase 2 they are H-antigens '1, 2'. These are universally regarded as 'classic' *S.* Typhimurium strains (antigenic formula: 1,4,[5],12:i:1,2). Antigenic variants that lack either the first or the second phase H antigen, or both, have been described (antigenic formulas respectively: 1,4,[5],12:-:1,2, or 1,4,[5],12:i:-, or 1,4,[5],12:-:-). Such variants have been termed '*Salmonella* Typhimurium-like' strains. Within these *Salmonella* Typhimurium-like strains, monophasic variants lacking the second phase H antigen (1,4,[5],12:i:-) are referred to as 'monophasic *S.* Typhimurium'.

Monophasic *S.* Typhimurium strains are believed to have emerged in EU countries and MSs over the last two decades and have rapidly increased in prevalence in cases of human illness over a relatively short time period, overall from 360 cases in 2007 to 1,416 in 2009 with a rise also in the number of countries reporting monophasic *S.* Typhimurium. The BIOHAZ Panel opinion concluded that these monophasic *S.* Typhimurium strains are growing in prominence within EU MSs and that greater harmonisation of typing and characterisation would enable greater analysis of the emergence and spread of monophasic strains. As MSs are required to meet a reduction target for certain serovars, including *S.* Typhimurium, in certain animal populations, it was important to define which strains were possible monophasic *S.* Typhimurium and would need to be included within the targeted results. The BIOHAZ assessment suggested harmonisation of analytical detection methods and the way the strain is reported within MSs.

The scientific opinion stated that only strains lacking the second phase H antigen were to be defined as monophasic *S.* Typhimurium. Other strains lacking the phase one flagella antigens, or both phase one and two antigens, were possible but had not been commonly reported and so were deemed to be of less importance.

An assessment of the results from the EU baseline surveys showed that monophasic *S.* Typhimurium was not reported in laying hens or broiler flocks, but was detected in 1 of 202 turkey samples between 2006 and 2007 and in broiler carcasses in the 2008 study (15 out of 10,035 samples). It was more commonly found in slaughter pigs between 2006 and 2007 (6 in 5,736 swabs and 128 from 19,071 lymph nodes) and in breeding pigs in 2008 (10 from 1,530 breeding holdings and 22 from 3,278 from production holdings).

The specific monitoring of other *Salmonella* Typhimurium-like strains in human salmonellosiscases and the increased focus on reporting monophasic *S.* Typhimurium from MSs allowed for a clearer assessment of the investigations reported by MSs in 2010. Monophasic *S.* Typhimurium was the fourth most commonly reported serovar in human cases (1.5 %) and was related to three human outbreaks (0.9 % of all *Salmonella* outbreaks). The outbreaks all occurred in Germany and were caused by pig meat or pork buffet meals. The 2010 serovar results from animals and animal products show that monophasic *S.* Typhimurium was the second most common serovar in pigs and the third in pig meat, but also that monophasic *S.* Typhimurium was common in cattle and bovine meat (third most common). Monophasic *S.* Typhimurium was also reported within turkey meat (ninth most common) and in *Gallus gallus* within five MSs.

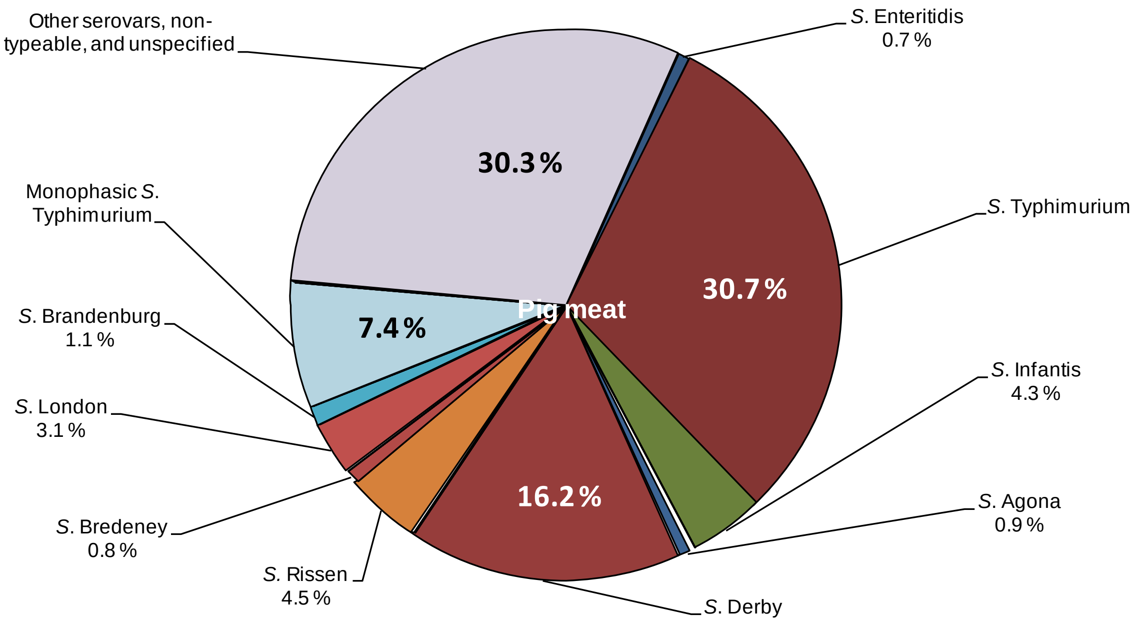
It is clear that monophasic *S.* Typhimurium strains are increasing in poultry and poultry products and that the current tetra-resistant DT193/DT120 'epidemic strain cluster' has spread beyond its initial porcine source[26] in many countries since its emergence in 2006. It is thought that this epidemic potential for dissemination relates to a greater ability to evade the immune system in exposed animals. Human outbreaks have continued but the severity of human disease in terms of systemic infection and mortality rate does not appear to be higher than that of other common strains, and is likely to be less than that associated with *S.* Enteritidis.

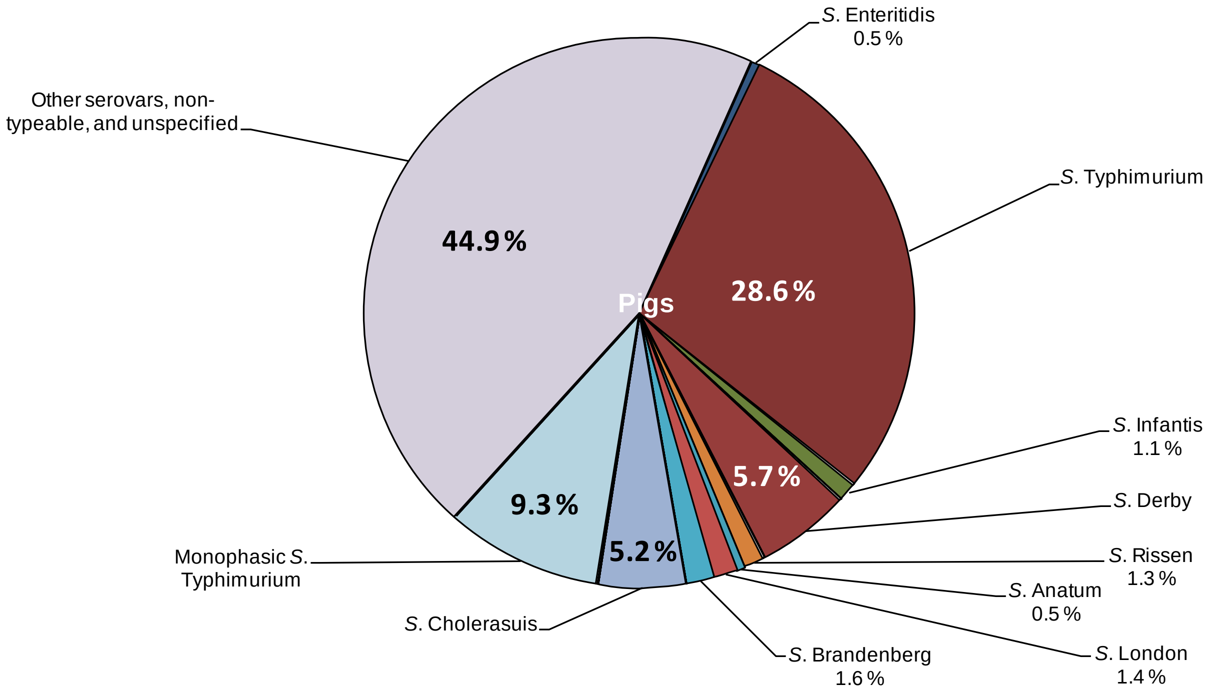
25 EFSA Panel on Biological Hazards (BIOHAZ), 2010. Scientific Opinion on monitoring and assessment of the public health risk of "*Salmonella* Typhimurium-like" strains. EFSA Journal 8(10):1826, 48 pp.

26 Hauser E, Tietze E, Helmuth R, Junker E, Blank K, Prager R, Rabsch W, Appel B, Fruth A, and. Malorny B, 2010. Pork Contaminated with *Salmonella* enterica Serovar 4,[5],12:i:−, an Emerging Health Risk for Humans. Applied and Environmental Microbiology, 76(14): 4601–4610.

### Serovars in pig meat production

***Figure SA26. Distribution of the 10 most common* Salmonella *serovars in pig meat and pigs, 2010***




Note: Data are included only for MS sample sizes ≥10.
Graph on pig meat includes data from 11 MSs (Czech Republic, Denmark, Estonia, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland and Romania), N=1,370.
Graph on pig data includes data from 10 MSs (Austria, Estonia, Germany, Italy, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom), N=3,301.

## Pig meat

Eleven MSs reported data on *Salmonella* serovars in pig meat. As in 2008 and 2009, *S.* Typhimurium (30.7 %) and *S.* Derby (16.2 %) were the most frequently isolated serovars in pig meat (Figure SA26 and Table SA37). *S.* Typhimurium was the most common serovar in all reporting MSs, except in Greece and Italy, where *S.* Typhimurium was second to *S.* Rissen (57.1 %, the fourth most reported serovar) and to *S.* Derby (18.9 %), respectively. The third most reported pig meat serovar was monophasic *S.* Typhimurium (7.4 %), which was reported by five MSs. The tenth most common serovar, *S.* Enteritidis was reported to account for 10.0 % and 4.0 % of isolates from Poland and Hungary, respectively. Compared with 2009, *S.* Agona (which is often related to feed contamination) and *S.* Bredeney replaced *S.* Manhattan and *S.* Livingstone in the top 10.

### *Table SA37. Distribution[1] of the 10 most common* Salmonella *serovars in pig meat, 2010*

| Country | No of isolates serotyped | % positive | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *S.* Typhimurium | *S.* Derby | Monophasic *S.* Typhimurium | *S.* Rissen | *S.* Infantis | *S.* London | *S.* Brandenburg | *S.* Agona | *S.* Bredeney | *S.* Enteritidis | Other serovars, non-typeable, and unspecified |
| **Total no of isolates** | **1,370** | **420** | **222** | **102** | **61** | **59** | **43** | **15** | **13** | **11** | **9** | **415** |
| Czech Republic | 41 | 31.7 | 24.4 | 7.3 | 7.3 | 7.3 | 9.8 | - | - | - | - | 12.2 |
| Denmark | 154 | 31.2 | 29.2 | - | - | 6.5 | 3.2 | 1.3 | - | - | - | 28.6 |
| Estonia | 34 | 38.2 | 11.8 | - | - | 14.7 | - | - | 23.5 | - | - | 11.8 |
| Germany | 262 | 35.9 | 8.0 | 25.6 | 1.1 | 6.1 | 6.1 | 1.1 | - | - | 0.4 | 15.6 |
| Greece | 14 | 35.7 | 7.1 | - | 57.1 | - | - | - | - | - | - | - |
| Hungary | 100 | 30.0 | 14.0 | 14.0 | - | 10.0 | 4.0 | 2.0 | - | - | 4.0 | 22.0 |
| Ireland | 126 | 62.7 | 7.9 | 7.9 | 1.6 | 0.8 | 0.8 | 2.4 | 3.2 | 3.2 | - | 9.5 |
| Italy | 465 | 15.5 | 18.9 | - | 6.9 | 2.4 | 2.8 | - | - | 0.2 | 0.4 | 52.9 |
| Netherlands | 29 | 37.9 | 6.9 | 27.6 | - | 3.4 | - | 3.4 | - | - | - | 20.7 |
| Poland | 10 | 40.0 | - | - | - | 10.0 | - | - | - | - | 10.0 | 40.0 |
| Romania | 135 | 37.8 | 20.0 | - | 9.6 | 0.7 | - | 3.0 | 0.7 | 4.4 | 0.7 | 23.0 |
| **Proportion of serotyped isolates** | | **30.7** | **16.2** | **7.4** | **4.5** | **4.3** | **3.1** | **1.1** | **0.9** | **0.8** | **0.7** | **30.3** |

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

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all serovars reported by countries with more than 10 isolates.

## Pigs

Information on the serovar distribution in pig herds was provided by 10 MSs, which was fewer than the 13 MSs reporting in 2009. It should be noted that Germany provided 68.6 % of the total isolates, and so the German results may have skewed the overall findings. As observed in pig meat, *S.* Typhimurium was by far the most frequently reported serovar (28.6 %) (Figure SA26 and Table SA38), and was the dominant serovar in all but two reporting MSs (Estonia and Romania). The second most common serovar was monophasic *S.* Typhimurium (9.3 %), which was reported by three MSs. The third and fourth serovars, *S.* Derby (5.7 %) and *S.* Choleraesuis (5.2 %), were the most frequently reported serovars in Estonia and Romania, respectively. The predominance of *S.* Choleraesuis in Romania was of interest as this serovar has been eliminated from most Western European herds. However, Romania reported low proportions of *S.* Typhimurium and monophasic *S.* Typhimurium, which appear to be more common in the industrialised pig production of northern and parts of southern Europe. *S.* Brandenberg and *S.* Anatum replaced *S.* Tennessee and *S.* Panama in the top 10 serovars.

***Table SA38. Distribution[1] of the 10 most common* Salmonella *serovars in pigs, 2010***

| Country | No of isolates serotyped | % positive | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | S. Typhimurium | Monophasic S. Typhimurium | S. Derby | S. Choleraesuis | S. Brandenberg | S. London | S. Rissen | S. Infantis | S. Enteritidis | S. Anatum | Other serovars, non-typeable, and unspecified |
| **Total no of isolates** | **3,301** | **945** | **307** | **187** | **172** | **52** | **46** | **43** | **35** | **16** | **16** | **1,482** |
| Austria | 31 | 74.2 | - | - | 19.4 | - | - | - | - | - | - | 6.5 |
| Estonia | 78 | 15.4 | - | 17.9 | 1.3 | - | - | - | 5.1 | 2.6 | - | 57.7 |
| Germany | 2,263 | 30.3 | 11.2 | 4.5 | - | 1.9 | 0.4 | 0.1 | 1.1 | 0.3 | 0.6 | 49.6 |
| Italy | 421 | 12.6 | - | 8.6 | 11.9 | - | 6.9 | 5.7 | - | - | - | 54.4 |
| Romania | 129 | 6.2 | 1.6 | - | 85.3 | 3.1 | - | 1.6 | - | - | - | 2.3 |
| Slovakia | 15 | 26.7 | - | 6.7 | 20.0 | 6.7 | - | - | 6.7 | 6.7 | - | 26.7 |
| Slovenia | 40 | 32.5 | - | 12.5 | - | - | - | - | 5.0 | 7.5 | - | 42.5 |
| Spain | 78 | 25.6 | - | 11.5 | - | 5.1 | 1.3 | 14.1 | 1.3 | 2.6 | 1.3 | 37.2 |
| Sweden | 12 | 33.3 | - | 16.7 | - | - | | - | - | 16.7 | - | 33.3 |
| United Kingdom | 234 | 52.1 | 21.8 | 8.1 | 0.9 | - | 2.6 | 1.3 | 1.3 | - | 0.4 | 11.5 |
| **Proportion of serotyped isolates** | | **28.6** | **9.3** | **5.7** | **5.2** | **1.6** | **1.4** | **1.3** | **1.1** | **0.5** | **0.5** | **44.9** |

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

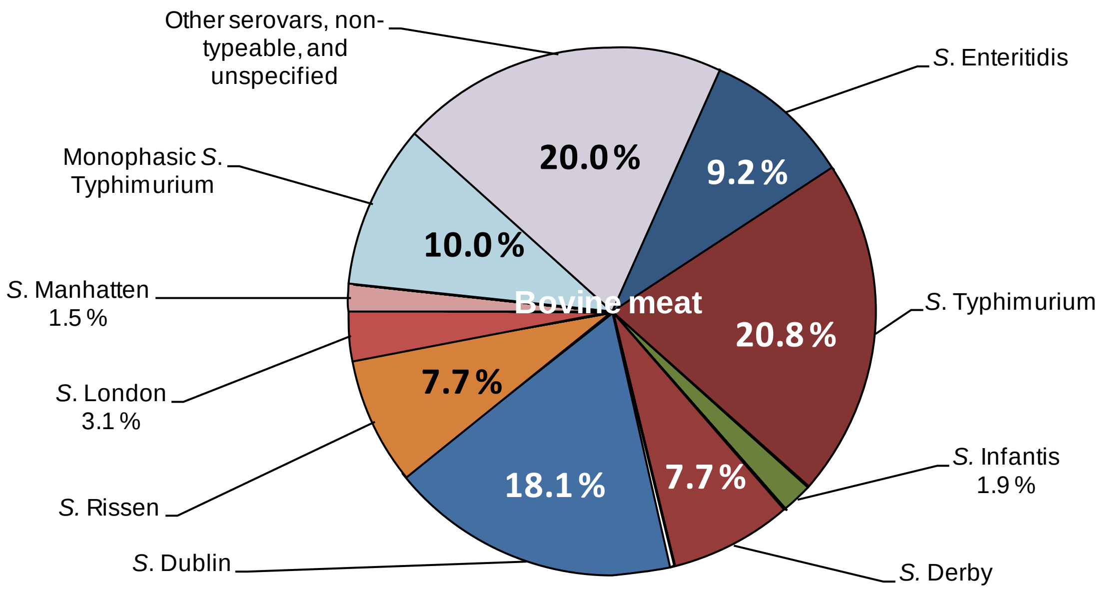
1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all serovars reported by countries with more than 10 isolates.

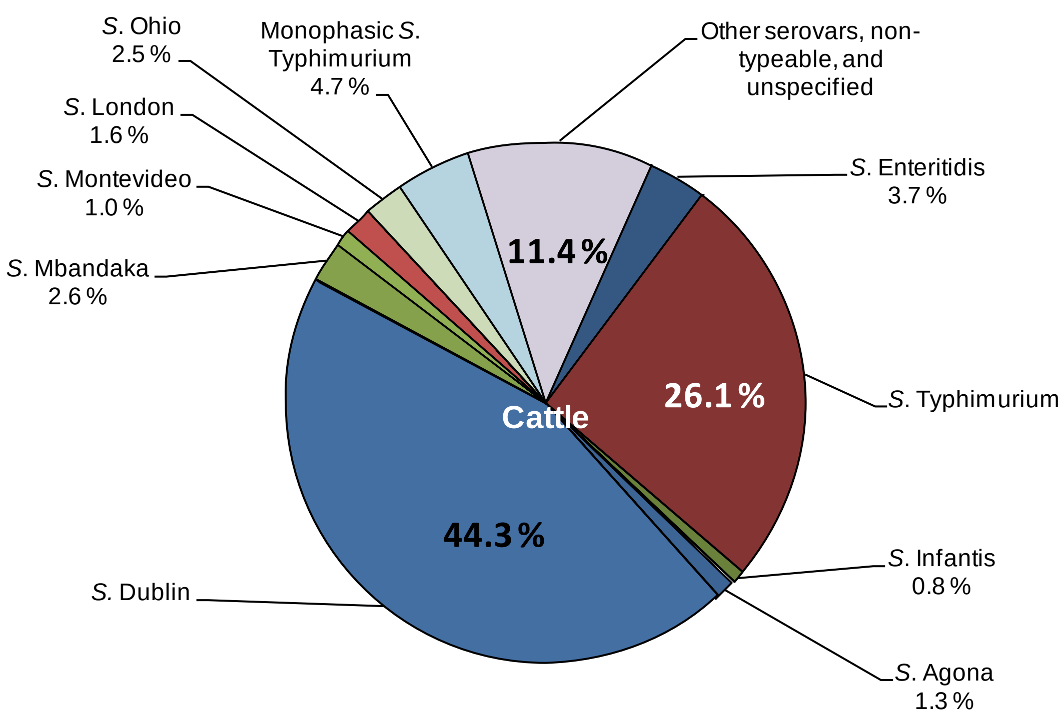
### Compound feed for pigs

Three MSs provided data on the serovar distribution in compound feed for pigs. There were only seven isolates reported: two *S.* Senftenberg, one *S.* Mbandaka and one group B *Salmonella* (reported by Germany), two *S.* Bareilly (reported by Latvia) and one *S.* Enteritidis (reported by Slovakia).

### Serovars in bovine meat production

***Figure SA27. Distribution of the 10[1] most common* Salmonella *serovars in bovine meat and cattle herds, 2010***




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

Graph on bovine meat includes data from 7 MSs (Czech Republic, Denmark, Germany, Hungary, Ireland, Italy and Netherlands), N=260. Graph on cattle includes data from 10 MSs (Austria, Estonia, Finland, Germany, Ireland, Italy, Slovakia, Spain, Sweden and United Kingdom), N=4,213.

1. Only nine serovars have been included for bovine meat. The tenth to fourteenth most commonly reported serovars in bovine meat were *S.* Bredeney, *S.* Bovismorbificans, *S.* Newport, *S.* Mbandaka and *S.* Tennessee, with three isolates each.

## Bovine meat

Seven MSs provided information on *Salmonella* serovars in bovine meat in 2010 (Figure SA27 and Table SA39), with small numbers of serotyped isolates reported by each MS. As in the last three years (2007-2009), *S.* Typhimurium (20.8 %) and *S.* Dublin (18.1 %) were the serovars most frequently isolated from bovine meat. The proportion of *S.* Dublin isolates showed considerable variation among MSs, with three MSs having no *S.* Dublin isolates and Ireland reporting 69.2 % of cases accounted for by this serovar. Monophasic *S.* Typhimurium was the third most commonly reported serovar (10.0 %; reported by four MSs) and was the predominant serovar reported by Germany. *S.* Enteritidis was the serovar most commonly reported by the Czech Republic, while *S.* Rissen was the main serovar reported by Italy, the only country reporting this serovar. The tenth to fourteenth most commonly reported serovars in bovine meat (not included in Table SA39) were *S.* Bredeney, *S.* Bovismorbificans, *S.* Newport, *S.* Mbandaka and *S.* Tennessee with three isolates each. It should be noted that several of the serovars were only reported in low numbers, and their presence on the list should be interpreted with caution.

***Table SA39. Distribution[1] of the nine most common* Salmonella *serovars in bovine meat, 2010***

| Country | No of isolates serotyped | % positive | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | S. Typhimurium | S. Dublin | Monophasic S. Typhimurium | S. Enteritidis | S. Derby | S. Rissen | S. London | S. Infantis | S. Manhattan | Other serovars, non-typeable, and unspecified |
| **Total no of isolates** | **260** | **54** | **47** | **26** | **24** | **20** | **20** | **8** | **5** | **4** | **52** |
| Czech Republic | 21 | 4.8 | - | 4.8 | 33.3 | 28.6 | - | - | 14.3 | - | 14.3 |
| Denmark | 13 | 15.4 | 38.5 | - | - | 7.7 | - | - | - | - | 38.5 |
| Germany | 48 | 16.7 | 4.2 | 31.3 | 2.1 | 14.6 | - | 14.6 | - | - | 16.7 |
| Hungary | 24 | 33.3 | - | 25.0 | 8.3 | - | - | - | 8.3 | 16.7 | 8.3 |
| Ireland | 39 | 15.4 | 69.2 | - | 7.7 | 5.1 | - | - | - | - | 2.6 |
| Italy | 69 | 15.9 | - | - | 15.9 | 2.9 | 29.0 | 1.4 | - | - | 34.8 |
| Netherlands | 46 | 39.1 | 28.3 | 8.7 | - | 4.3 | - | - | - | - | 19.6 |
| **Proportion of serotyped isolates** | | **20.8** | **18.1** | **10.0** | **9.2** | **7.7** | **7.7** | **3.1** | **1.9** | **1.5** | **20.0** |

Note: Data are presented only for sample sizes ≥10. Both clinical and monitoring isolates are included, and it should be noted that there can be some overlap of isolates between the two datasets and the sum of isolates does not correspond to the number of tested samples. The tenth to fourteenth most commonly reported serovars in bovine meat were *S.* Bredeney, *S.* Bovismorbificans, *S.* Newport, *S.* Mbandaka and *S.* Tennessee with three isolates each.

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all serovars reported by countries with more than 10 isolates.

## Cattle

In 2010, information on the serovar distribution in cattle herds was provided by 10 MSs. The distribution of the 10 most common serovars in cattle is shown in Figure SA27 and Table SA40. The most commonly reported serovar was *S.* Dublin (44.3 %), although the proportions reported by the individual MSs varied greatly. The observed predominance of *S.* Dublin was mainly due to the extremely high proportions reported by Ireland and Austria (97.5 % and 88.4 %, respectively). *S.* Dublin was also the most frequently reported serovar by the United Kingdom (71.5 %). *S.* Typhimurium, which was the most common serovar in 2009 and 2008, was reduced to the second most frequently isolated serovar (26.1 %) and was detected in all reporting countries. It was also the most frequently reported serovar in seven countries. The other serovars in the top 10 each accounted for less than 4 % of the serotyped isolates, except for monophasic *S.* Typhimurium (4.7 %) which was isolated in Germany and the United Kingdom. These findings are of interest, although it should be noted that the large difference in the number of isolates serotyped between the countries is likely to skew the overall results towards the countries that reported the most isolates.

***Table SA40. Distribution[1] of the 10 most common* Salmonella *serovars in cattle, 2010***

| Country | No of isolates serotyped | % positive | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | S. Dublin | S. Typhimurium | Monophasic S. Typhimurium | S. Enteritidis | S. Mbandaka | S. Ohio | S. London | S. Agona | S. Montevideo | S. Infantis | Other serovars, non-typeable, and unspecified |
| **Total no of isolates** | **4,213** | **1,868** | **1,098** | **196** | **154** | **108** | **107** | **67** | **55** | **44** | **34** | **482** |
| Austria | 43 | 88.4 | 11.6 | - | - | - | - | - | - | - | - | - |
| Estonia | 13 | 38.5 | 53.8 | - | - | - | - | - | - | - | - | 7.7 |
| Finland | 13 | - | 76.9 | - | 7.7 | - | - | - | - | - | - | 15.4 |
| Germany | 1,948 | 7.3 | 47.7 | 8.1 | 7.4 | - | 5.4 | 3.4 | 2.8 | 0.1 | 1.6 | 16.3 |
| Ireland | 938 | 97.5 | 2.3 | - | - | - | - | - | - | 0.1 | - | - |
| Italy | 125 | - | 34.4 | - | - | - | - | - | - | - | - | 65.6 |
| Slovakia | 15 | 6.7 | 53.3 | - | 26.7 | - | - | - | - | 13.3 | - | - |
| Spain | 30 | - | 20.0 | - | - | 20.0 | - | - | - | 3.3 | - | 56.7 |
| Sweden | 15 | - | 60.0 | - | 6.7 | - | - | - | 6.7 | - | - | 26.7 |
| United Kingdom | 1,073 | 71.5 | 5.5 | 3.5 | 0.4 | 9.5 | 0.2 | 0.1 | - | 3.6 | 0.2 | 5.5 |
| **Proportion of serotyped isolates** | | **44.3** | **26.1** | **4.7** | **3.7** | **2.6** | **2.5** | **1.6** | **1.3** | **1.0** | **0.8** | **11.4** |

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

1. The serovar distribution (% isolates) was based on the number of serotyped isolates, including non-typeable isolates. Ranking was based on the sum of all serovars reported by countries with more than 10 isolates.

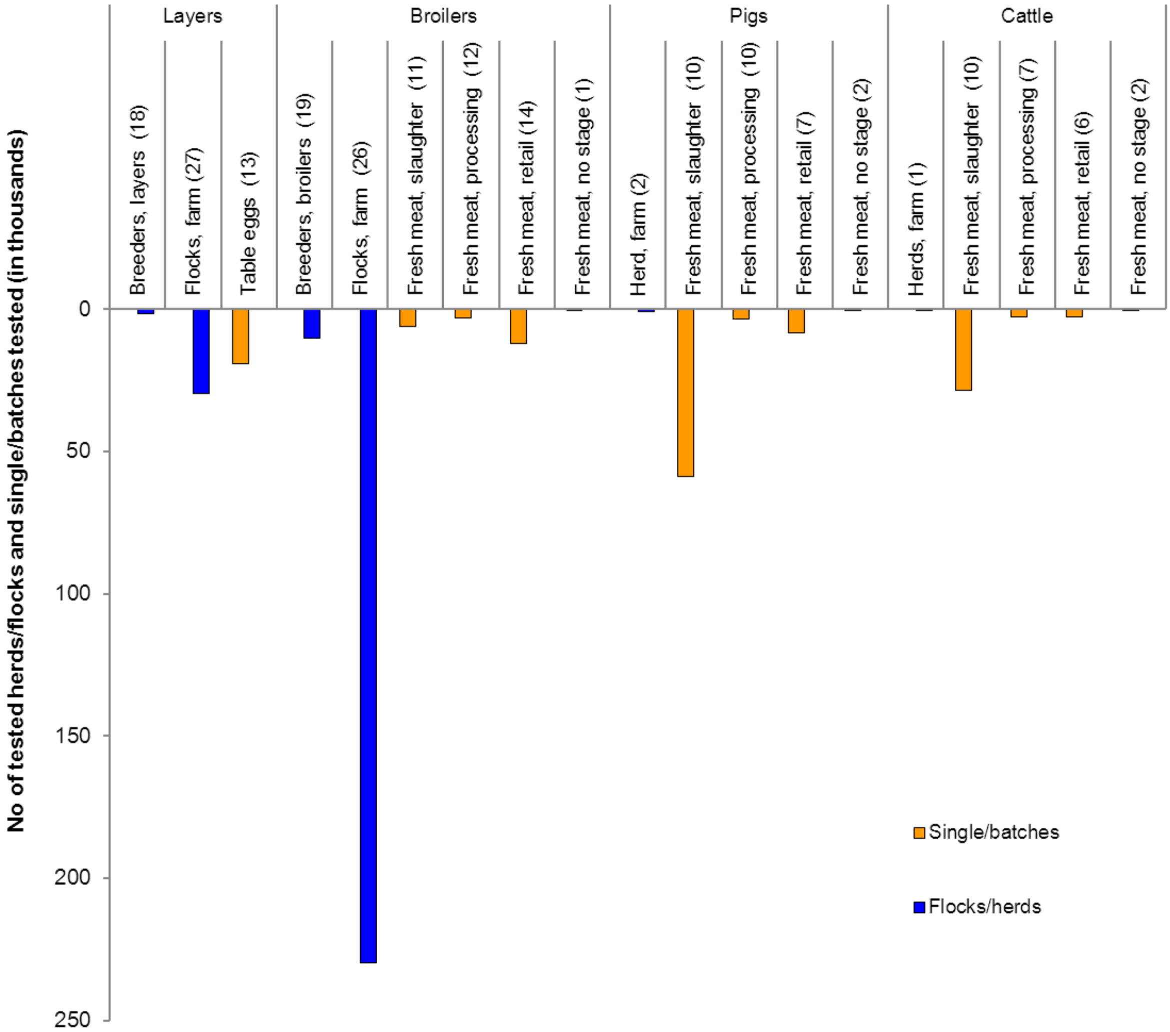
### Compound feed for cattle

Only three MSs reported on the serovar distribution in compound feed for cattle. Only four isolates were reported, two *S*. Typhimurium from Finland and Latvia and one isolate each for *S*. Derby and *S*. Lexington from Estonia. The low number of isolates does not make it possible to draw any conclusions regarding the distribution of *Salmonella* serovars in compound feed for cattle in the EU.

### 3.1.7 Overview of *Salmonella* from farm-to-fork

The implementation of harmonised EU *Salmonella* microbiological criteria and *Salmonella* monitoring and control programmes in some food animal sectors has enhanced the ability to analyse trends in *Salmonella* in the EU and evaluate how the efforts by the MSs have improved the quality of reporting. Figure SA28 illustrates the type of data reported in 2010 and the number of units tested. The majority of the tested units were from broiler flocks and also laying hen flocks. Within the EU a large number of MSs contributed to these two categories, with 27 MSs reporting on *Salmonella* in laying hen flocks and 26 MSs reporting data from broilers. A substantial number of investigations was also supplied for fresh meat from cattle and pigs.

***Figure SA28. The number of units tested, presented by animal species and sampling level within the EU, 2010***




Note. Table eggs include tests at packing centres, retail and where no level of sampling was reported.
Number of MSs included in brackets.

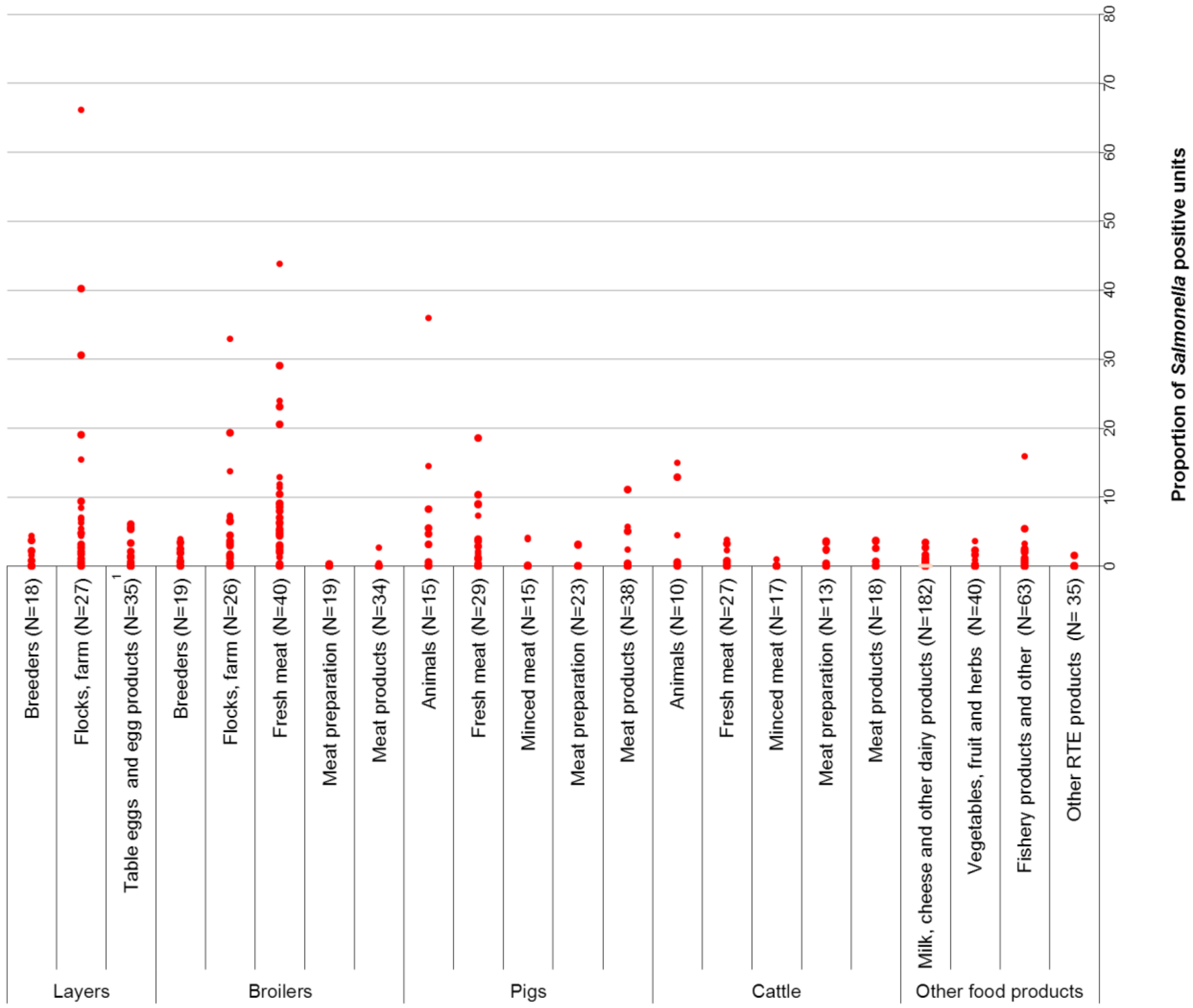
Figure SA29 provides an overview of the *Salmonella* occurrence in investigations of the different animal populations and meat thereof reported by MSs. Of the 743 investigations included in the figure, the majority were investigations of poultry (29.3 %) and other food products (43.1 %). In the other food products, only one of the investigations detected 10.0 % or more units positive for *Salmonella*, whereas in poultry there were 17 investigations with 10.0 % or more units positive, especially from fresh broiler meat, which had the lowest proportion of investigations with under 10.0 % of units positive (22.5 %). It should be noted that fresh broiler meat investigations were associated with the highest proportion of positive units, but proportions over 20.0 % were also recorded from laying hen flocks, broiler flocks and broiler meat preparations, demonstrating the substantial variation in results between investigations. In contrast, 97.6 % of investigations of cattle and bovine products and 95.0 % of pigs and pig products reported less than 10.0 % of the sampled units to have *Salmonella* present. Only one investigation from pig animals reported *Salmonella* in more than 20.0 % of samples.

Analysis of the data demonstrates a substantial variation among countries in the occurrence of *Salmonella* in different food categories and animal species, but also in different investigations within the categories, for example between samples collected from farm and from slaughter. Therefore, the variation in the occurrence of *Salmonella* between countries could, in large part, be due to differences in sampling and testing schemes but also reflect true differences. Similarly, great variations between MS-specific *Salmonella* prevalence were also observed in EU-wide baseline surveys that have been published in previous years. For areas where harmonised schemes have not yet been established, comparison between countries can only be done with caution taking into account the sampling schemes.

The changes in the human top 10 serovars between 2010 and 2009 show that *S*. Kentucky (associated with broilers) has increased in proportion and that monophasic *S*. Typhimurium (associated predominantly with pigs), *S*. Agona and *S*. Mbandaka (both often of animal feed origin affecting poultry and cattle) are new additions to the human top 10, replacing *S*. Bovismorbificans (predominantly pig origin), *S*. Hadar (poultry, especially broilers and ducks) and *S*. Saintpaul (turkeys). These serovars also showed increased prominence in terms of the proportion of serovars in specific animal and food types. *S*. Kentucky was the fourth most common serovar in turkey meat and the second most common in broiler meat. *S*. Agona was the eighth most common serovar in cattle and pig meat and the seventh most common in broiler meat, whereas *S*. Mbandaka was the fifth most common in both cattle and *Gallus gallus*. The emphasis on reporting monophasic *S*. Typhimurium in humans and animals may have partly contributed to its increased rank in the list of most common serovars, but evidence from individual countries suggests an ongoing increase.

Some serovars seem to be particularly well established in certain countries. As in 2008 and 2009, a high proportion of *S.* Infantis in broiler meat was reported by Hungary (96.0 %), which had been reflected in flocks of *Gallus gallus* reported in previous years but no reporting of this serovar from *Gallus gallus* was provided in 2010. *S.* Infantis was also reported to account for 15.3 % of turkey meat, 10.0 % of pig meat and 8.3 % of bovine meat isolates from Hungary.

***Figure SA29. Proportion of* Salmonella*-positive units presented by animal species and food category within the EU, 2010***




Note: Data are presented only for sample sizes ≥25. Each point represents a MS investigation, N = number of investigations including both batch and single samples.

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

### 3.1.8 Discussion

In 2010, salmonellosis was again the second most commonly reported zoonotic disease in humans in the EU, following campylobacteriosis. However, while the campylobacteriosis notification rate has increased, the notification rate of salmonellosis cases continued to decrease at EU level, which is demonstrated by the statistically significant trend observed since 2006. This further decrease in reported salmonellosis cases was 8.8 % in 2010, which is about half of the reduction noted in 2009 (17.4 %). *S.* Enteritidis and *S.* Typhimurium continued to be the most frequently reported *Salmonella* serovars in human cases. The overall decrease in salmonellosis is mostly attributed to the *S.* Enteritidis serovar, which continued to decline for the fifth consecutive year. The reporting of *S.* Typhimurium cases has also decreased but not to the same extent as *S*. Enteritidis.

The continuing decrease in the numbers of salmonellosis cases in humans is likely to be mainly related to the successful *Salmonella* control programmes in poultry populations, particularly in laying hens. The majority of MSs met their *Salmonella* reduction targets for laying hens, broilers, turkeys and breeding flocks in 2010, and the prevalence of the target serovars is clearly declining at EU level. A positive finding was that all except one reporting MS already met the targets set for turkey flocks, even though 2010 was the first year of implementation of these mandatory control programmes. All these results indicate that MSs have invested in *Salmonella* control and this work is giving positive results.

Reports on food-borne outbreaks caused by *Salmonella* within the EU have also shown a reduction in number, and there was a further decline in numbers of *Salmonella* food-borne outbreaks caused by eggs and egg products. However, the food-borne outbreak data still show that eggs are clearly the most important cause of food-borne *Salmonella* outbreaks. Other important sources of food-borne *Salmonella* outbreaks in 2010 were mixed and buffet meals, broiler meat, pig meat and bovine meat.

These results concur well with the latest source attribution estimation by the BIOHAZ Panel[27], according to which of all human salmonellosis cases in the EU (i.e. estimated true number of cases when accounting for underreporting) approximately 65 % were attributed to laying hens (eggs) and 28 %, 4.5 % and 2.4 % to pigs, turkeys and broilers, respectively. Furthermore, an external scientific report[28] which used serotyping data to investigate source attribution of human salmonellosis cases and used data from EU baseline surveys and EU Summary Reports estimated that the laying hen reservoir is the most important source in the EU, contributing to 43.8 % of human cases, followed by 26.9 % of cases attributed to pigs. Together 4.0 % and 3.4 % of human cases were attributed to turkeys and broilers.

An interesting development in 2010 was that the monophasic *S.* Typhimurium appeared in fourth place on the top 10 list of the most commonly reported serovars in human cases. These strains were also often detected in pigs, cattle and pig and bovine meat, but less often in poultry. The BIOHAZ Panel concluded in its recent opinion[29] that monophasic *S.* Typhimurium appears to be of increasing importance in many MSs and has caused a substantial number of infections in both humans and animals bred for food. However, the recently agreed reporting guidelines for these strains may have partly contributed to these increased reports in 2010.

As regards findings in food, *Salmonella* was most often detected in fresh broiler and turkey meat. Some decrease in the occurrence of *Salmonella* was apparent in products derived from of poultry meat and table eggs. Otherwise no major developments in occurrence were observed compared with previous years.

27 EFSA Panel on Biological Hazards (BIOHAZ), 2011. Scientific Opinion on a quantitative estimation of the public health impact of setting a new target for the reduction of *Salmonella* in broilers. EFSA Journal, 9(7):2106, 94 pp.

28 Scientific report submitted to EFSA ‘Estimation of the relative contribution of different food and animals sources to human *Salmonella* infections in the European Union’, DTU Food.

29 EFSA Panel on Biological Hazards (BIOHAZ), 2010. Scientific Opinion on monitoring and assessment of the public health risk of “*Salmonella* Typhimurium-like” strains. EFSA Journal, 8(10):1826, 48 pp.

Following a request from the European Commission, the Panels on Biological Hazards (BIOHAZ), on Contaminants in the Food Chain (CONTAM) and on Animal Health and Welfare (AHAW) were asked to deliver a series of Scientific Opinions on the public health hazards (biological and chemical) to be covered by inspection of meat for several animal species; the first scientific opinion dealt with swine[30]. *Salmonella* was deemed to be of high relevance at present in the EU and one of the most relevant biological hazards in the context of meat inspection of swine, alongside *Yersinia enterocolitica, Toxoplasma gondii* and *Trichinella* spp.

30 EFSA (European Food Safety Authority), 2011. Scientific Report of EFSA on technical specifications on harmonised epidemiological indicators for public health hazards to be covered by meat inspection of swine. EFSA Journal, 9(10):2371, 125 pp.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.2 *Campylobacter*

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

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

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

The bacteria can readily contaminate various foodstuffs, including meat, raw milk and dairy products and less frequently fish and fishery products, mussels and fresh vegetables. Among sporadic human cases, contact with live poultry, consumption of poultry meat, drinking water from untreated water sources and contact with pets and other animals have been identified as the major sources of infections. Cross-contamination during food-preparation in the home has also been described as an important transmission route. Raw milk and contaminated drinking water have been causes of large outbreaks.

Table CA1 presents the countries reporting data for 2010.

***Table CA1. Overview of countries reporting data for* Campylobacter*, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 25 | **All MSs** except PT and GR<br>**Non-MSs:** CH, IS, NO |
| Food | 20 | **All MSs** except BG, CZ, FI, FR, GR, MT, UK<br>**Non-MS:** CH |
| Animal | 21 | **All MSs** except BE, CY, GR, LT, MT, PT<br>**Non-MSs:** CH, NO |
| Species | 25 | **All MSs** except GR, MT<br>**Non-MSs:** CH, NO |

Note: The overview table includes all data reported by MSs. However, in the following chapter, data reported as HACCP or own control are not included in the detailed tables, and, unless stated data from import, suspect sampling and outbreak or clinical investigations are also excluded. Also, only countries reporting 25 samples or more have been included for analyses.

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

### 3.2.1 Campylobacteriosis in humans

In 2010, *Campylobacter* continued to be the most commonly reported gastrointestinal bacterial pathogen in humans in the EU since 2005. The number of reported confirmed human campylobacteriosis cases in the EU increased by 6.7 % in 2010 compared with 2009. The increase was also reflected again as an increase in the overall EU campylobacteriosis notification rate, increasing from 45.6 per 100,000 population in 2009 to 48.6 per 100,000 population in 2010 (Table CA2). In 2010, 266 deaths were reported due to campylobacteriosis (reported for N=115,747).

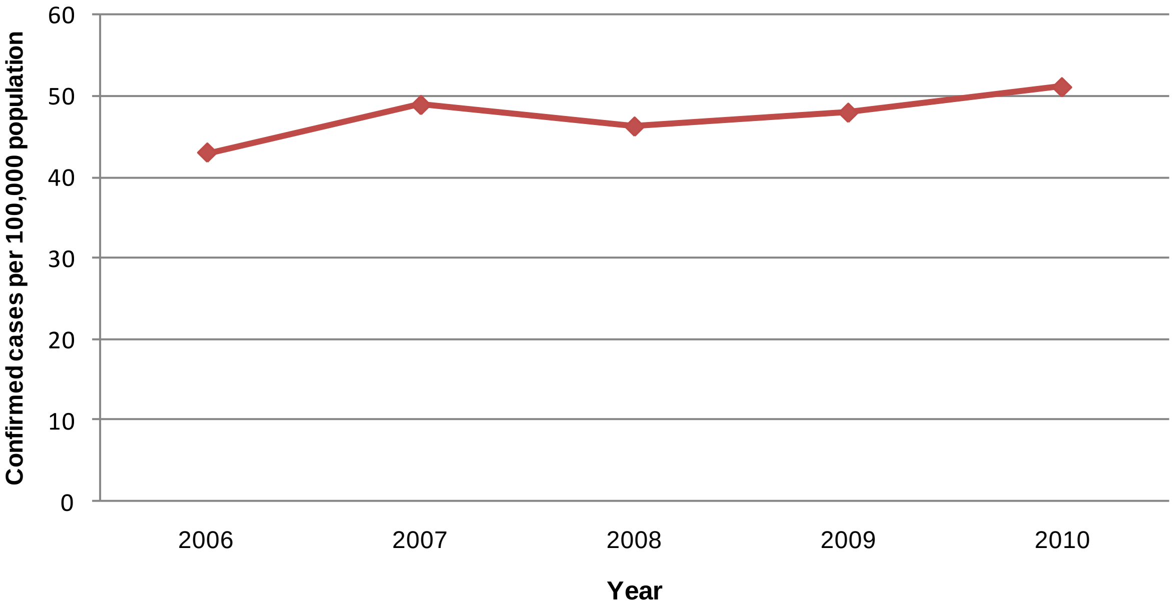
The EU notification rate of confirmed cases of campylobacteriosis has shown a significant increasing trend in the last five years (2006-2010), more evident since 2008. This EU trend was observed among 24 MSs that reported consistently during this five-year period (Figure CA1). By country, statistically significant increase in campylobacteriosis notification rates from 2006 to 2010 were observed in Cyprus, Estonia, France, Luxemburg, Malta, the Netherlands and Poland, while a statistically significant decreasing trend was observed in Belgium and Bulgaria (Figures CA1 and CA2).

***Table CA2. Reported campylobacteriosis cases in humans 2006-2010 and notification rates for 2010***

| Country | 2010 | | | | 2009 | 2008 | 2007 | 2006 |
|---|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases | Confirmed cases/ 100,000 | Confirmed cases | | | |
| Austria | C | 4,405 | 4,405 | 52.60 | 1,516 | 4,280 | 5,822 | 5,020 |
| Belgium | C | 3,031 | 3,031 | 27.96 | 5,697 | 5,111 | 5,895 | 5,771 |
| Bulgaria | A | 6 | 6 | 0.08 | 26 | 19 | 38 | 75 |
| Cyprus | C | 55 | 55 | 6.85 | 37 | 23 | 17 | 2 |
| Czech Republic | C | 21,164 | 21,075 | 200.58 | 20,259 | 20,067 | 24,137 | 22,571 |
| Denmark | C | 4,037 | 4,037 | 72.94 | 3,353 | 3,470 | 3,868 | 3,239 |
| Estonia | C | 197 | 197 | 14.70 | 170 | 154 | 114 | 124 |
| Finland | C | 3,944 | 3,944 | 73.70 | 4,050 | 4,453 | 4,107 | 3,439 |
| France | C | 4,324 | 4,324 | 6.68 | 3,956 | 3,424 | 3,058 | 2,675 |
| Germany | C | 65,713 | 65,110 | 79.59 | 62,787 | 64,731 | 66,107 | 52,035 |
| Greece | -[4] | - | - | - | - | - | - | - |
| Hungary | C | 7,201 | 7,201 | 71.91 | 6,579 | 5,516 | 5,809 | 6,807 |
| Ireland | C | 1,662 | 1,660 | 37.15 | 1,810 | 1,752 | 1,885 | 1,812 |
| Italy | C | 457 | 457 | 0.76 | 531 | 265 | 676 | 801 |
| Latvia | C | 1 | 1 | 0.04 | 0 | 0 | 0 | 0 |
| Lithuania | C | 1,095 | 1,095 | 32.89 | 812 | 762 | 564 | 624 |
| Luxembourg | C | 600 | 600 | 119.51 | 523 | 439 | 345 | 285 |
| Malta | C | 204 | 204 | 49.40 | 132 | 77 | 91 | 54 |
| Netherlands[2] | C | 4,322 | 3,983 | 46.21 | 3,739 | 3,341 | 3,289 | 3,186 |
| Poland | C | 375 | 367 | 0.96 | 359 | 270 | 192 | 157 |
| Portugal | -[4] | - | - | - | - | - | - | - |
| Romania | C | 179 | 175 | 0.82 | 254 | 2 | - | - |
| Slovakia | C | 4,578 | 4,476 | 82.51 | 3,813 | 3,064 | 3,380 | 2,718 |
| Slovenia | C | 1,022 | 1,022 | 49.93 | 952 | 898 | 1,127 | 944 |
| Spain[3] | C | 6,340 | 6,340 | 55.14 | 5,106 | 5,160 | 5,331 | 5,889 |
| Sweden | C | 8,001 | 8,001 | 85.66 | 7,178 | 7,692 | 7,106 | 6,078 |
| United Kingdom | C | 70,298 | 70,298 | 113.37 | 65,043 | 55,609 | 57,849 | 52,134 |
| **EU Total** | | **213,211** | **212,064** | **48.56** | **198,682** | **190,579** | **200,807** | **176,440** |
| Iceland | C | 55 | 55 | 17.32 | 74 | 98 | 93 | 117 |
| Liechtenstein | - | - | - | - | - | 2 | 0 | 10 |
| Norway | C | 2,682 | 2,682 | 55.21 | 2,848 | 2,875 | 2,836 | 2,588 |
| Switzerland[5] | C | 6,604 | 6,604 | 85.05 | 7,795 | 7,552 | 5,834 | 5,240 |

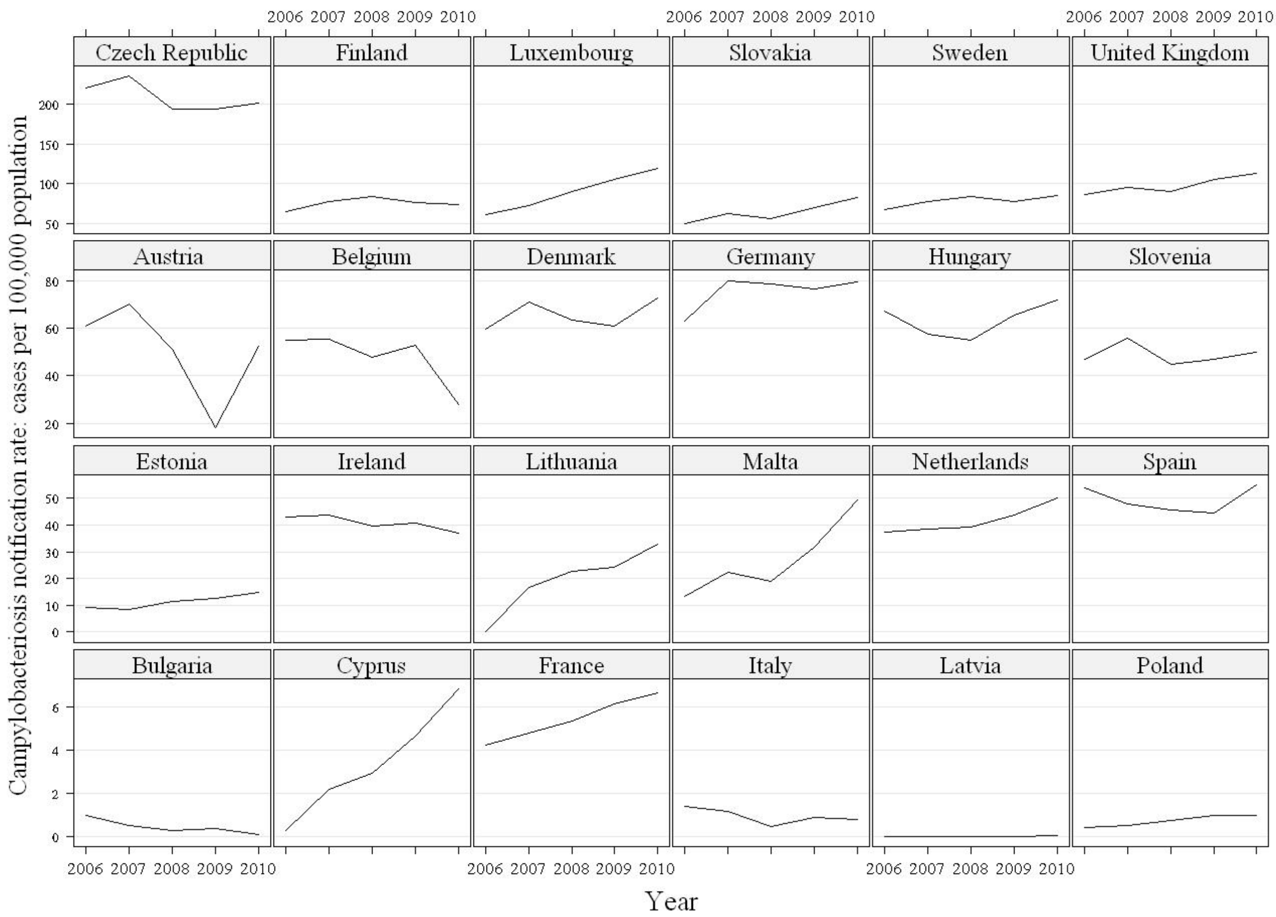
1. A: aggregated data report; C: case-based report; –: no report.
2. Sentinel system; notification rates calculated on estimated coverage of 52 %.
3. Surveillance system; notification rates calculated on estimated coverage of 25 %.
4. No surveillance system exists.
5. Switzerland provided data directly to EFSA.

***Figure CA1. Notification rates of reported confirmed cases of human campylobacteriosis in the EU, 2006-2010***




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

***Figure CA2. Notification rates of reported confirmed cases of human campylobacteriosis in Member States[1], 2006-2010***




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

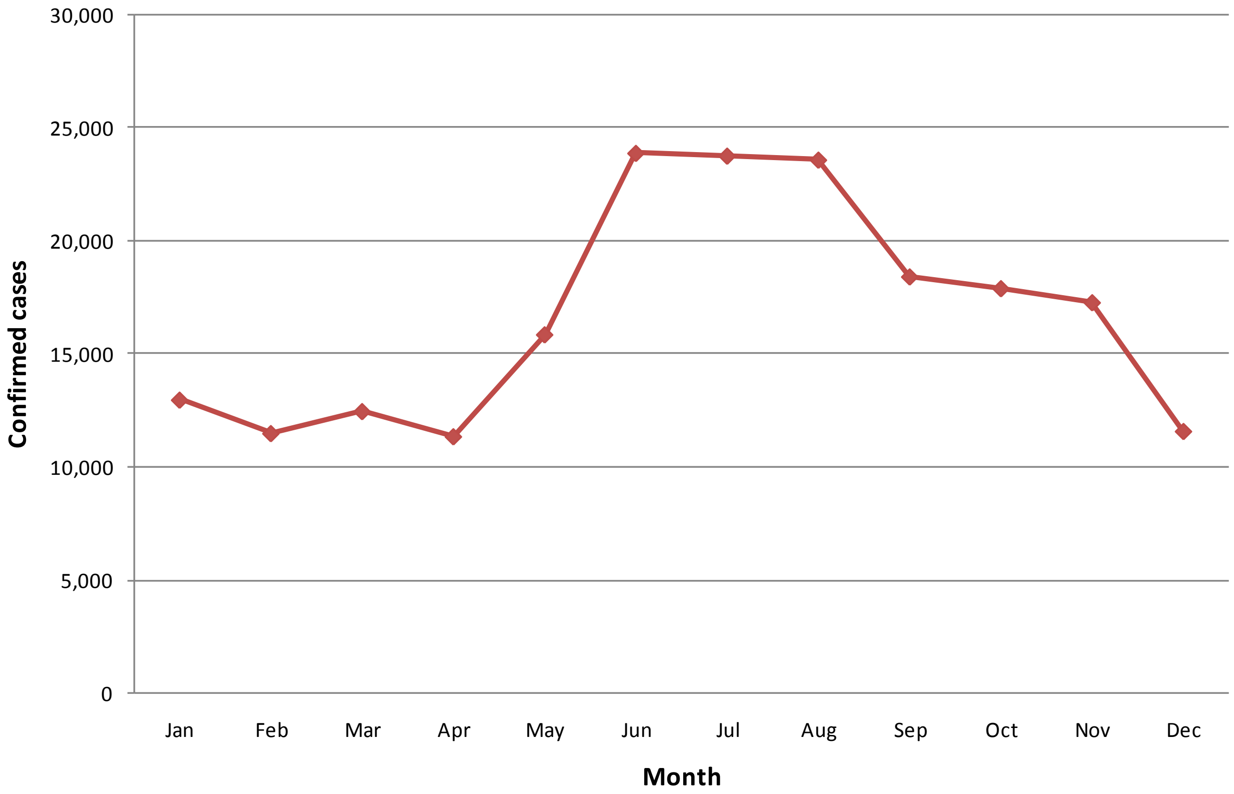
1. The Netherlands sentinel system; notification rates calculated on estimated coverage of 52 %. The Spanish surveillance system; notification rates calculated on estimated coverage 25 %.

In 2010, the proportion of confirmed campylobacteriosis cases reported as imported and domestic was 6.3 % and 57.2 %, respectively. The proportion of reported cases of unknown origin was 36.5 %.

As in previous years, children under the age of five had the highest notification rate in 2010 (126.8 per 100,000 population). However, this rate was slightly lower than in 2009 (128.0 per 100,000 population). Overall, the notification rates for all age groups continued to increase, especially among the three age groups encompassing 15 to 64-year olds. However, in 2010 the case fatality ratio was low, 0.22 %.

As in previous years, the highest number and notification rate of *Campylobacter* cases in humans was reported during the summer months, from June to August gradually decreasing from September to December (Figure CA3).

***Figure CA3. Number of reported confirmed campylobacteriosis cases in humans by month, TESSy data for reporting Member States, 2010***




Source: All MSs except Greece, Portugal and Romania (N=200,435)

As previously, the most frequently reported *Campylobacter* species in 2010 was *C. jejuni* (35.7 %) which accounted for 93.4 % of the confirmed cases characterised at the species level (N=81,202). The proportion of confirmed *Campylobacter* cases due to *C. coli* was 2.3 %. Other species reported included *C. lari* (0.22 %) and *C. upsaliensis* (0.006 %). In 2010, 51.8 % of the 212,063 confirmed *Campylobacter* cases either was not characterised at the species level or the species was unknown.

### 3.2.2 *Campylobacter* in food

Twenty MSs and Switzerland reported data on *Campylobacter* in food in 2010 (Table CA3). The number of samples within the food categories tested ranged from a few to more than a thousand. The majority of the samples were from food of animal origin; primarily from poultry meat, which is considered to be one of the major vehicles of *Campylobacter* infections in humans. About the same number of MSs reported data on *Campylobacter* in poultry meat in 2010 as in 2009.

***Table CA3. Overview of countries reporting data on foodstuffs, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Poultry meat | 19 | **MSs:** AT, BE, DE, DK, EE, ES, HU, IE, IT, LT, LU, LV, NL, PL, PT, RO, SE, SI, SK<br>**Non-MS:** CH |
| Pig meat | 14 | **MSs:** BE, DE, ES, HU, IE, IT, LT, LU, NL, PL, PT, RO, SE, SK |
| Bovine meat | 11 | **MSs:** BE, DE, ES, HU, IE, IT, LU, NL, PL, PT, SK |
| Other types of meat | 9 | **MSs:** AT, CY, DE, ES, IE, IT, NL, PT, SE |
| Milk and dairy products | 10 | **MSs:** AT, BE, DE, ES, HU, IE, IT, LT, SE, SK |
| Other food | 10 | **MSs:** AT, BE, DE, ES, HU, IE, IT, NL, SE, SK |

Note: The overview table includes all data reported by MSs. However, in the following chapter, data reported as HACCP, own control or import are not included in the detailed tables, and, unless stated otherwise, data from import, suspect sampling and outbreak or clinical investigations are also excluded. Also, only countries reporting 25 samples or more have been included in the analysis.

Note: Poultry meat includes broiler meat, turkey meat, meat from ducks, geese, other poultry or unspecified poultry. Other types of meat includes meat from horse, rabbit, sheep, mixed meat, wild game (birds) and other animal species or unspecified. Other food includes soups, sauce and dressings, spices and herbs, sweets, ready-to-eat salads, other processed food products and prepared dishes, other food, cereals and meals, bakery products, live bivalve molluscs, other fishery products and all foodstuffs.

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

#### Fresh poultry meat

The occurrence of *Campylobacter* in fresh broiler meat sampled at slaughter, processing and at retail in 2008 to 2010, is presented in Table CA4. In 2010, the overall proportion of positive samples was 29.6 % at reporting MS level. As in previous years, the proportions of *Campylobacter*-positive broiler meat samples, at any sampling level varied widely among MSs (with the prevalence varying from 3.1 % to 90.0 %), and of the 16 reporting MSs, seven MSs (Austria, Hungary, Ireland, Luxembourg, Poland, Slovenia and Spain) recorded very high (>50 %) or extremely high proportions (>70 %) of positive samples.

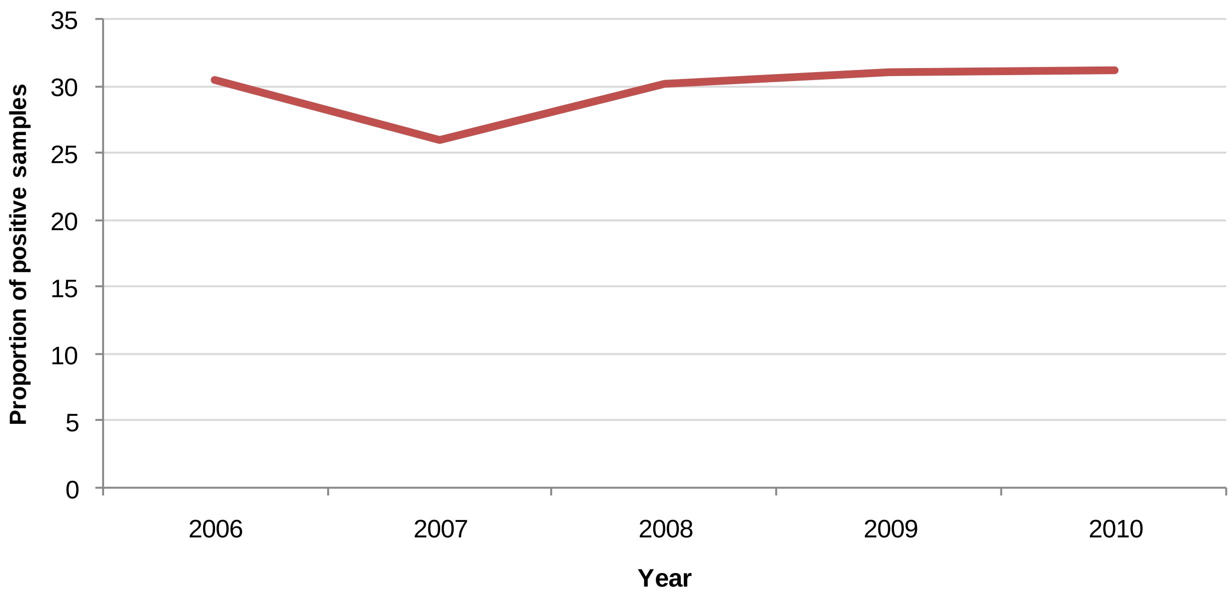
The overall proportion of *Campylobacter*-positive broiler meat samples among the reporting MSs in the years 2006-2010 is presented in Figure CA4. It appears that the overall proportion of *Campylobacter*-positive broiler meat samples has remained at a stable high level in the reporting MSs group since 2006, where approximately 30 % of the samples were reported positive each year.

The data reported in 2010 revealed a large variation in proportions of positive samples at all three sampling stages. At the slaughterhouse, the level ranged from 8.5 % in Estonia to 63.4 % in Ireland; at processing, from 8.9 % in Belgium to 90 % in Austria; and at retail, from 3.1 % in Austria to 58.8 % in Luxembourg (Table CA4). In most MSs the contamination levels remained at high or very high levels, even though for some countries some variation was observed between the years. However, since the number of samples tested and also the sampling and testing schemes may vary between the years, no firm conclusions on trends at specific MS level can be drawn. Austria, Belgium, Germany, Hungary, Poland and Spain reported data from two or three stages of the food chain (slaughter, processing or retail). A reduction in the occurrence of *Campylobacter* along the food chain was mainly observed in Austria, Belgium, and Germany. The reported occurrence of *Campylobacter* from processing increased in Hungary, Poland and Spain. All investigations listed as results from imports have been excluded from this analysis.

In 2010, seven MSs reported data on *Campylobacter* in fresh turkey and other poultry meat, excluding broiler meat, sampled at different stages in the production chain (Table CA5). Overall, 29.5 % and 24.2 %, respectively, of the tested turkey meat and other poultry meat samples were found to be contaminated with *Campylobacter* at the reporting MS levels. All the MSs providing data reported *Campylobacter* findings, and the proportion of positive samples varied from 6.7 % to 68.0 % among the countries. These findings indicate that poultry meat in general, and not only broiler meat, can be an important vehicle for *Campylobacter* infections in humans.

Germany and Hungary examined turkey meat samples at multiple stages of the production chain. The proportion of positive samples reported at retail compared with slaughter decreased substantially in Germany, from 68.0 % to 19.1 %. Little difference was observed between the proportions of positive samples at different stages in Hungary (Table CA5).

***Figure CA4. The proportion of* Campylobacter*-positive fresh broiler meat samples among the reporting Member States, 2006-2010***



### *Table CA4.* Campylobacter *in fresh broiler meat, 2008-2010*

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| **At slaughter** | | | | | | | | |
| Belgium | Single | 1 g | 388 | 37.9 | 261 | 32.2 | 185 | 33.0 |
| Denmark | Single | 10 g/15 g | 1,177 | 10.4 | 986 | 12.4 | 484 | 14.7 |
| Estonia | Batch | 1 g | 47 | 8.5 | 48 | 6.3 | - | - |
| Hungary | Single | 25 g | 170 | 54.1 | - | - | - | - |
| Greece | Single | 25 g | - | - | 47 | 70.2 | - | - |
| Ireland[4] | Single | Various | 202 | 63.4 | 273 | 59.3 | - | - |
| Italy | Batch | Not indicated | 30 | 26.7 | - | - | - | - |
| Poland | Single | 400 $cm^2$ | 451 | 58.8 | - | - | - | - |
| Romania[7] | Batch | 1 g | 225 | 40.4 | 266 | 34.2 | - | - |
| Spain | Single | 25 g | 139 | 44.6 | 72 | 95.8 | 420 | 86.2 |
| **At processing plants** | | | | | | | | |
| Austria | Single | 25 g | 30 | 90.0 | - | - | - | - |
| Belgium[1] | Batch | 1 g | 358 | 8.9 | 1,007 | 9.0 | 523 | 7.3 |
| Germany | Single | 25 g | 107 | 47.7 | 45 | 35.6 | 78 | 33.3 |
| Hungary | Single | 25 g | 77 | 29.9 | 291 | 26.8 | - | - |
| Poland[6] | Single | 10 g | 118 | 89.0 | - | - | - | - |
| Portugal | Single | 25 g | 108 | 19.4 | - | - | - | - |
| Slovenia[8] | Single | 1 g | 100 | 79.0 | 101 | 67.3 | - | - |
| Spain | Single | 25 g | 178 | 74.7 | 99 | 70.7 | 50 | 58.0 |
| **At retail** | | | | | | | | |
| Austria | Single | 25 g | 324 | 3.1 | 37 | 24.3 | 138 | 8.0 |
| Belgium | Batch | 1 g | 439 | 12.1 | 199 | 12.1 | - | - |
| Czech Republic | Single | 25 g/27 g | - | - | 120 | 75.0 | - | - |
| Denmark[2] | Single | 10 g/15 g | 767 | 46.2 | 702 | 32.5 | 1,057 | 36.6 |
| France | Single | 1 g | - | - | 120 | 90.0 | - | - |
| | Single[9] | 1 g | - | - | 241 | 69.3 | - | - |
| Germany[3] | Single[10] | 25 g | 681 | 28.5 | 633 | 28.6 | 887 | 36.4 |
| | Single[11] | 10 g | - | - | 413 | 47.0 | - | - |
| Hungary | Single | 25 g | 30 | 43.3 | 64 | 17.2 | - | - |
| Latvia[5] | Single | 25 g | 50 | 10.0 | - | - | 205 | 9.8 |
| Luxembourg | Single | 10 g | 68 | 58.8 | 84 | 79.8 | 122 | 49.2 |
| Netherlands | Single | 25 g | 1,023 | 9.9 | 657 | 10.8 | 1,421 | 14.1 |
| Slovenia | Single | 25 g | - | - | 106 | 78.3 | 315 | 74.6 |
| Spain | Single | 25 g | 126 | 25.4 | 273 | 49.5 | 165 | 13.3 |
| **Sampling level not stated** | | | | | | | | |
| Italy | Batch | Not indicated | - | - | 59 | 16.9 | 66 | 3.0 |
| | Single | Not indicated | - | - | 108 | 0 | 26 | 7.7 |
| **Total (16 MSs in 2010)** | | | **7,413** | **29.6** | **7,312** | **31.0** | **6,142** | **30.1** |

Note: Data are presented only for sample sizes ≥25**.**

Only data specified as fresh or carcass are included, frozen meat is not included.

1. In Belgium, in 2009 and 2008 was single unit data.
2. In Denmark, the numbers at retail are not yearly mean estimates. The high prevalent period (second quarter) is underrepresented in 2010.
3. In Germany, sample weight at retail in 2008 was 10 g.
4. In Ireland, sample weight at slaughterhouse in 2010 was 25 g and 1 g in 2009 and 2008. Slaughter data for carcass wash and neck skin samples have been combined.
5. In Latvia, sample weight at retail in 2008 was 1 g.
6. In Poland, processing plant data for fresh and carcass samples have been combined.
7. In Romania, sample weight at slaughterhouse in 2009 and 2008 was 1 g. In 2008, it was single unit data.
8. In Slovenia, sample weight at processing plant in 2009 and 2008 was 20 $cm^2$.
9. In France 2009, results include 240 samples of meat with skin and 121 samples from skinned meat.
10. In Germany, surveillance in 2009.
11. In Germany, monitoring in 2009.

*Table CA5.* **Campylobacter** *in fresh non-broiler poultry meat, 2010*

| Country | Sample level | Sample unit | Sample Weight | N | % pos |
|---|---|---|---|---|---|
| **Turkeys** | | | | | |
| Germany | Slaughter | Single | 25 g | 359 | 68.0 |
| | Retail | Single | 25 g | 649 | 19.1 |
| Hungary | Slaughter | Single | 25 g | 69 | 26.1 |
| | Processing | Single | 25 g | 263 | 20.9 |
| | Retail | Single | 25 g | 68 | 22.1 |
| Netherlands | Retail | Single | 25 g | 135 | 6.7 |
| Slovenia | Processing | Single | 1 g | 49 | 10.2 |
| **Total turkeys (4 MSs)** | | | | **1,592** | **29.5** |
| **Other poultry** | | | | | |
| Belgium (laying hens) | Slaughter | Single | 1 g | 300 | 35.3 |
| Hungary (ducks) | Retail | Single | 25 g | 36 | 25.0 |
| Hungary (geese) | Slaughter | Single | 25 g | 123 | 8.1 |
| Hungary (ducks) | Slaughter | Single | 25 g | 167 | 18.6 |
| Italy (unspecified) | unspecified | Single | Not indicated | 40 | 12.5 |
| Spain (unspecified) | Retail | Single | 25 g | 46 | 23.9 |
| **Total other poultry (4 MSs)** | | | | **712** | **24.2** |

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

Note: Only data specified as fresh or carcass are included, frozen meat is not included.

In the United Kingdom, a Foodborne Disease Strategy 2010-2015 has been developed by the Food Standards Agency with the desired outcome that ‘food produced or sold in the UK is safe to eat’. Tackling *Campylobacter* in UK-produced chicken is the main priority of the strategy. A *Campylobacter* Risk Management Programme has been developed, encompassing a range of projects targeted at different points across the food chain, from farm to fork. The Programme aims to reduce *Campylobacter* to a specified target: a reduction in the percentage of chickens that have the highest level of contamination (i.e. those with more than 1,000 cfu) from a baseline of 27 % to a target of 10 % by April 2015. A joint cross-government and industry stakeholder working group has been set up to work towards achieving this target. The reduction is planned to be achieved through stakeholder engagement and partnership working to set in place interventions at primary production, slaughterhouse/processing, retail and consumer level.

This work is being supported by a joint *Campylobacter* research strategy to feed in to the evidence-based approach to the Programme. The research programme will also build on the acceptability of interventions to consumers, including issues relating to cost, which will inform decisions on what is appropriate for the UK consumer and how best to communicate the *Campylobacter* control programme to the public. The findings of the first wave of research, Citizens’ Forums on *Campylobacter*, were published in 2010.

More information can be found in www.food.gov.uk/science/socsci/ssres/foodsafetyss/citforumcampy.

## Fresh pig meat

Data reported by MSs on the occurrence of *Campylobacter* in fresh pig meat sampled at retail for the period 2008-2010 are summarised in Table CA6. In 2010, MSs reported a low proportion of *Campylobacter*-positive fresh pig meat samples at retail, or no isolation at all. Overall 0.6 % of samples tested positive. Despite only a few reporting MSs, the 2010 data and the data reported in 2009 and 2008 imply that pig meat is only infrequently contaminated with *Campylobacter*, at retail.

In 2010, Belgium, Germany, Hungary and Spain reported data at several stages of production. The occurrence of *Campylobacter* at slaughter and processing was 10.4 % and 0.4 %, respectively, in Belgium, and 4.9 % and 3.0 %, respectively, in Hungary. At slaughter, Spain reported a high proportion of positive samples (45.5 %). At processing, Germany reported positive findings in 0.9 % of samples. Poland and Portugal reported positive findings of 27.9 % at slaughter and 1.7 % at processing, respectively.

***Table CA6.* Campylobacter *in fresh pig meat at retail, 2008-2010***

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| Germany | Single[1] | 25 g | 174 | 1.7 | 238 | 0.8 | 212 | 0.5 |
| | Single[2] | 25 g | - | - | 382 | 0.3 | - | - |
| Hungary | Single | 25 g | 46 | 4.3 | 52 | 1.9 | - | - |
| Latvia | Single | 1 g | - | - | - | - | 440 | 0 |
| Luxembourg[3] | Single | 10 g | - | - | 26 | 3.8 | - | - |
| Netherlands | Single | 25 g | 617 | 0 | 308 | 0.3 | - | - |
| Spain | Single | 25 g | 95 | 1.1 | - | - | 33 | 6.1 |
| United Kingdom | Single | Swab | - | - | - | - | 1,693 | 0.6 |
| **Total (4 MSs in 2010)** | | | **932** | **0.6** | **1,006** | **0.6** | **2,378** | **0.5** |

Note: data are presented only for sample sizes ≥25.

Note: Only data specified as fresh or carcass are included; frozen meat is not included.

1. In Germany, surveillance in 2010 and 2009.
2. In Germany, monitoring in 2009.
3. In Luxembourg in 2009, additional 169 samples (1 positive) from bovine and pig meat at retail (single sample, 10 g).

## Fresh bovine meat

Five MSs reported data on *Campylobacter* in fresh bovine meat at retail in 2010, with 0.4 % of positive samples in total (Table CA7). This is at the same level as in previous years. Germany and the Netherlands were the only MSs to report positive findings, of 1.9 % and 0.3 %, respectively. Investigations were also reported at other sampling levels. Poland reported a moderate proportion of *Campylobacter*-positive samples at slaughter of 15.0 %. Hungary reported data at slaughter, processing and retail levels from 2010, and the occurrence of *Campylobacter* decreased from 2.2 % at slaughter to 0.6 % at processing and 0 % at retail.

### *Table CA7.* Campylobacter *in fresh bovine meat at retail, 2008-2010*

| Country | Sample unit | Sample weight | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | N | % pos |
| Germany | Single[1] | 25 g | 53 | 1.9 | 168 | 0.6 | 86 | 4.7 |
| | Single[2] | 25 g | - | - | 351 | 0.3 | - | - |
| Hungary | Single | 25 g | 70 | 0 | 57 | 1.8 | - | - |
| Luxembourg[3] | Single | 10 g | 58 | 0 | 151 | 0 | - | - |
| Netherlands | Single | 25 g | 595 | 0.3 | 201 | 1.0 | 322 | 0.9 |
| Spain | Single | 25 g | 32 | 0 | - | - | - | - |
| United Kingdom | Single | Swab | - | - | - | - | 3,249 | 0.1 |
| **Total (5 MSs in 2010)** | | | **808** | **0.4** | **928** | **0.5** | **3,657** | **0.3** |

Note: data are presented only for sample sizes ≥25.

Note: Only data specified as fresh or carcass are included, frozen meat is not included.

1. In Germany, surveillance in 2010 and 2009.
2. In Germany, monitoring in 2009.
3. In Luxembourg in 2009, additional 169 samples (1 positive) from bovine and pig meat at retail (single sample, 10 g).

## Products of meat origin

Data reported on the occurrence of *Campylobacter* in RTE minced meat, meat preparations and meat products are summarised in Table CA8. In 2010, *Campylobacter* was isolated only from RTE products of broiler meat and turkey meat origin in Germany and Ireland. Both of the positive findings were at a low level. *Campylobacter* was not reported from RTE meat products of pig and bovine meat origin.

Several MSs reported data for various types of non-RTE minced meat, meat preparations and meat products at retail, and particularly products from broiler meat were found to be *Campylobacter*-positive. Refer to the level 3 tables for more detailed information.

### *Table CA8.* Campylobacter *in ready-to-eat meat products of meat origin, 2010*

| Country | Description | Sample unit | Sample weight | N | N pos | % pos |
|---|---|---|---|---|---|---|
| **Broiler meat** | | | | | | |
| Germany | Meat products at retail | Single | 25 g | 126 | 8 | 6.3 |
| Ireland | Meat products at processing | Single | 25 g | 50 | 0 | 0 |
| Ireland | Meat products at retail | Single | Various[1] | 400 | 3 | 0.8 |
| Slovakia | Meat products at retail | Batch | 25 g | 34 | 0 | 0 |
| **Total broiler meat (3 MSs)** | | | | **610** | **11** | **1.8** |
| **Turkey meat** | | | | | | |
| Germany | Meat products at retail | Single | 25 g | 36 | 1 | 2.8 |
| Ireland | Meat products at processing | Single | 25 g | 29 | 0 | 0 |
| Ireland | Meat products at retail | Single | Various[1] | 77 | 0 | 0 |
| **Total turkey meat (2 MSs)** | | | | **142** | **1** | **0.7** |
| **Pig meat** | | | | | | |
| Ireland | Meat products at processing | Single | 25 g | 116 | 0 | 0 |
| Ireland | Meat products at retail | Single | Various[1] | 173 | 0 | 0 |
| **Total pig meat (1 MS)** | | | | **289** | **0** | **0** |
| **Bovine meat** | | | | | | |
| Ireland | Meat products at retail | Single | Various[1] | 98 | 0 | 0 |
| **Total bovine meat (1 MS)** | | | | **98** | **0** | **0** |
| **Unspecified meat** | | | | | | |
| Ireland | Meat products at retail | Single | Various[1] | 76 | 0 | 0 |
| **Total unspecified meat (1 MS)** | | | | **76** | **0** | **0** |

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

1. In Ireland, sample weight ranges from 10 g to 25.96 g.

## Other foodstuffs

Several MSs tested other food categories for the presence of *Campylobacter*. The proportion of positive samples in raw cows' milk and dairy products in 2010 is presented in Table CA9. The occurrence of *Campylobacter* ranged from 0 % to 2.7 % in raw cows' milk samples, which included milk intended to be consumed raw, raw milk for the manufacture of low heat treated products, and bulk tank milk intended to be heat treated. No MSs reported investigations with 25 samples or more, from pasteurised milk from cows.

In dairy products made with various types of milk, *Campylobacter* was detected in Belgium and Italy, where 4.1 % of tested batches of cheeses from raw or low heat-treated cows' milk and 2.4 % of tested cheeses from unspecified milk, respectively, were *Campylobacter*-positive.

Ten MSs reported data on food other than meat, milk and dairy products. This included soups, sauces and dressings, spices and herbs, sweets, RTE salads, other processed food products and prepared dishes, cereals and meals, bakery products, live bivalve molluscs and other fishery products. Three MSs tested a total of 113 units of fruit and vegetables (unspecified) and only Italy reported *Campylobacter*-positive findings in 8.3 % of vegetable samples.

***Table CA9.* Campylobacter *in milk and dairy products, 2010***

| Country | Description | Sample unit | Sample weight | N | N pos | % pos |
|---|---|---|---|---|---|---|
| **Cows milk** | | | | | | |
| Germany | Certified raw milk intended to be consumed raw | Single | 25 g | 121 | 0 | 0 |
| | Bulk tank milk samples, intended to be heat treated[1] | Single | 25 g | 314 | 6 | 1.9 |
| | Raw milk for manufacture of pasteurised milk products[2] | Single | 25 g | 438 | 9 | 2.1 |
| Hungary | Raw milk | Single | 50 ml | 185 | 3 | 1.6 |
| Italy | Milk unspecified | Single | Not indicated | 699 | 2 | 0.3 |
| | Milk unspecified | Batch | Not indicated | 51 | 0 | 0 |
| Slovakia | Raw milk | Single | 25 ml | 185 | 5 | 2.7 |
| **Total cow's milk (4 MSs)** | | | | **1,993** | **25** | **1.3** |
| **Dairy products** | | | | | | |
| Belgium | Cheeses made from raw or low heat-treated cows' milk | Batch | 1 g | 49 | 2 | 4.1 |
| Italy | Cheeses made from cows' milk | Single | Not indicated | 34 | 0 | 0 |
| | Cheeses, made from unspecified milk or other animal milk | Single | Not indicated | 83 | 2 | 2.4 |
| | Cheeses, made from unspecified milk or other animal milk 'at processing' | Single | Not indicated | 135 | 0 | 0 |
| Spain | Cheeses, made from unspecified milk or other animal milk | Single | 25 g | 83 | 0 | 0 |
| **Total dairy products (3 MSs)** | | | | **384** | **4** | **1.0** |

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

1. Monitoring.

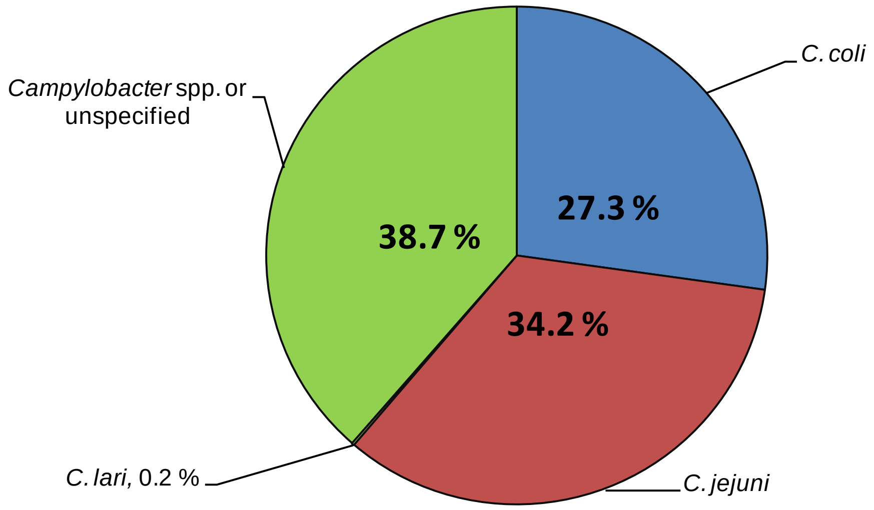
2. Surveillance.

### *Campylobacter* species in fresh broiler meat

The overall *Campylobacter* species distribution in fresh broiler meat at EU level is presented in Figure CA5. As in 2009, *C. jejuni* accounted for approximately one third of the isolates. Unfortunately, almost half of the *Campylobacter* isolates were reported only as *Campylobacter* spp. Five MSs reported *C. coli* as the predominant species (45.9 %-59.3 % of isolates) in fresh broiler meat (Austria, Hungary, Ireland, Poland and Romania), while *C. jejuni* was reported as the predominant species (60.0 %-62.0 % of isolates) in three MSs (Germany, Luxembourg and Slovenia). *C. lari* was found in fresh broiler meat in Germany, Hungary and Romania in 2 of 245, one of 128 and 1 of 91 speciated isolates, respectively.

For information on data reported on other foodstuffs, refer to the level 3 tables.

***Figure CA5. Species distribution of* Campylobacter *isolates from fresh broiler meat, 2010***




Source: Includes data from 16 MSs (Austria, Belgium, Denmark, Estonia, Germany, Hungary, Ireland, Italy, Latvia, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovenia and Spain).

Note: Some of the isolates might be positive with more than one species.
N = 2,386
Includes data where the sample size is <25.

### 3.2.3 *Campylobacter* in animals

In 2010, 21 MSs and two non-MSs reported data on *Campylobacter* in animals (Table CA10), primarily from broiler flocks, but also in pigs, cattle and to some extent in goats, sheep and pets.

***Table CA10. Overview of countries reporting animal data, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Poultry[1] | 16 | **MSs:** AT, CZ, DE, DK, EE, ES, FI, FR, HU, IT, LU, NL, RO, SE, SI, SK<br>**Non-MSs:** CH, NO |
| Pigs | 9 | **MSs:** DE, EE, ES, HU, IE, IT, LV, SK, UK<br>**Non-MS:** CH |
| Cattle | 12 | **MSs:** AT, BG, DE, ES, HU, IE, IT, LV, NL, PL, SK, UK<br>**Non-MSs:** CH, NO |
| Sheep and goats | 8 | **MSs:** DE, HU, IE, IT, NL, RO, SK, UK<br>**Non-MSs:** CH, NO |
| Pets | 10 | **MSs:** DE, DK, EE, IE, IT, LV, NL, RO, SK, UK<br>**Non-MSs:** CH, NO |
| Other animals | 9 | **MSs:** DE, IE, IT, LV, NL, PL, RO, SK, UK<br>**Non-MS:** CH |

Note: The overview table includes all data reported by MSs. However, in the following chapter, data reported as HACCP, own control and import are not included in the detailed tables, and, unless stated otherwise, data from import, suspect sampling and outbreak or clinical investigations are also excluded. Also, only countries reporting 25 samples or more have been included for analysis.

1. Poultry includes laying hens, broilers unspecified *Gallus gallus*, ducks, geese and turkeys.

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

#### Broilers and other poultry

In 2010, 11 MSs and two non-MSs provided information on the occurrence of *Campylobacter* in broiler flocks, batches or individual animals based on a sample size ≥25 (Table CA11). In two of three MSs reporting animal-based data, the prevalences were extremely high (>78 %). In four of the MSs reporting flock/batch-based data, the reported occurrences were extremely high (>72 %), whereas low levels (<6 %) were observed in Estonia, Finland and Norway.

Denmark, Finland, Sweden, and Norway reported the highest number of broiler flocks tested, and each of these countries has had a *Campylobacter* control or monitoring programme in place for several years. Denmark reported fewer flocks positive in 2010 than in 2009 and 2008 owing to a change in their sampling strategy (see text box below), while in Sweden, Finland and Norway the prevalences over the three years were more stable.

In most cases, MSs reported the occurrence of *Campylobacter* in broilers or broiler flocks in 2010 at similar levels as in previous years (Table CA11). However, Spain reported a higher proportion of positive flocks in a national survey in 2010 (82.2 %) than in 2009 (59.6 %).

*Campylobacter* investigations in turkeys were reported by Germany, where 66.2 % of the flocks tested were found positive and 33.3 % of slaughter batches were positive. In Slovenia, 41.8 % of slaughter batches of turkeys were positive for *Campylobacter*.

In Denmark in 2010, as ante mortem surveillance for *Campylobacter* in broiler flocks became mandatory, the industry discontinued reporting on the voluntary sampling of cloacal swabs at the slaughterhouse prior to slaughter. The 2010 data therefore include samples of boot swabs collected in the stable 7–10 days before slaughter but not samples from flocks that may have contracted *Campylobacter* between sampling and slaughter. This has resulted in a decrease in the reporting of positive flocks due to the lower prevalence of *Campylobacter* at this stage. The boot swab samples are analysed using a polymerase chain reaction (PCR) detection method.

***Table CA11.* Campylobacter *in broilers, 2008-2010***

| Country | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|
| | N | % pos | N | % pos | N | % pos |
| **Broilers (animal-based data)** | | | | | | |
| Czech Republic | - | - | - | - | 422 | 69.9 |
| France | 196 | 78.1 | 191 | 80.6 | - | - |
| Hungary[2] | 439 | 66.5 | 713 | 78.0 | 325 | 54.2 |
| Romania | 51 | 100 | 104 | 100 | - | - |
| **Total animal-based (3 MSs in 2010)** | **686** | **72.3** | **1,008** | **80.8** | **747** | **63.1** |
| **Broilers (flock-based data)** | | | | | | |
| Austria[1] | 394 | 46.7 | 326 | 55.5 | - | - |
| Czech Republic[1] | 134 | 72.4 | - | - | 422 | 61.1 |
| Denmark[10] | 3,132 | 16.5 | 4,591 | 29.4 | 4,912 | 25.9 |
| Estonia[1] | 47 | 0 | 48 | 0 | - | - |
| Finland[1,6] | 338 | 1.8 | - | - | - | - |
| Finland[1,7] | 1,409 | 6.0 | 1,720 | 4.8 | 1,276 | 6.5 |
| Germany[2,4] | - | - | 149 | 15.4 | 345 | 32.2 |
| Germany[2,5] | - | - | 332 | 10.2 | - | - |
| Lithuania | - | - | - | - | 374 | 42.0 |
| Poland | - | - | - | - | 420 | 79.0 |
| Slovenia[1,8] | 100 | 88.0 | 157 | 73.2 | - | - |
| Slovenia[1,9] | 99 | 92.9 | 149 | 83.9 | - | - |
| Spain[1] | 202 | 82.2 | 198 | 59.6 | - | - |
| Sweden[1] | 3,357 | 13.2 | 3,219 | 12.0 | 2,398 | 12.4 |
| United Kingdom[1] | - | - | 400 | 77.5 | - | - |
| **Total flock-based (8 MSs in 2010)** | **9,212** | **18.2** | **11,289** | **24.1** | **10,147** | **24.7** |
| Norway[2,3] | 2,170 | 5.1 | 1,924 | 6.1 | 4,675 | 4.1 |
| Switzerland | 400 | 33.0 | 442 | 44.3 | - | - |

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

1. Slaughter batch-based data.
2. At farm, Germany (2009), Hungary (2009) and Norway (2008-2010). For Norway (2008-2010), flocks sampled maximum four days before slaughter.
3. Data from Norway 2009 and 2010 cover only the peak season, 1 May to 31 October.
4. In Germany, surveillance in 2009.
5. In Germany, monitoring in 2009.
6. In Finland, sampling in January-May and November-December in 2010.
7. In Finland, sampling between June and October in 2010.
8. In Slovenia, caecum samples in 2010.
9. In Slovenia, neck skin samples in 2010.
10. Data from Denmark in 2010 are not comparable with previous years owing to a change in sampling strategy from cloacal swabs at slaughter to boot swabs 7-10 days prior to slaughter.

## Pigs

In 2010, five MSs and one non-MS reported data on *Campylobacter* in pigs. The proportion of *Campylobacter*-positive animals ranged between 1.8 % and 66.7 % in the reporting MSs. Germany and Spain reported 34.5 % and 59.9 % of the investigated pig herds as *Campylobacter* positive (Table CA12). The *Campylobacter* prevalence in animals varied between the years in Hungary and ranged from 23.6 % in 2008 to 61.2 % in 2009. In herds it varied between 34.5 % to 43.9 % in Germany, and between 59.9 % and 67.6 % in Spain from 2009 to 2010.

***Table CA12.* Campylobacter *in pigs, 2008-2010***

| Country | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|
| | N | % pos | N | % pos | N | % pos |
| **Pigs (animal-based data)** | | | | | | |
| Austria | - | - | - | - | 286 | 50.0 |
| Denmark | - | - | 287 | 55.7 | - | - |
| Estonia | 42 | 66.7 | - | - | - | - |
| France | - | - | 174 | 67.2 | - | - |
| Hungary | 785 | 37.7 | 930 | 61.2 | 225 | 23.6 |
| Italy | - | - | 155 | 3.2 | - | - |
| Latvia | 110 | 1.8 | - | - | - | - |
| Slovakia | - | - | - | - | 156 | 7.7 |
| Slovenia | - | - | 261 | 23.4 | - | - |
| **Total animal-based data (3 MSs in 2010)** | **937** | **34.8** | **1,807** | **50.5** | **667** | **31.2** |
| Switzerland | 300 | 65.0 | 350 | 67.4 | - | - |
| **Pigs (herd-based data)** | | | | | | |
| Denmark | - | - | - | - | 292 | 67.8 |
| Germany | 113 | 34.5 | 123 | 43.9 | 209 | 37.3 |
| Spain[1] | 217 | 59.9 | 284 | 67.6 | 171 | 65.5 |
| **Total herd-based data (2 MSs in 2010)** | **330** | **51.2** | **407** | **60.4** | **672** | **57.7** |

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

1. In Spain, slaughter batch-based data.

## Cattle

Eight MSs provided data on cattle in 2010 (clinical investigations are not included). The data on *Campylobacter* findings in cattle populations for the years 2008-2010 are summarised in Table CA13.

For the animal-based data, Austria reported the highest MSs' prevalence in cattle of 27.4 %. The two non-MSs also reported moderate to high prevalence of *Campylobacter*-positive animals. The other MSs reported low levels or no positive animals in 2010. Two MSs reported herd-based data in 2010. A very high proportion of positive samples was reported by Spain (67.0 %), whereas Germany found a low to moderate prevalence of *Campylobacter*-positive tested herds.

### *Table CA13.* Campylobacter *in cattle, 2008-2010*

| Country | Description | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|
| | | N | % pos | N | % pos | N | % pos |
| **Cattle (animal-based data)** | | | | | | | |
| Austria | Unspecified | 671 | 27.4 | - | - | 923 | 28.5 |
| Bulgaria | Dairy cows | 235 | 0 | 222 | 0 | 218 | 0 |
| Denmark | Cattle >2 years | - | - | 188 | 58.0 | - | - |
| Germany[1] | Calves <1 year | 184 | 9.8 | 321 | 29.0 | - | - |
| Hungary | Dairy cows | 439 | 3.9 | 39 | 100 | 234 | 9.4 |
| Ireland | Calves <1 year | - | - | 2,358 | 8.0 | 2,549 | 11.9 |
| Italy | Unspecified 'at farm'[2] | 1,172 | 0 | 2,756 | 1.2 | 2,147 | 1.6 |
| | Unspecified 'at farm'[3] | 233 | 0 | - | - | - | - |
| | Unspecified[2] | 303 | 0 | - | - | - | - |
| Poland | Unspecified | 96 | 0 | 130 | 30.8 | - | - |
| Slovakia | Unspecified | 77 | 0 | 316 | 0 | 508 | 6.1 |
| | Breeding bulls | 105 | 0 | - | - | - | - |
| Slovenia | Unspecified | - | - | - | - | 385 | 7.8 |
| **Total animal-based (7 MSs in 2010)** | | **3,515** | **6.2** | **6,330** | **7.9** | **6,964** | **9.8** |
| Norway | Unspecified | 121 | 21.5 | - | - | - | - |
| Switzerland | Calves <1 year | 245 | 15.1 | - | - | - | - |
| **Cattle (herd-based data)** | | | | | | | |
| Denmark | Cattle >2 years | - | - | - | - | 168 | 61.3 |
| Germany | Cattle (all) | 380 | 10.8 | 706 | 18.0 | 788 | 6.7 |
| | Calves <1 year | 133 | 8.3 | 149 | 4.7 | 206 | 9.7 |
| | Dairy cows | 58 | 1.7 | 179 | 0.6 | 184 | 0 |
| Spain[4] | Calves <1 year | 200 | 67.0 | 258 | 41.5 | 168 | 37.5 |
| **Total herd-based (2 MSs in 2010)** | | **771** | **24.3** | **1,292** | **18.7** | **1,514** | **15.8** |

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

1. In Germany, monitoring in 2009.
2. In Italy, control and eradication programme data.
3. In Italy, survey data.
4. In Spain, slaughter batch-based data from a national survey.

### Other farm animals

Data on *Campylobacter* in sheep and goats are primarily from clinical investigations. In 2010, a total of 317 goats (animal-based) from Ireland, Italy, the Netherlands, Slovakia and Switzerland were tested (overall, 1.9 % positive) and 89 herds from Germany and Italy (overall, 1.1 % positive). A total of 1,095 sheep (animal-based) from Hungary, Ireland, Italy, the Netherlands, Norway, Romania, Slovakia and Switzerland were tested (overall, 4.6 % positive) and 338 herds from Germany and Italy (overall 1.2 % positive). Additionally, 137 mixed sheep and goats were tested in Italy (13.9 % positive).

## Pets

In 2010, MSs reported information on *Campylobacter* from testing of cats and dogs, which covered 2,152 animals and results, mostly from clinical investigations. All MSs providing information on *Campylobacter* in cats and dogs reported between 2.3 % (Germany) and 47.7 % (the Netherlands) positive samples (Table CA14).

### *Table CA14.* Campylobacter *in pets, 2008-2010*

| Country | 2010 | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|
| | N | % pos | N | % pos | N | % pos |
| **Cats** | | | | | | |
| Germany | 600 | 2.3 | 184 | 6.5 | 251 | 2.0 |
| Italy | - | - | 27 | 0 | - | - |
| Netherlands[1] | 56 | 25.0 | 246 | 13.0 | 214 | 8.9 |
| Slovakia | - | - | - | - | 25 | 8.0 |
| **Total (cats, 2 MSs in 2010)** | **656** | **4.3** | **457** | **9.6** | **490** | **5.3** |
| Norway[1] | 97 | 9.3 | 97 | 9.3 | 85 | 7.1 |
| Switzerland[1] | 885 | 0.1 | 952 | 0.3 | 929 | 1.2 |
| **Dogs** | | | | | | |
| Germany | 1,129 | 5.0 | 374 | 4.8 | 491 | 5.9 |
| Ireland | - | - | - | - | 33 | 27.3 |
| Italy[1,2] | 30 | 0 | 169 | 3.6 | 61 | 11.5 |
| Latvia[1] | - | - | - | - | 26 | 3.8 |
| Netherlands[1] | 235 | 47.7 | 461 | 15.6 | 418 | 15.8 |
| Romania | 25 | 16.0 | - | - | - | - |
| Slovakia[1] | 77 | 11.7 | 121 | 5.0 | 137 | 10.9 |
| **Total (dogs, 5 MSs in 2010)** | **1,496** | **12.2** | **1,125** | **9.1** | **1,166** | **10.9** |
| Norway[1] | 386 | 31.6 | 342 | 27.5 | 287 | 28.9 |
| Switzerland[1] | 1,290 | 0.4 | 1,350 | 0.9 | 1,366 | 3.4 |

Note: Data are presented only for sample sizes ≥25. Clinical or diagnostic investigations are included.

1. Clinical investigations: Italy (2010), Latvia (2008), the Netherlands (2008), Norway (2008), Slovakia (2008 and 2010) and Switzerland (2008, 2009 and 2010).
2. In Italy in 2008, clinical investigations and surveillance.

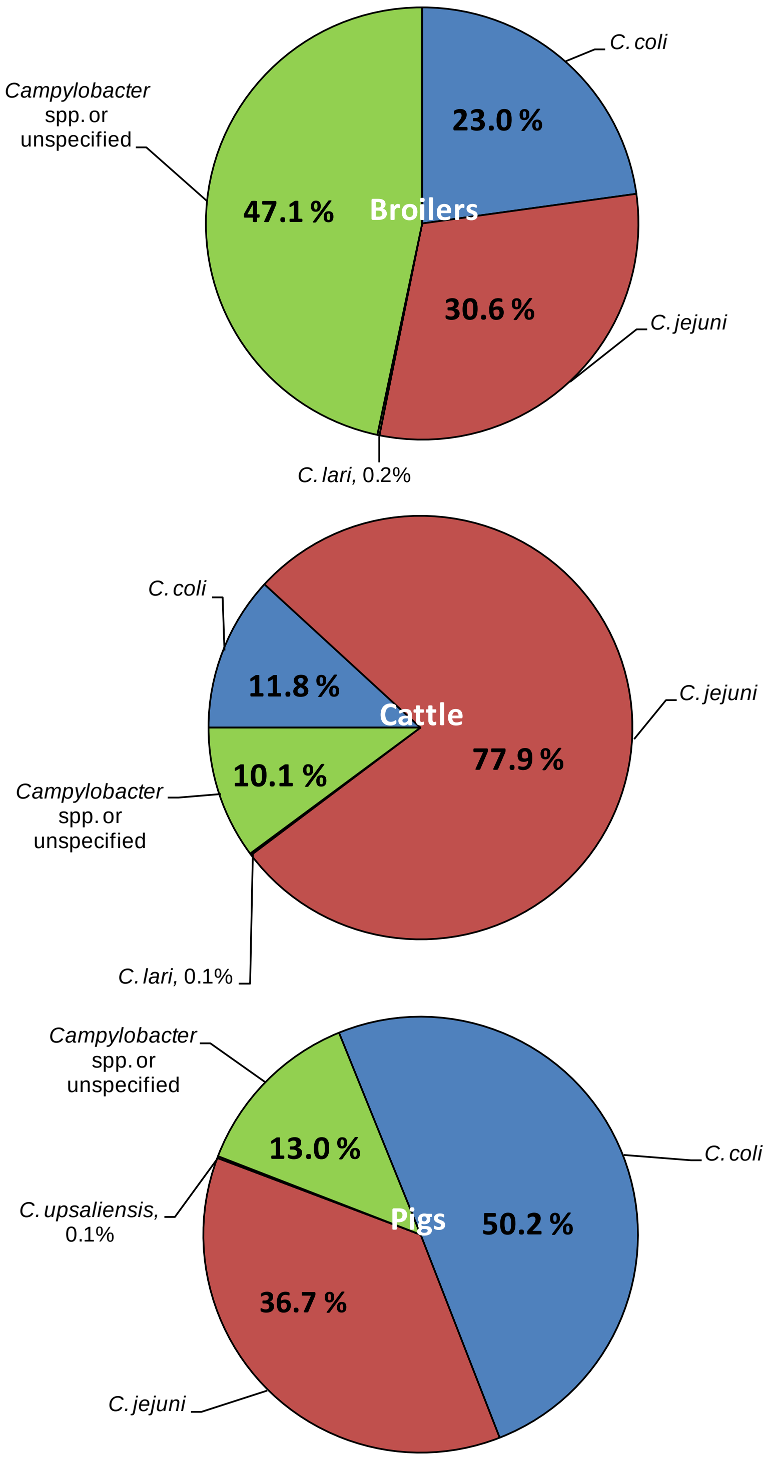
## *Campylobacter* species in animals

Among animal samples testing positive for *Campylobacter*, only about half of the isolates from broilers were speciated (53.1 %), whereas speciation was more common for isolates from pigs (87.0 %) and cattle (89.8 %). Nevertheless, the reported data indicate that *C. jejuni* was the most commonly isolated species in broilers (30.6 %) and cattle (77.9 %), while the majority of isolates from pigs were *C. coli* (50.2 %). This was lower than the proportion of *C. coli* observed in pigs in 2009 (84.2 %) (Figure CA6). *C. lari* was reported in four broiler samples and one bovine sample. *C. upsaliensis* was reported in one pig sample.

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

For additional information on the speciation of animal isolates, see the level 3 tables.

***Figure CA6. Species distribution of positive samples isolated from broilers, cattle and pigs, 2010***




Source:

Broilers: Data from 16 MSs are included (Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Luxembourg, Netherlands, Romania, Slovakia, Slovenia, Spain and Sweden) and two non-MSs (Norway and Switzerland), N=14,192.

Cattle: Data from 12 MSs are included (Austria, Bulgaria, Germany, Hungary, Ireland, Italy, Latvia, Netherlands, Poland, Slovakia, Spain and United Kingdom) and two non-MSs (Norway and Switzerland), N=10,028.

Pigs: Data from 9 MSs are included (Estonia, Germany, Hungary, Ireland, Italy, Latvia, Slovakia, Spain and United Kingdom) and one non-MS (Switzerland), N=1,709.

Note: Clinical investigations included.
Data for broilers from Estonia include animal and slaughter batch data, and from Italy include animal and herd data.
Data for cattle from Italy include animal and herd data.

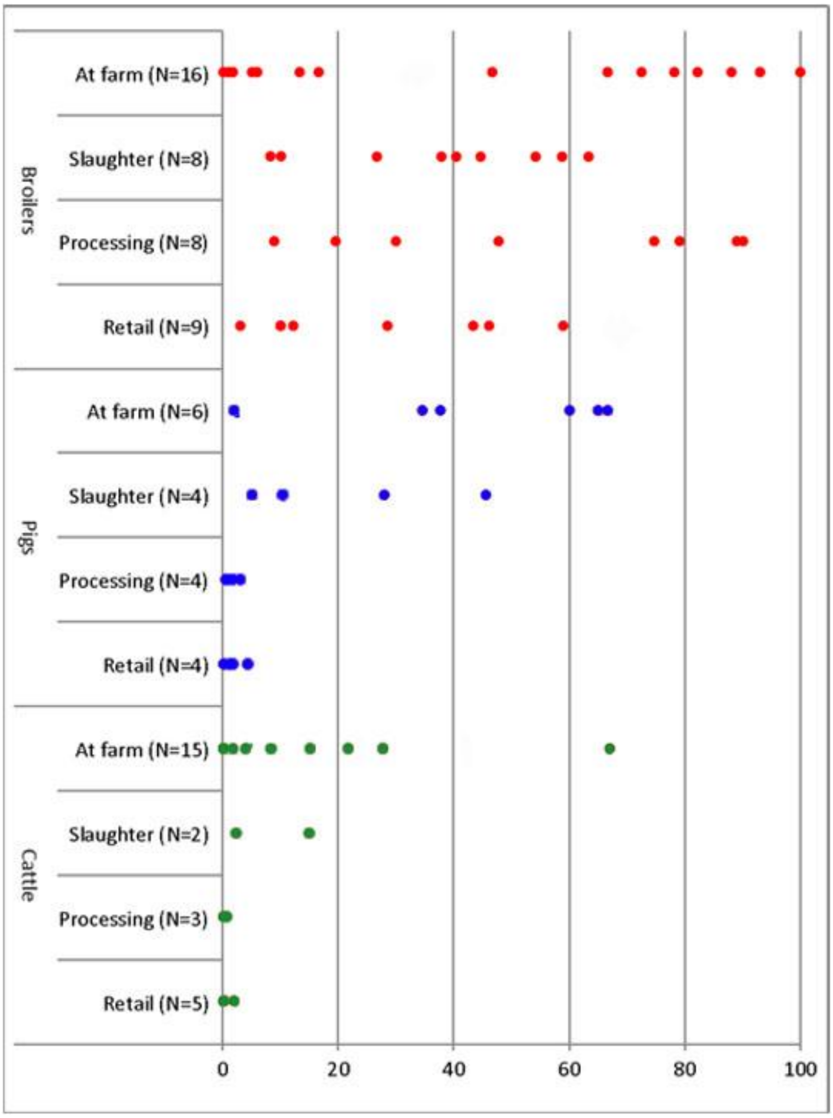
Note: Some of the isolates might be positive with more than one species.

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

A general overview of *Campylobacter* data reported by MSs in 2010 from broilers, pigs, bovine animals and food thereof is presented in Figure CA7. As in previous years, data included indicate that the proportion of positive samples is much higher in pig and cattle populations than in samples of fresh pig and bovine meat at processing and retail. However, this is not observed in broilers among which the prevalence of *Campylobacter* does not decrease notably from live animals along the food chain to retail.

The findings in 2010 are similar to those in 2009 and suggest that pig and bovine carcasses are less contaminated with faecal material during slaughter and/or that *Campylobacter* species are not able to survive well on pig and bovine meat during slaughtering and processing operations. The number of MS investigations reported at the different stages in the food chain in 2010 was similar to the number reported in 2009, and was fairly consistent across stages for broilers and pigs. However, for cattle, the numbers of investigations at farm were substantially higher than at other production stages. *Campylobacter* observations are distributed quite evenly between the maximum and minimum values within the different stages, which might indicate substantial variations within EU. The observed variation may be due to several reasons, for example a true variation among MSs, differences in sampling and testing protocols or seasonal variation in the occurrence of *Campylobacter,* or simply a random variation owing to the low number of tested samples.

***Figure CA7. Proportions of* Campylobacter*-positive units, by animal species and sampling level of fresh meat within the EU, 2010***




Note: Data are presented only for sample sizes ≥25. Each point represents a MS investigation, including animal, herd, single samples and batch based data.

### 3.2.5 Discussion

Campylobacteriosis has, since 2005, continued to be the most commonly reported zoonosis in humans in the EU. In 2010, the number of notified cases of thermotolerant *Campylobacter* in the EU increased by 6.7 % compared with 2009. The EU notification rate of confirmed cases of human campylobacteriosis has followed a 5 year increasing trend since 2006 which has been more marked since 2008. The reasons for this increasing trend are not completely understood at present. One possible explanation for the continuous marked increase since 2008 might be more focused surveillance and/or greater awareness of human campylobacteriosis owing to a decrease in human salmonellosis. However, because of the characteristics of this multi-host pathogen and its prevalence in the environment, it is difficult to understand all aspects of its epidemiology and the possible reasons for the increase of the human cases.

EFSA's Panel on Biological Hazards (BIOHAZ) estimated in its scientific opinion[31] that the handling, preparation and consumption of broiler meat may account for 20 % to 30 % of human campylobacteriosis cases in the EU, while 50 % to 80 % may be attributed to the chicken (broiler) reservoir as a whole. *Campylobacter* strains from the broiler reservoir may reach humans via routes other than food (e.g. by the environment or by direct contact). The principal reservoirs of *Campylobacter* spp. are the alimentary tracts of wild and domesticated birds and mammals. There are multiple pathways of human exposure, and a meta-analysis of case-control studies suggests a variety of risk factors including travelling, animal contact, food and untreated drinking water.

Once again in 2010, fresh broiler and other poultry meat were the foodstuffs in which *Campylobacter* was most frequently reported. The proportion of *Campylobacter*-positive fresh broiler meat samples has remained at a stable high level in the reporting MSs group since 2005. Approximately 30 % of the samples are reported positive each year, even though there are large differences between the MSs. As broiler meat is regarded as the most important food source of human *Campylobacter* infections, and as no major changes compared with previous years were observed either in other foodstuffs or in animal species, it appears, in light of the reported data, that the occurrence of *Campylobacter* in food and animals has remained mostly unchanged throughout the past 5 years.

The importance of broiler meat as a source of human *Campylobacter* infections was further illustrated by the reported food-borne outbreak data from 2010. Two-thirds (17 out of 27) of the *Campylobacter* strong evidence outbreaks, where information on the implicated food vehicle was provided, were linked to broiler meat. Five of the outbreaks were attributed to raw milk, indicating the relevance of risks related to consuming unpasteurised milk. The risk of campylobacteriosis and other diseases associated with the consumption of raw milk has been well documented[32,33,34].

As in previous years, most MSs reported high to extremely high prevalence of *Campylobacter* in broiler flocks. Low to moderate prevalence was reported by the Nordic countries and Estonia.

*Campylobacter* was relatively often detected in pigs and cattle but only infrequently from fresh meat of these animal species. This is in line with the notion that these foodstuffs are not a common source of human campylobacteriosis.

31 EFSA (European Food Safety Authority), 2010. Scientific Opinion of Panel on Biological Hazards (BIOHAZ) on Quantification of the risk posed by broiler meat to human campylobacteriosis in the EU. EFSA Journal 2010, 8(1):1437, 89 pp.

32 Heuvelink AE, Heerwaarden C van, Zwartkruis-Nahuis A; Tilburg JJHC, Bos MH, Heilmann FGC, Hofhuis A, Hoekstra T and Boer E de, 2009. Two outbreaks of campylobacteriosis associated with the consumption of raw cow's milk. International Journal of Food Microbiology, 134, 70-74.

33 Schoder D, Zangana A and Wagner M, 2010. Sheep and goat raw milk consumption: a hygienic matter of concern? Archiv fuer Lebensmittelhygiene, 61, 229-234.

34 Amato S, Maragno M, Mosele P, Sforzi M, Mioni R, Barco L, Pozza M, Antonello K and Ricci A, 2007. An outbreak of *Campylobacter jejuni* linked to the consumption of raw milk in Italy. Zoonoses and public health, 54 s1, 23-23.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.3 *Listeria*

The bacterial genus *Listeria* currently comprises eight species, but human cases of listeriosis are almost exclusively caused by the species *Listeria monocytogenes. Listeria* species are ubiquitous organisms that are widely distributed in the environment, especially in plant matter and soil. The principal reservoirs of *Listeria* are soil, forage and water. Other reservoirs include infected domestic and wild animals. The main route of transmission to both humans and animals is believed to be through consumption of contaminated food or feed. Although rare, infection can also be transmitted directly from infected animals to humans as well as between humans. Cooking at temperatures higher than 65°C destroys *Listeria*, but the bacteria are known to multiply at temperatures down to +2/+4°C, which makes the occurrence in RTE foods with a relatively long shelf life of particular concern.

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

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

Table LI1 presents the countries that have reported data on *L. monocytogenes* for 2010.

***Table LI1. Overview of countries reporting* L. monocytogenes *data, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 26 | **All MSs** except PT<br>**Non-MSs**: CH, IS, NO |
| Food | 27 | **All MSs**<br>**Non-MSs:** CH, NO |
| Animals | 16 | **MSs:** AT, BG, DE, EE, ES, GR, HU, IE, IT, LT, LV, NL, PL, PT, RO, SK<br>**Non MSs:** CH, NO |

Note: The overview table includes all data reported by MSs. However, in the following chapter, data reported as HACCP or own control are not included in the detailed tables, and, unless stated, data from import, suspect sampling and outbreak or clinical investigations are also excluded. Also, only countries reporting 25 samples or more have been included for analysis.

### 3.3.1 Listeriosis in humans

In 2010, 26 MSs reported 1,601 confirmed human cases of listeriosis (Table LI2). This represented a 3.2 % decrease compared with 2009 (1,654). The overall EU notification rate was 0.35 cases per 100,000 population, with the highest country-specific notification rates observed in (Finland 1.33 cases per 100,000 population) followed by Denmark and Spain (1.12 cases per 100,000 population).

***Table LI2. Reported listeriosis cases in humans, 2006-2010, and notification rate for confirmed cases, 2010***

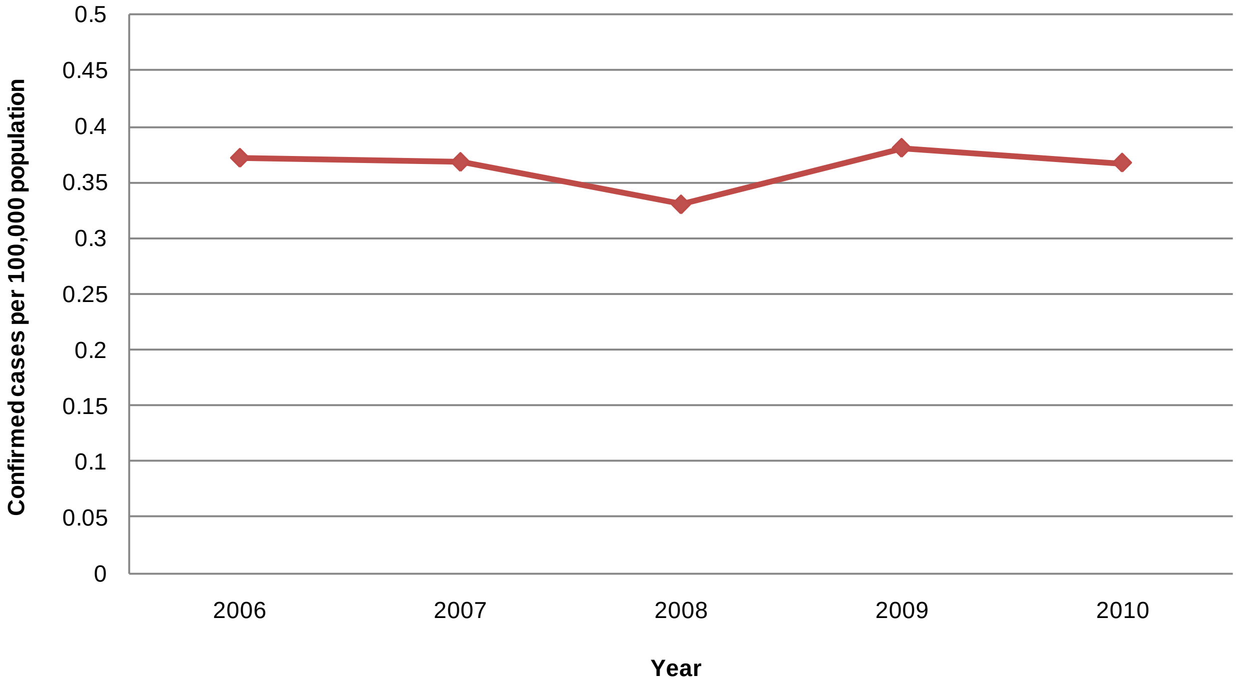
| Country | 2010 | | | | 2009 | 2008 | 2007 | 2006 |
|---|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases | Confirmed cases/ 100,000 | Confirmed cases | | | |
| Austria | C | 34 | 34 | 0.41 | 46 | 31 | 20 | 10 |
| Belgium | C | 40 | 40 | 0.37 | 58 | 64 | 57 | 67 |
| Bulgaria | A | 4 | 4 | 0.05 | 5 | 5 | 11 | 6 |
| Cyprus | C | 1 | 1 | 0.12 | 0 | 0 | 0 | 1 |
| Czech Republic | C | 26 | 26 | 0.25 | 32 | 37 | 51 | 78 |
| Denmark | C | 62 | 62 | 1.12 | 97 | 51 | 58 | 56 |
| Estonia | C | 5 | 5 | 0.37 | 3 | 8 | 3 | 1 |
| Finland | C | 71 | 71 | 1.33 | 34 | 40 | 40 | 46 |
| France | C | 312 | 312 | 0.48 | 328 | 276 | 319 | 290 |
| Germany | C | 390 | 377 | 0.46 | 394 | 306 | 356 | 508 |
| Greece | C | 10 | 10 | 0.09 | 4 | 1 | 10 | 7 |
| Hungary | C | 20 | 20 | 0.20 | 16 | 19 | 9 | 14 |
| Ireland | C | 10 | 10 | 0.22 | 10 | 13 | 21 | 7 |
| Italy | C | 95 | 95 | 0.16 | 88 | 118 | 89 | 51 |
| Latvia | C | 7 | 7 | 0.31 | 4 | 5 | 5 | 2 |
| Lithuania | A | 5 | 5 | 0.15 | 5 | 7 | 4 | 4 |
| Luxembourg | U | 0 | 0 | 0 | 3 | 1 | 6 | 4 |
| Malta | C | 1 | 1 | 0.24 | 0 | 0 | 0 | 0 |
| Netherlands | C | 72 | 72 | 0.43 | 44 | 45 | 68 | 64 |
| Poland | C | 59 | 59 | 0.15 | 32 | 33 | 43 | 28 |
| Portugal | -[2] | - | - | - | - | - | - | - |
| Romania | C | 6 | 6 | 0.03 | 6 | 0 | 0 | - |
| Slovakia | C | 5 | 5 | 0.09 | 10 | 8 | 9 | 12 |
| Slovenia | C | 11 | 11 | 0.54 | 6 | 3 | 4 | 7 |
| Spain[3] | C | 129 | 129 | 1.12 | 121 | 88 | 82 | 78 |
| Sweden | C | 63 | 63 | 0.67 | 73 | 60 | 56 | 42 |
| United Kingdom | C | 176 | 176 | 0.28 | 235 | 206 | 260 | 208 |
| **EU Total** | | **1,614** | **1,601** | **0.35** | **1,654** | **1,425** | **1,581** | **1,591** |
| Iceland | C | 1 | 1 | 0.31 | 0 | 0 | 4 | 0 |
| Liechtenstein | - | - | - | - | - | 0 | 0 | 0 |
| Norway | C | 23 | 23 | 0.47 | 31 | 34 | 49 | 27 |
| Switzerland[4] | C | 67 | 67 | 0.90 | 41 | 43 | 51 | 73 |

1. A: aggregated data report; C: case-based report; –: no report; U: unspecified.
2. No surveillance system exists.
3. Sistema de Informacion Microbiologica (SIM), notification rates calculated on estimated coverage, 25 %.
4. Switzerland provided data directly to EFSA.

The EU notification rate of confirmed cases of listeriosis was slightly fluctuating in the 2006-2010 period (based on countries reporting data for five consecutive years) (Figure LI1).

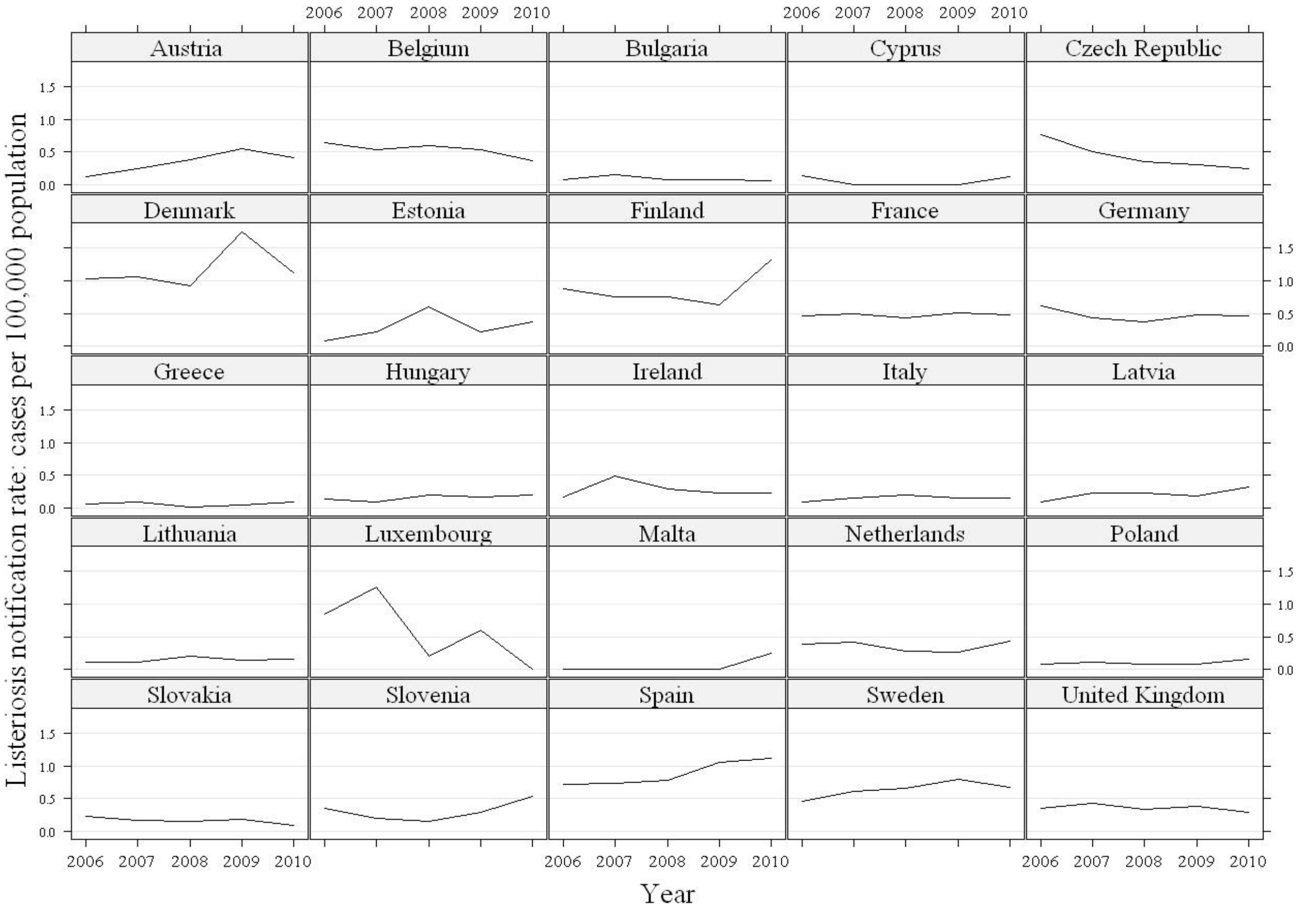
Within each reporting MS, statistically significant increasing trends in listeriosis notification rates from 2006 to 2010 were noted in Austria, Latvia and Spain, while statistically significant decreasing trends were noted in Belgium, the Czech Republic, Luxembourg, and Slovakia (Figure LI2).

***Figure LI1. Notification rates of reported confirmed cases of human listeriosis in 25 Member States[1], 2006-2010***




1. Includes only MSs with data from five consecutive years: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

***Figure LI2. Notification rates of reported confirmed cases of listeriosis in humans per Member State[1], (2006-2010)***




1. Spanish surveillance system covers only 25 % of the total population.

The age distribution of listeriosis cases in 2010 was similar to that observed in previous years. The notification rate was highest in those aged over 65 years (1.21 cases per 100,000 population), covering 60.2 % of all reported cases. Out of 1,595 confirmed reported cases, the age group over 65 years old accounted for most of the cases (60.3 %), while 6.7 % of cases were detected in the age group 0-4 years and the majority of these cases (96.3 %, N=108) were in infants (age <1 year).

The transmission route was stated for 132 (8.26 %) confirmed cases. Of those, 87 cases were infected with *L. monocytogenes* via suspected food, and 43 cases were pregnancy-associated. One case was reported as transmission by contact with animals and one as other (not specified) transmission. Of the cases infected via consumption of contaminated food, cheese was mentioned as the suspected vehicle for 13 cases, milk and fish for one case, while for the remaining cases no information on the food source was provided.

The outcome of the disease was known for 1,063 confirmed cases (66.3 %). Of these, 181 cases were reported as deceased due to *Listeria* spp. infection (17.0 %), with the highest case fatality reported in the age groups 0-5 years (22.9 %, 19 deaths in 83 cases) followed by 45-64 years (19.1 %, 44 deaths in 230 cases) and 65 plus years (17.3 %, 110 deaths in 637 cases).

In total, 98 % of confirmed *L. monocytogenes* cases with known importation status (reported for 83 % of cases) were of domestic origin.

### 3.3.2 *Listeria* in food

EU legislation (Regulation (EC) No 2073/2005) lays down food safety criteria for *L. monocytogenes* in RTE foods. This regulation came into force in January 2006, and criteria laid down by it are described below. Data reported reflect the Regulation and investigations have therefore focused on testing RTE foods for compliance with these limits.

In 2010, data on *L. monocytogenes,* in 25 or more samples of food, were reported by 19 MSs and one non-MS. These data cover a substantial number of food samples and food categories. The data presented in the following section focus on RTE foods, where *L. monocytogenes* was detected either by qualitative (absence or presence) or quantitative (enumeration) investigations (findings of *L. monocytogenes* with more than 100 cfu/g) or both.

#### Compliance with microbiological criteria

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

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

For many of the reported data, it was not evident whether the RTE food tested was able to support the growth of *L. monocytogenes* or not. This information is difficult to collect as the ability of a product to support growth is dependent on various factors such as the pH, water activity and composition of the specific product, which can vary even within the same food category. Also, information from studies, carried out by the producers, on the growth capacity of *L. monocytogenes* in individual products was not available. Furthermore, in some cases, it was not possible to establish at which stage in the production chain samples were collected.

For the reasons described above, the following assumptions were applied to the analyses:

- for samples reported to be taken at processing, a criterion of absence in 25 g was applied. Samples from hard cheeses and fermented sausages are an exception, as these categories are assumed not to be able to support the growth of *L. monocytogenes*. For these samples the limit ≤100 cfu/g was applied at processing;
- for all investigations, where the sampling stage was not reported, it was assumed that samples were collected from products placed on the market, and the criterion ≤100 cfu/g was applied; and
- for food intended for infants and special medical purposes the criterion absence in 25 g was applied throughout the food chain.

Only investigations including 25 tested units or more were included in analyses. Samples reported as HACCP or own controls were not included for analysis and, unless stated, data from import, suspect sampling and outbreak or clinical investigations are also excluded. The results from qualitative examinations have been used to analyse the compliance with the criterion 'absence in 25 g' (unless stated otherwise), and the results from quantitative analyses have been used to analyse compliance with the limit 100 cfu/g.

The number of samples in non-compliance with the *L. monocytogenes* criteria is shown in Table LI3. For RTE products on the market, very low proportions of samples were generally found to be non-compliant with the criterion of ≤100 cfu/g. However, higher levels of non-compliant samples were reported in samples analysed using the detection method (absence in 25 g) for RTE products at the processing stage. There were no major developments in the levels of non-compliant RTE food units in 2010.

*RTE products at processing level*

The highest level of non-compliance in single samples was observed in RTE fishery products (9.6 %). The category 'other RTE products' was also among the categories with the highest levels of non-compliance (4.9 %). In samples from RTE products of meat origin other than fermented sausage or from cheeses and other dairy products, non-compliance ranged from 0 % to 2.3 %. For batch-based sampling, collected at processing, the highest level of non-compliance was reported in RTE fishery products (4.5 %). Non-compliance is also reported in RTE milk (2.7 %), with 32 positive samples from raw milk intended for human consumption in the Czech Republic and three from pasteurised milk in Ireland. Some non-compliance was also detected from RTE products of meat origin other than fermented sausages, soft and semi-soft cheeses, other RTE dairy products and, other RTE products at processing.

*RTE products at retail level*

In 2010, the highest levels of non-compliance with the criterion ≤100 cfu/g among single samples collected at retail, were observed in RTE fishery products (1 %) and RTE meat products other than fermented sausage (0.4 %). This is similar to the levels reported in 2009. Non-compliance was also detected in soft and semi-soft cheese (0.2 %), in other dairy products (0.2 %) and in other RTE products (0.1 %) (Table LI3). For the batch-based sampling at retail the highest non-compliance was reported for soft and semi-soft cheeses (0.8 %) followed by RTE products of meat origin other than fermented sausage (0.6 %), as well as other RTE products (0.2 %). All other single samples and batches tested at retail were in compliance with the *L. monocytogenes* criteria.

*RTE products at farm level*

Sampling done at farm level was reported by two MSs for RTE milk, for soft and semi-soft cheeses made from milk of cows and for other RTE dairy products. Estonia reported the highest level of non-compliance in single sampling in RTE milk (11.5 %) due to three positive samples (out of 26) in raw milk intended for human consumption. Belgium reported non-compliance, at farm-level, in 6.2 % of 65 batches of butter and cream as well as in 8.8 % of 34 batches of soft and semi-soft cheeses made from milk of cows.

*Non-compliance in the last five years*

Figure LI3 presents the proportions of non-compliance of single samples of selected RTE foods in 2006-2010. At processing, the proportion of samples of fishery products in non-compliance with the criteria was highest in 2006 compared with the following years, although the reported level increased consistently from 2007 to 9.6 % in 2010. At retail, the same observations can be made. The level of non-compliance for fishery products was highest in 2006 (and in 2007) compared with the following years, although the reported level increased consistently from 2008 to 1 % in 2010. The low level in 2008 was probably due to large surveys carried out in the United Kingdom with very few samples exceeding the limit.

At the processing stage, the level of non-compliance among single samples increased in 2010 in three categories (fishery products, other RTE food and soft and semi-soft cheeses) compared with previous years. In RTE products of meat origin, the prevalence was three times lower in 2010, and in RTE hard cheese, it remained stable. At retail, no trends were observed between 2006 and 2009, but compared with 2009 the level of non-compliance in 2010 decreased in soft and semi-soft cheese and increased in RTE products of meat origin.

However, it is good to note that these results over the years are influenced by the MSs reporting and the sample sizes in their investigations, both of which vary between the years.

***Table LI3. Compliance with the L. monocytogenes criteria laid down by Regulation (EC) No 2073/2005 in food categories in the EU, 2010***

| Food category[1] | Sampling unit | Absence in 25 g | | ≤100 cfu/g | |
|---|---|---|---|---|---|
| | | Units tested | % in non-compliance | Units tested | % in non-compliance |
| **RTE food intended for infants and for medical purposes** | | | | | |
| Processing plant | Batch | 70 | 0 | - | - |
| Retail | Single | 746 | 0 | 41 | 0 |
| Retail | Batch | 446 | 0 | - | - |
| **RTE products of meat origin other than fermented sausage** | | | | | |
| Processing plant | Single[2] | 5,221 | 2.3 | - | - |
| | Batch[2] | 12,684 | 1.7 | - | - |
| Retail | Single[1] | - | - | 12,474 | 0.4 |
| | Batch | - | - | 3,577 | 0.6 |
| **RTE products of meat origin, fermented sausage** | | | | | |
| Processing plant | Batch | - | - | 36 | 0 |
| Retail | Single | - | - | 102 | 0 |
| | Batch | - | - | 33 | 0 |
| **Milk, RTE** | | | | | |
| At farm | Single | 26 | 11.5 | - | - |
| Processing plant | Single | 401 | 0 | - | - |
| | Batch | 1,312 | 2.7 | - | - |
| Retail | Single[1] | - | - | 238 | 0 |
| | Batch | - | - | 2,528 | 0 |
| **Soft and semi-soft cheeses, RTE** | | | | | |
| At farm | Batch | 34 | 8.8 | - | - |
| Processing plant | Single | 1,046 | 0.9 | - | - |
| | Batch | 2,910 | 1.5 | - | - |
| Retail | Single[1] | - | - | 3,358 | 0.2 |
| | Batch | - | - | 3,783 | 0.8 |
| **Hard cheeses, RTE** | | | | | |
| Processing plant | Single | - | - | 366 | 0.3 |
| | Batch | - | - | 422 | 0 |
| Retail | Single | - | - | 1,375 | 0 |
| | Batch | - | - | 6,254 | 0 |
| **Other Dairy products, RTE** | | | | | |
| At farm | Batch | 65 | 6.2 | - | - |
| Processing plant | Single[2] | 1,418 | 0 | - | - |
| | Batch | 1,378 | 0.8 | - | - |
| Retail | Single[1] | - | - | 615 | 0.2 |
| | Batch | - | - | 978 | 0 |

Table continued overleaf.

***Table LI3 (continued). Compliance with the* L. monocytogenes *criteria laid down by Regulation (EC) No 2073/2005 in food categories in the EU, 2010***

| Food category[1] | Sampling unit | Absence in 25 g | | ≤100 cfu/g | |
|---|---|---|---|---|---|
| | | Units tested | % in non-compliance | Units tested | % in non-compliance |
| **Fishery products, RTE** | | | | | |
| Processing plant | Single | 612 | 9.6 | - | - |
| | Batch | 330 | 4.5 | - | - |
| Retail | Single[1] | - | - | 3,442 | 1.0 |
| | Batch | - | - | 476 | 0 |
| **Other RTE products** | | | | | |
| Processing plant | Single | 243 | 4.9 | - | - |
| | Batch | 727 | 2.2 | - | - |
| Retail | Single[1] | - | - | 9,786 | 0.1 |
| | Batch | - | - | 1,707 | 0.2 |

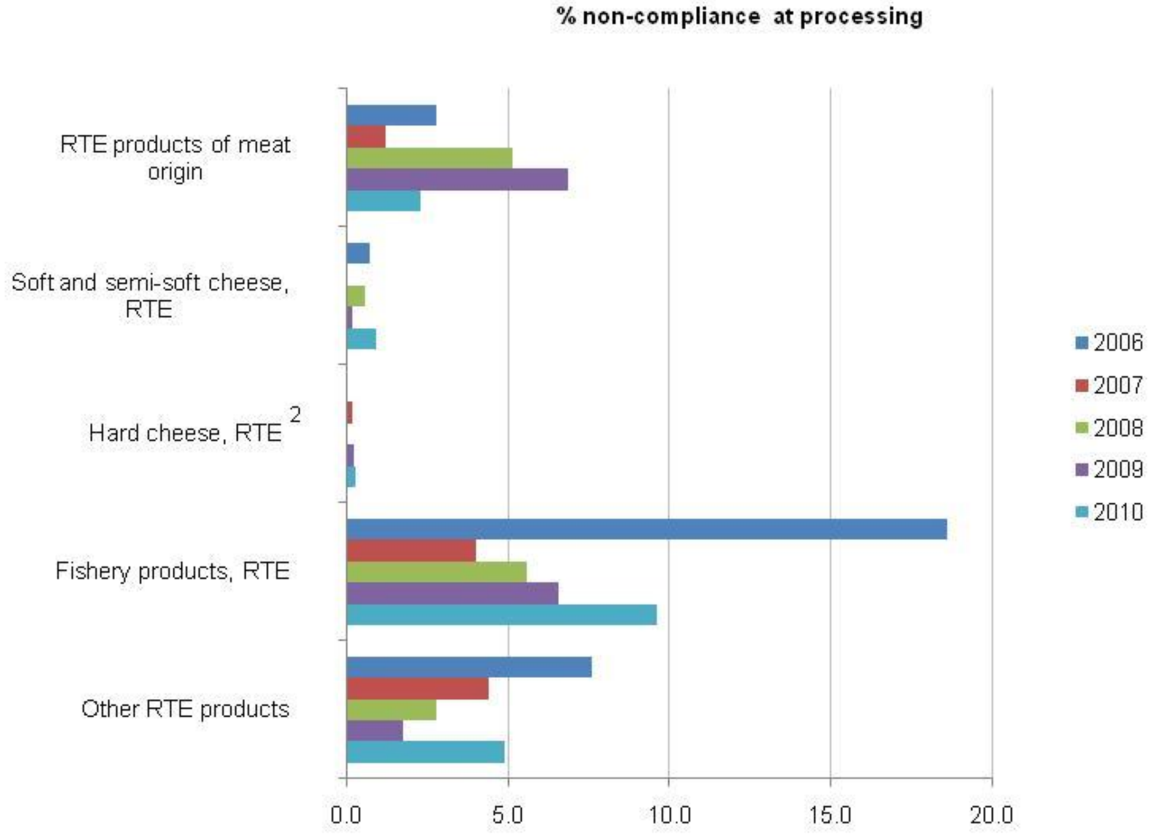
Note: RTE: ready-to-eat products. Data are presented only for MS investigations with ≥25 sample units.
1. Retail include data with unspecified sampling stage.
2. Includes samples from official-industry sampling from Poland: 83 single samples (0 positives) of other dairy products and 1,205 single samples (1 positive) and 491 batch samples (0 positive) of products of meat origin.

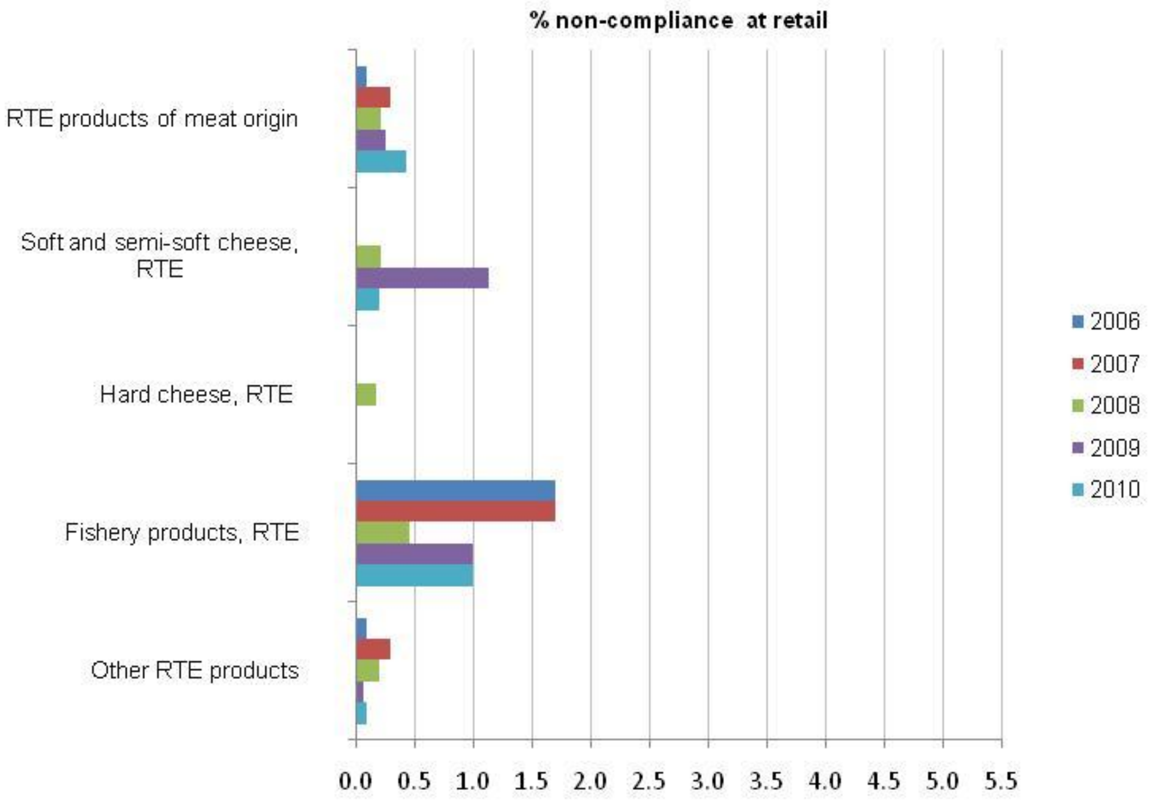
**Soft and semi-soft cheeses at farm** include data on fresh cheeses: 11 batches of fresh cheeses were tested for detection and 1 was positive (data from Belgium).

**Soft and semi-soft cheeses at processing plant** include data on fresh cheeses: 149 single samples of fresh cheeses were tested for detection and 3 samples of fresh cheese made from pasteurised sheep milk tested positive (data from Austria, Cyprus and Portugal). Thirty-one batches of fresh cheeses were tested for detection and none were positive (data from Belgium).

**Soft and semi-soft cheeses at retail** include data on fresh cheeses: 18 single samples of fresh cheeses were tested for enumeration and no samples had levels >100 cfu/g (data from Austria). Eighty-eight batches of fresh cheeses were tested for enumeration and no batches had levels >100 cfu/g (data from Belgium**).**

***Figure LI3. Proportion of single samples at processing and retail[1] in non-compliance with EU* L. monocytogenes *criteria, 2006-2010***




Note: RTE: ready-to-eat products. Data are presented only for MS investigations with ≥25 sample units.

1. Retail include data with unspecified sampling stage.

2. In 2006, there were no investigations with 25 samples or more reporting results for evaluation of non-compliance in hard cheese.

In 2010 and 2011, an EU-wide baseline survey on *L. monocytogenes* in RTE food was carried out, targeting smoked and gravad fish, soft and semi-soft cheeses, and heat-treated meat products that have been handled between the heat treatment and packaging. The results of this survey will provide further valuable information on the occurrence of *L. monocytogenes* in these RTE food categories perceived as being at high risk regarding *Listeria* contamination. EFSA will publish the results in 2013.

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

Data on examinations for *L. monocytogenes* in RTE meat products were available from 17 MSs. Data categorised according to the origin of the meat are presented in Tables LI4, LI5 and LI6.

#### *Bovine meat*

Data on RTE products of bovine meat are reported by six MSs and summarised in Table LI4. The number of units qualitatively tested (1,450 units) was somewhat lower than in 2009 (1,808 samples) and 2008 (7,510 samples). Overall, *L. monocytogenes* was detected in 25 g from 1.5 % of these units. The highest occurrence of *L. monocytogenes* at processing was recorded in single samples of meat products from Poland (2.9 %). A large investigation was reported by the Czech Republic in which 0.1 % of the 814 tested batches of meat products contained *L. monocytogenes* at processing. In total, 2,168 units of RTE meat products were analysed quantitatively at processing or at retail. None of the RTE products of bovine meat contained levels of *L. monocytogenes* above 100 cfu/g, and only 0.1 % of the units had counts over the detection level.

#### *Pig meat*

Data on RTE products of pig meat were provided by 16 MSs (Table LI5). Qualitative investigations were performed on 22,158 units, and *L. monocytogenes* was detected in 25 g from 2.0 % of samples. The proportion of units positive for *L. monocytogenes* varied between 0 % and 31.3 %. The highest occurrences at processing were reported by Poland (31.3 %), Hungary (13.1 %) and Portugal (9.0 %). At retail, the Netherlands (10.5 % and 11.4 %) and Denmark (5.0 %) reported the highest proportion of units in which *L. monocytogenes* was detected. Slight increases in the proportion of samples positive for *L. monocytogenes* from processing to retail were observed in the Czech Republic, Denmark and Ireland, while decreases were observed in Germany, Hungary and Romania.

Quantitative investigations of RTE products of pig meat generally revealed a low to very low occurrence of units exceeding 100 cfu/g; however, 9.5 % of samples from Spain (sampling stage not specified) and 3.0 % of samples from Hungary contained more than 100 cfu/g of the bacterium (Table LI5). In France, only samples positive with the detection method were tested for enumeration, of which three (8.3 % of positive samples) were found to contain *L. monocytogenes* at a level above 100 cfu/g. The overall proportion of observations with counts above 100 cfu/g was 0.5 %, which is higher than the proportions reported for 2009 (0.2 %) and 2008 (0.3 %).

#### *Poultry meat*

Thirteen MSs reported results concerning *L. monocytogenes* in RTE products of broiler meat in 2010, four of which also reported on RTE products of turkey meat and one from unspecified poultry meat. Overall, *L. monocytogenes* was found by detection method in 1.5 % of the 3,636 units of poultry meat products tested, ranging from 0 % to 7.5 % positive units for broiler meat and from 0 % to 11.8 % for turkey meat (Table LI6). In Germany, an increase in *L. monocytogenes* was observed in broiler meat products along the food chain; this was also the case for turkey meat products from Ireland. Hungary reported a decrease in *L. monocytogenes* in both broiler meat and turkey meat from processing to retail.

Quantitative investigations were carried out on 2,444 units of RTE products from poultry meat, and 0.2 % of these were found to contain levels of *L. monocytogenes* above 100 cfu/g. Only three MSs reported samples with levels above 100 cfu/g, and all of these were taken at retail. The occurrence ranged from 0.1 % to 3.0 %, with the highest proportion reported by Hungary. In turkey meat, none of the samples taken contained levels above 100 cfu/g.

A summary of the proportions of units positive for RTE products of meat origin is presented in Figure LI4. As in 2009, *L. monocytogenes* was most often found in RTE products from pig meat but with an overall lower prevalence. For further information on reported data, refer to the level 3 tables.

***Table LI4.*** **L. monocytogenes** ***in ready-to-eat products of bovine meat, 2010***

| Country | Sampling unit | Description | Units tested presence | *L. m.* presence in 25 g | Units tested enumeration | > detection but ≤100 cfu/g | *L. m.* >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **At processing/cutting plant** | | | | | | | |
| Czech Republic | Batch | Meat products | 814 | 0.1 | 185 | 0 | 0 |
| Ireland | Single | Meat products | 52 | 0 | - | - | - |
| Poland[1] | Batch | intended to be eaten raw | 40 | 0 | - | - | - |
| | Single | Meat products | 105 | 2.9 | 40 | - | - |
| **At retail** | | | | | | | |
| Austria | Single | Meat products | 256 | 5.9 | 255 | 0 | 0 |
| Bulgaria | Batch | Meat products | - | - | 93 | 0 | 0 |
| Ireland[2] | Single | Meat products | 183 | 1.6 | 355 | 0 | 0 |
| Netherlands | Single | Meat products | - | - | 31 | 0 | 0 |
| | Single | intended to be eaten raw | - | - | 1,209 | 0.2 | 0 |
| **Total (6 MSs)** | | | **1,450** | **1.5** | **2,168** | **0.1** | **0** |

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

1. Data were not available on the number of units that tested positive for single meat product samples analysed by the enumeration method.
2. Sample weight is 'various'.

***Table LI5.* L. monocytogenes *in ready-to-eat products of pig meat, 2010***

| Country | Sampling unit | Description | Units tested presence | *L. m.* presence in 25 g | Units tested enumeration | > detection but ≤100 cfu/g | *L. m.* >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **At processing/cutting plant** | | | | | | | |
| Czech Republic | Batch | - | 6,461 | 1.2 | 1,445 | 0 | 0 |
| Denmark[1] | Batch | - | 44 | 4.5 | 110 | 0 | 0 |
| Estonia | Single | - | 114 | 7.0 | - | - | - |
| Germany | Single | Heat treated meat products | 86 | 3.5 | 64 | 0 | 0 |
| Hungary | Single | - | 107 | 13.1 | 43 | 16.3 | 0 |
| Ireland | Single | - | 131 | 0 | - | - | - |
| Poland[3] | Batch | - | 2,913 | 2.3 | 806 | 0 | 0.6 |
| | Batch[5] | Intended to be eaten raw | 115 | 31.3 | 70 | 0 | 0 |
| | Single[6] | - | 3,100 | 1.9 | 1,040 | 0.2 | 0.5 |
| Portugal | Single | - | 122 | 9.0 | 122 | 7.4 | 1.6 |
| Romania | Batch | - | 26 | 7.7 | - | - | - |
| Slovakia[2] | Batch | - | 243 | 0.8 | - | - | - |
| **At retail** | | | | | | | |
| Austria | Single | - | 348 | 2.0 | 347 | 0 | 0 |
| Bulgaria | Batch | - | 231 | 0 | 551 | 0 | 0 |
| Czech Republic | Single | - | 71 | 1.4 | 71 | 1.4 | 0 |
| | Batch | - | - | - | 180 | 0 | 0 |
| Denmark[1] | Single | - | 40 | 5.0 | 76 | 0 | 0 |
| Estonia | Single | - | - | - | 36 | 0 | 0 |
| France | Single | RTE Cooked, chilled | 5,827 | 0.6 | 5,827 | <0.1 | <0.1 |
| Germany | Single | Heat treated meat products | 903 | 3.3 | 727 | 1.4 | 0.1 |
| Greece | Single | - | 36 | 0 | - | - | - |
| Hungary[1] | Single | - | 125 | 3.2 | 33 | 0 | 3.0 |
| Ireland[4] | Single | - | 213 | 1.4 | 718 | 0 | 0 |
| Netherlands | Single | - | 105 | 10.5 | 106 | 0 | 0 |
| | Single | Intended to be eaten raw | 219 | 11.4 | - | - | - |
| Portugal | Batch | - | - | - | 1,345 | 0 | 1.1 |
| Romania | Batch | - | 91 | 1.1 | - | - | - |
| **Sampling level not specified** | | | | | | | |
| Spain | Single | Unspecified RTE | 487 | 9.7 | 455 | 1.5 | 9.5 |
| **Total (16 MSs)** | | | **22,158** | **2.0** | **14,172** | **0.3** | **0.5** |

Note: Data are presented only for sample sizes ≥25.
Note: Poland additionally tested 33 single samples by the enumeration method where the sampling level was not specified; no data were available on the number of units that tested positive.
Note: In France, at retail, the enumeration analysis was carried out on samples positive with the detection method only. Of these 36 positive samples, 3 (8.3 %) were also positive with more than 100 cfu/g of *L. monocytogenes*.
1. Sampling weight 1 g or 25 g.
2. Sampling weight 10 g or 25 g.
3. Sampling weight 1 g, 25 g, 250 g.
4. Sampling weight: various.
5. Official and industry sampling.
6. 1,205 samples from the detection method and 752 samples from the enumeration method are from official and industry sampling.

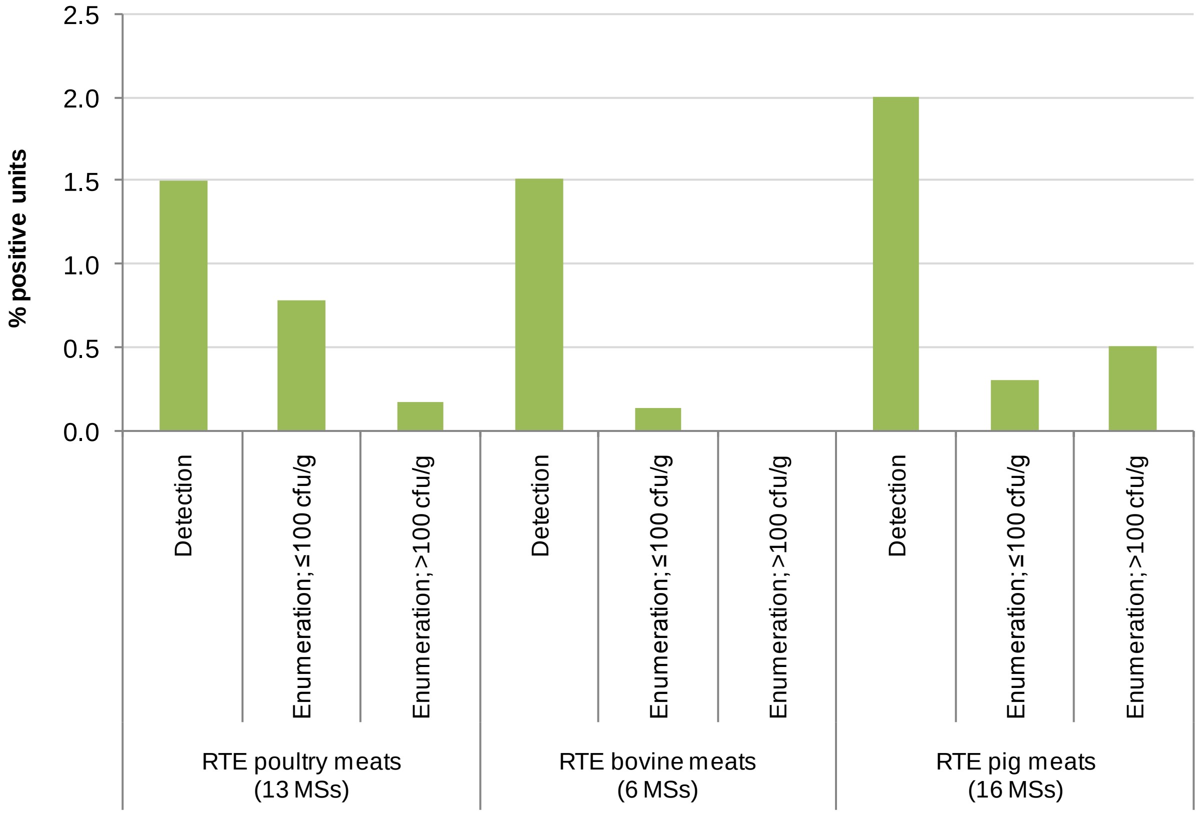
### *Table LI6.* L. monocytogenes *in ready-to-eat products of poultry meat, 2010*

| Country | Sampling unit | Description | Units tested presence | *L. m.* presence in 25 g | Units tested enumeration | > detection but ≤100 cfu/g | *L. m.* >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **At processing/cutting plant** | | | | | | | |
| Belgium[1] | Batch | Broiler meat products | 106 | 3.8 | 59 | 3.4 | 0 |
| Czech Republic | Batch | Broiler meat products | 542 | 0.6 | 226 | 0 | 0 |
| Germany | Single | Broiler meat products | 56 | 0 | 25 | 0 | 0 |
| Hungary | Single | Broiler meat products | 80 | 7.5 | 33 | 9.1 | 0 |
| | Single | Turkey meat products | 77 | 2.6 | - | - | - |
| Ireland | Single | Broiler meat products | 460 | 0 | - | - | - |
| | Single | Turkey meat products | 30 | 0 | - | - | - |
| | Single | Poultry meat, unspecified | 30 | 3.3 | - | - | - |
| Poland | Batch[2] | Broiler meat products | 306 | 0 | - | - | - |
| | Single[4] | Broiler meat products | 405 | - | 361 | 0.6 | 0 |
| | Batch[3] | Turkey meat products | 70 | 0 | - | - | - |
| Portugal | Single | Broiler meat products | 36 | 2.8 | 36 | 2.8 | 0 |
| | Single | Turkey meat products | 34 | 11.8 | 34 | 11.8 | 0 |
| Romania | Batch | Broiler meat products | 235 | 0 | - | - | - |
| Slovakia | Batch | Broiler meat products | 40 | 0 | - | - | - |
| **At retail** | | | | | | | |
| Bulgaria | Batch | Broiler meat products | 89 | 0 | 310 | 0 | 0 |
| Estonia | Single | Broiler meat products | - | - | 42 | 0 | 0 |
| Germany | Single | Broiler meat products | 270 | 4.1 | 194 | 1.5 | 1.0 |
| Hungary | Single | Broiler meat products | 188 | 5.9 | 33 | 0 | 3.0 |
| | Single | Turkey meat products | 218 | 1.8 | - | - | - |
| Ireland[5] | Single | Broiler meat products | 220 | 1.4 | 886 | 0.5 | 0.1 |
| | Single | Turkey meat products | 42 | 2.4 | 156 | 0 | 0 |
| Netherlands | Single | Broiler meat products | 45 | 4.4 | 49 | 0 | 0 |
| **Not specified** | | | | | | | |
| Spain | Single | Broiler meat products | 57 | 0 | - | - | - |
| **Total (13 MSs)** | | | **3,636** | **1.5** | **2,444** | **0.8** | **0.2** |

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

1. Sampling weight 1 g or 25 g.
2. Sampling weight 250 g.
3. Turkey meat: sample weight 1 g, 25 g; official and industry sampling.
4. Data was not available on the number of units that tested positive for single broiler meat samples analysed by the detection method.
5. Sampling weight: various.

***Figure LI4. Proportion of* L. monocytogenes*-positive units in ready-to-eat meat categories in the EU, 2010*[1]**




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

**RTE poultry meats** include data from Belgium, Bulgaria, the Czech Republic, Estonia, Germany, Hungary, Ireland, the Netherlands, Poland, Portugal, Romania, Slovakia and Spain (Detection: 12 MSs, Enumeration: 10 MSs).

**RTE bovine meats** include data from Austria, Bulgaria, the Czech Republic, Ireland, the Netherlands and Poland (Detection: 4 MSs, Enumeration: 6 MSs).

**RTE pig meats** include data from Austria, Bulgaria, the Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, the Netherlands, Poland, Portugal, Romania, Slovakia and Spain (Detection: 16 MSs, Enumeration: 13 MSs).

1. Data pooled for all sampling stages for all reporting MSs (single and batch). Only investigations covering 25 or more samples are included.

## Cheeses

In 2010, 15 MSs and one non-MS provided a large quantity of data on *L. monocytogenes* in cheeses (Tables LI7-LI10) and 19 MSs in other RTE dairy products.

### *Soft and semi-soft cheeses*

The presence of *L. monocytogenes* in soft and semi-soft cheeses made from raw or low heat-treated milk from cows, sheep and goats was detected in 5 out of 15 qualitative investigations (Table LI7). Portugal reported the highest level of *L. monocytogenes* at processing, with 7.5 % of single samples of cheese made from sheep's milk testing positive. Belgium reported 2.2 % of batches of cheese made from cow's milk as positive at processing. In 2010, two countries, in contrast to none in 2009, reported units with levels above 100 cfu/g: Austria (0.8 % in cheese made from cow's milk at retail) and Portugal (4.5 % in cheese made from sheep's milk at processing).

Over 6,000 samples were reported from soft and semi-soft cheeses made from pasteurised milk of cows, sheep and goats (Table LI8). A total of 5,548 samples of cheeses made with milk from cows were analysed qualitatively by MSs, and 0.9 % were found to be contaminated with *L. monocytogenes*. The proportion of positive findings ranged from 0 % to 2.9 %, the highest being reported by Slovakia at processing. The apparent prevalence of *L. monocytogenes* in cheeses made with milk from cows was higher in 2009 than in 2010 (1.3 % versus 0.9 % respectively), and a higher proportion of samples containing levels above 100 cfu/g was reported in 2009 (0.3 % versus 0.1 % in 2010). A total of 458 samples of soft and semi-soft cheeses, made from pasteurised milk from sheep and goats, were investigated qualitatively. In contrast to 2009, when no samples containing *L. monocytogenes* at a level over the detection limit were identified, such samples were reported in 2010 by Hungary at retail (3.2 %), and levels above 100 cfu/g were also reported by Portugal (25.8 % of the 31 samples of cheeses from goats' milk and 4.6 % of the 452 samples of cheeses from sheep's milk).

### *Hard cheeses*

The results regarding hard cheeses made from raw or low heat-treated milk are shown in Table LI9, and the results for hard cheese made from pasteurised milk are shown in Table LI10. As reported in 2009, it appears that these cheeses may occasionally harbour *L. monocytogenes*; however, levels above 100 cfu/g were not reported in either of these two categories in 2010.

In 2010, both Germany (7.1 % at processing) and Austria (1.9 % at retail) reported *L. monocytogenes* positive samples in hard cheeses made from unpasteurised milk from cows whereas Poland (0.9 %) reported positive samples in hard cheeses made from pasteurised milk from cows at the processing plant. Germany also reported investigations of hard cheeses made from pasteurised cow's milk, with findings of 0.5 % of samples positive at processing plants and 0.7 % positive at retail and in hard cheeses made from goat's milk at retail (3.1 %).

In 2007-2009, it was observed that *L. monocytogenes* was more often detected over the 100 cfu/g limit in soft and semi-soft cheeses made from pasteurised milk compared with cheeses made from unpasteurised milk. However, in 2010, almost the same proportion of units exceeded this limit for both soft and semi-soft cheeses made from pasteurised milk and from unpasteurised milk.

A summary of tested units and the proportion of units positive for cheeses is presented in Figure LI5. For further information on reported data, refer to the level 3 tables.

## *Table LI7.* L. monocytogenes *in soft and semi-soft cheeses made from raw or low heat-treated milk, 2010*

| Country | Sampling unit | Description | Units tested presence | *L. m.* presence in 25 g | Units tested enumeration | > detection but ≤100 cfu/g | *L. m.* >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **Cheeses made from milk from cows** | | | | | | | |
| Austria | Single | At retail | 407 | 0.7 | 386 | 0 | 0.8 |
| Belgium[1] | Batch | At farm | - | - | 32 | 9.4 | 0 |
| | Batch | At processing plant | 46 | 2.2 | 30 | 20.0 | 0 |
| Bulgaria | Batch | At retail | 101 | 0 | 352 | 0 | 0 |
| Germany | Single | At processing plant | 27 | 0 | - | - | - |
| | Single | At retail | 152 | 0.7 | 141 | 0 | 0 |
| Poland | Batch | At processing plant | 43 | 0 | - | - | - |
| Romania | Batch | At processing plant | 197 | 0 | - | - | - |
| | Batch | At retail | 701 | 0 | - | - | - |
| **Total cheeses made from milk from cows (6 MSs)** | | | **1,674** | **0.3** | **941** | **1.0** | **0.3** |
| Switzerland | Single | At processing plant | 70 | 0 | - | - | - |
| **Cheeses made from milk from sheep and goats** | | | | | | | |
| Portugal | Single | Sheep's milk, at processing plant | 67 | 7.5 | 67 | 3.0 | 4.5 |
| Romania | Batch | Sheep's milk, at processing plant | 37 | 0 | - | - | - |
| | Batch | Sheep's milk, at retail | 585 | 0 | - | - | - |
| Slovakia | Batch | Sheep's milk, at processing plant | 176 | 1.1 | - | - | - |
| **Total cheeses made from milk from sheep and goats (3 MSs)** | | | **865** | **0.8** | **67** | **3.0** | **4.5** |
| Switzerland | Single | Goat's milk, at processing plant | 26 | 0 | - | - | - |
| **Cheeses made from mixed milk from cows, sheep and/or goats** | | | | | | | |
| Slovakia[2] | Batch | Mixed from cows, sheep and/or goats, at retail | 64 | 0 | - | - | - |
| **Total cheeses made from mixed milk (1 MS)** | | | **64** | **0** | **-** | **-** | **-** |

Note: Data are presented only for sample sizes ≥25.
1. Sampling weight 1 g or 25 g.
2. Sampling weight 10 g or 25 g.

***Table LI8.* L. monocytogenes *in soft and semi-soft cheeses made from pasteurised milk, 2010***

| Country | Sampling unit | Description | Units tested presence | *L. m.* presence in 25 g | Units tested enumeration | > detection but ≤100 cfu/g | *L. m.* >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **Cheeses made from milk from cows** | | | | | | | |
| Austria | Single | At processing plant | 102 | 1.0 | 44 | 0 | 0 |
| | Single | At retail | 73 | 0 | 43 | 0 | 0 |
| Belgium[1] | Batch | At processing plant | 72 | 1.4 | 38 | 0 | 0 |
| Bulgaria | Batch | At retail | 398 | 0 | 1,856 | 0 | 0 |
| Czech Republic | Batch | At processing plant | 1,589 | 2.3 | 1,144 | 0 | 0 |
| | Batch | At retail | - | - | 105 | 0 | 0 |
| France | Single | At retail | 1,453 | 0.4 | 1,453 | 0 | 0 |
| Germany | Single | At processing plant | 79 | 0 | 41 | 0 | 0 |
| | Single | At retail | 797 | 0.5 | 645 | 2.8 | 0.6 |
| Hungary[2,3] | Unknown | At processing plant | 76 | 0 | 36 | - | - |
| | Unknown | At retail | 32 | 0 | 72 | - | - |
| Netherlands | Single | At retail | 374 | 0 | 382 | 0 | 0 |
| Poland | Batch | At processing plant | 155 | 0 | - | - | - |
| | Single | At processing plant | 62 | 0 | - | - | - |
| Portugal | Batch | At retail | - | - | 50 | 0 | 0 |
| Romania | Batch | At retail | 218 | 0 | - | - | - |
| Slovakia[4] | Batch | At processing plant | 68 | 2.9 | - | - | - |
| | Batch | At retail | - | - | 101 | 0 | 1.0 |
| **Total cheeses made from milk from cows (12 MSs)** | | | **5,548** | **0.9** | **6,010** | **0.3** | **0.1** |
| Switzerland | Single | At processing plant | 38 | 0 | - | - | - |
| **Cheeses made from milk from sheep and goats** | | | | | | | |
| Bulgaria | Batch | Goat's milk, at retail | 34 | 0 | 221 | 0 | 0 |
| | Batch | Sheep's milk, at retail | 65 | 0 | 292 | 0 | 0 |
| Czech Republic | Batch | Goat's milk, at processing | 203 | 0 | - | - | - |
| Germany | Single | Goat's milk, at retail | 26 | 0 | - | - | - |
| Greece | Single | Sheep's milk, at retail | 33 | 0 | - | - | - |
| Hungary | Unknown | Sheep's milk, at processing | 31 | 0 | - | - | - |
| | Unknown | Sheep's milk, at retail | 31 | 3.2 | - | - | - |
| Netherlands | Single | Goat's milk, at retail | 35 | 0 | 35 | 0 | 0 |
| Portugal | Batch | Goat's milk, at retail | - | - | 31 | 0 | 25.8 |
| | Batch | Sheep's milk, at retail | - | - | 452 | 0 | 4.6 |
| **Total cheeses made from milk from sheep and goats (7 MSs)** | | | **458** | **0.2** | **1,031** | **0** | **2.8** |
| Switzerland | Single | Goat's milk, at processing | 28 | 0 | - | - | - |

Table continued overleaf.

***Table LI8 (continued)*** **L. monocytogenes in soft and semi-soft cheeses made from pasteurised milk, 2010**

| Country | Sampling unit | Description | Units tested presence | *L. m.* presence in 25 g | Units tested enumeration | > detection but ≤100 cfu/g | *L. m.* >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **Cheeses made from unspecified milk or mixed milk from cows, sheep and/or goats** | | | | | | | |
| Cyprus | Single | Mixed from cows, sheep and/or goats, at processing plant | 175 | 0 | - | - | - |
| Greece | Single | Mixed from cows, sheep and/or goats, at retail | 40 | 0 | - | - | - |
| Ireland | Batch | Unspecified, at processing plant | 25 | 0 | - | - | - |
| **Total cheeses made from mixed or unspecified milk (3 MSs)** | | | **240** | 0 | **-** | - | - |

Note: Data are presented only for sample sizes ≥25.
1. Samples weight 1 g, 25 g.
2. Batch samples weight not known.
3. Data were not available on the number of units that tested positive for samples analysed by the enumeration method.
4. Samples weight 10 g, 25 g.

***Table LI9.*** **L. monocytogenes** ***in hard cheeses made from raw or low heat-treated milk, 2010***

| Country | Sampling unit | Description | Units tested presence | *L. m.* presence in 25 g | Units tested enumeration | > detection but ≤100 cfu/g | *L. m.* >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **Cheeses made from milk from cows** | | | | | | | |
| Austria | Single | At retail | 53 | 1.9 | 46 | 0 | 0 |
| Bulgaria[1] | Batch | At retail | 123 | 0 | 497 | 0 | - |
| Germany | Single | At processing plant | 42 | 7.1 | 29 | 3.4 | 0 |
| | Single | At retail | 326 | 0 | 110 | 0 | 0 |
| Poland | Batch | At processing plant | 45 | 0 | - | - | - |
| Romania | Batch | At processing plant | 310 | 0 | - | - | - |
| | Batch | At retail | 125 | 0 | - | - | - |
| **Total hard cheeses made from milk from cows (5 MSs)** | | | **1,024** | **0.4** | **682** | **0.1** | **0** |
| Switzerland | Single | At processing plant | 393 | 0 | - | - | - |
| **Cheeses made from milk from sheep and goats** | | | | | | | |
| Bulgaria | Batch | Goats' milk, at retail | - | - | 36 | 0 | 0 |
| | Batch | Sheep's milk, at retail | - | - | 75 | 0 | 0 |
| Portugal | Batch | Goats' milk, at retail | - | - | 80 | 0 | 0 |
| Romania | Batch | Sheep's milk, at processing plant | 49 | 0 | - | - | - |
| | Batch | Sheep's milk, at retail | 254 | 0 | - | - | - |
| **Total hard cheeses made from milk from sheep and goats (3 MSs)** | | | **303** | **0** | **191** | **0** | **0** |
| Switzerland | Single | Goats' milk, at processing plant | 46 | 0 | - | - | - |

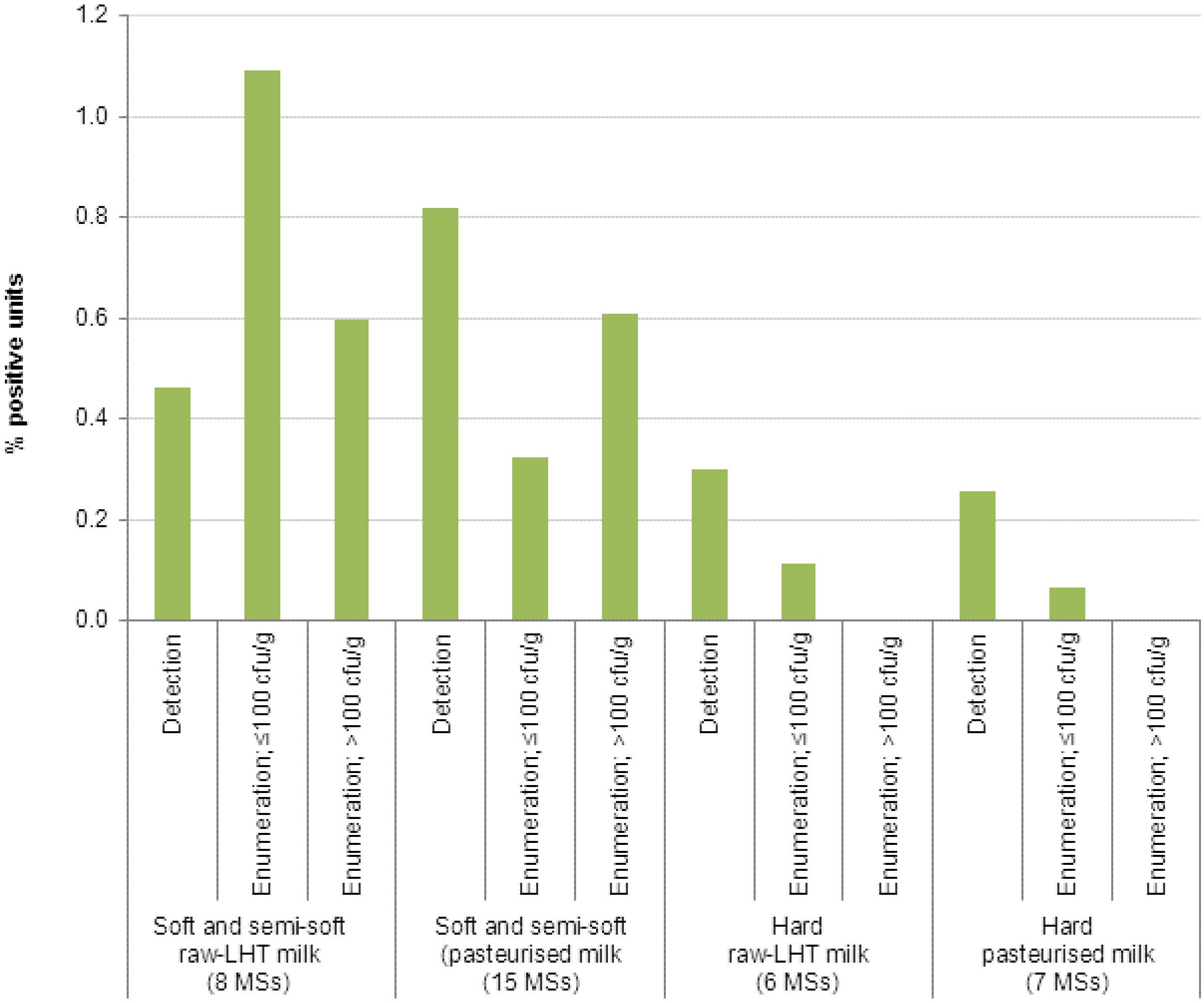
Note: Data are presented only for sample sizes ≥25.
1. Data were not available on the number of units that tested positive for *L. monocytogenes* >100 cfu/g, in samples analysed by the enumeration method.

## *Table LI10.* L. monocytogenes *in hard cheeses made from pasteurised milk, 2010*

| Country | Sampling unit | Description | Units tested presence | L.m.presencein25g | Units tested enumeration | >detection but ≤100 cfu/g | L. m. >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **Cheeses made from milk from cows** | | | | | | | |
| Bulgaria | Batch | At retail | 1,289 | 0 | 3,945 | 0 | 0 |
| Czech Republic | Batch | At processing plant | 3,405 | 0 | 406 | 0 | 0 |
| Germany | Single | At processing plant | 639 | 0.5 | 252 | 0 | 0 |
| | Single | At retail | 2,444 | 0.7 | 1,106 | 0.5 | 0 |
| Poland | Batch | At processing plant | 108 | 0.9 | - | - | - |
| | Single | At processing plant | 61 | 0 | - | - | - |
| Romania | Batch | At processing plant | 83 | 0 | - | - | - |
| **Total hard cheeses made from milk from cows (5 MSs)** | | | **8,029** | **0.3** | **5,709** | **0.1** | **0** |
| Switzerland | Single | At processing plant | 57 | 0 | - | - | - |
| **Cheeses made from milk from sheep and goats** | | | | | | | |
| Bulgaria | Batch | Goat's milk, at retail | - | - | 38 | 0 | 0 |
| | Batch | Sheep's milk, at retail | 235 | 0 | 1,568 | 0 | 0 |
| Germany | Single | Goat's milk, at processing plant | 59 | 0 | 45 | 0 | 0 |
| | Single | Goat's milk, at retail | 98 | 3.1 | 63 | 0 | 0 |
| | Single | Sheep's milk, at processing plant | 34 | 0 | - | - | - |
| | Single | Sheep's milk, at retail | 64 | 0 | 33 | 0 | 0 |
| Greece | Single | Sheep's milk, at retail | 95 | 0 | - | - | - |
| **Total hard cheeses made from milk from sheep and goats (3 MSs)** | | | **585** | **0.5** | **1,747** | **0** | **0** |
| **Cheeses made from milk mixed from cows, sheep and goats** | | | | | | | |
| Cyprus | Single | Mixed from cows, sheep and/or goats, at processing plant | 770 | 0 | - | - | - |
| **Total hard cheeses made from mixed milk (1 MS)** | | | **770** | **0** | **-** | **-** | **-** |

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

***Figure LI5. Proportion of* L. monocytogenes*-positive units in soft and semi-soft cheeses, and in hard cheeses made from raw or low heat-treated milk and pasteurised milk, 2010*[1]**




Note:

**Soft and semi-soft cheeses, made from raw-LHT milk,** include data from Austria, Belgium, Bulgaria, Germany, Poland, Portugal, Romania and Slovakia (Detection: 8 MSs, Enumeration: 5 MSs).

**Soft and semi-soft cheeses, made from pasteurised milk**, include data from Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, France, Germany, Greece, Hungary, Ireland, the Netherlands, Poland, Portugal, Romania and Slovakia. (Detection: 14 MSs, Enumeration: 9 MSs).

**Hard cheeses, made from raw-LHT milk**, include data from Austria, Bulgaria, Germany, Poland, Portugal and Romania (Detection: 5 MSs, Enumeration: 4 MSs).

**Hard cheeses, made from pasteurised milk**, include data from Bulgaria, the Czech Republic, Cyprus, Germany, Greece, Poland and Romania (Detection: 7 MSs, Enumeration: 3 MSs).

1. Data pooled for all sampling stages for all reporting MSs (single and batch). Only investigations covering 25 or more samples are included.

### Fishery products

In 2010, 11 MSs reported data on findings of *L. monocytogenes* in RTE fish (Table LI11). The products tested were mainly smoked fish except in Romania (cooked fish).

The presence of *L. monocytogenes* in fish was detected in 8 out of 14 qualitative investigations. A total of 2,938 samples were tested by detection method. However, the Netherlands submitted nearly one-third of these investigations (1,001 samples) from various types of fish (trout, mackerel, salmon, herring and eel), with detection levels of 6.1 % compared with 7.0 % in 2009. High proportions of *L. monocytogenes* positive samples were reported at the processing plant by Ireland (28.3 %) and Denmark (22.2 %).

Seven out of 11 quantitative investigations reported levels of *L. monocytogenes* above 100 cfu/g. Overall, 1.3 % of 2,607 samples tested quantitatively were found to exceed the limit of 100 cfu/g, compared with 0.6 % in 2009 and 0.5 % in 2008. The proportion of samples containing the bacteria at levels above the limit of 100 cfu/g ranged from 0.1 % to 18.8 %, with the highest level in samples of smoked fish at retail in Denmark.

Five MSs reported investigations in other fishery products. *L. monocytogenes* was detected in 5.7 % of the 1092 samples taken under qualitative investigations. Estonia submitted the highest level of positive findings with 18.9 % positive samples taken at the processing plant. Three of the five MSs that tested more than 25 samples with the enumeration method also found *L. monocytogenes* above 100 cfu/g, with levels ranging between 0.6 % and 7.1 %.

*L. monocytogenes* was detected during qualitative testing in crustaceans, molluscan shellfish and in other fishery products. Germany reported cases of *L. monocytogenes* in 2.0 % and 3.1 % of crustaceans at retail and processing plant level, respectively, and Hungary reported cases in 1.2 % of molluscan shellfish tested qualitatively at retail.

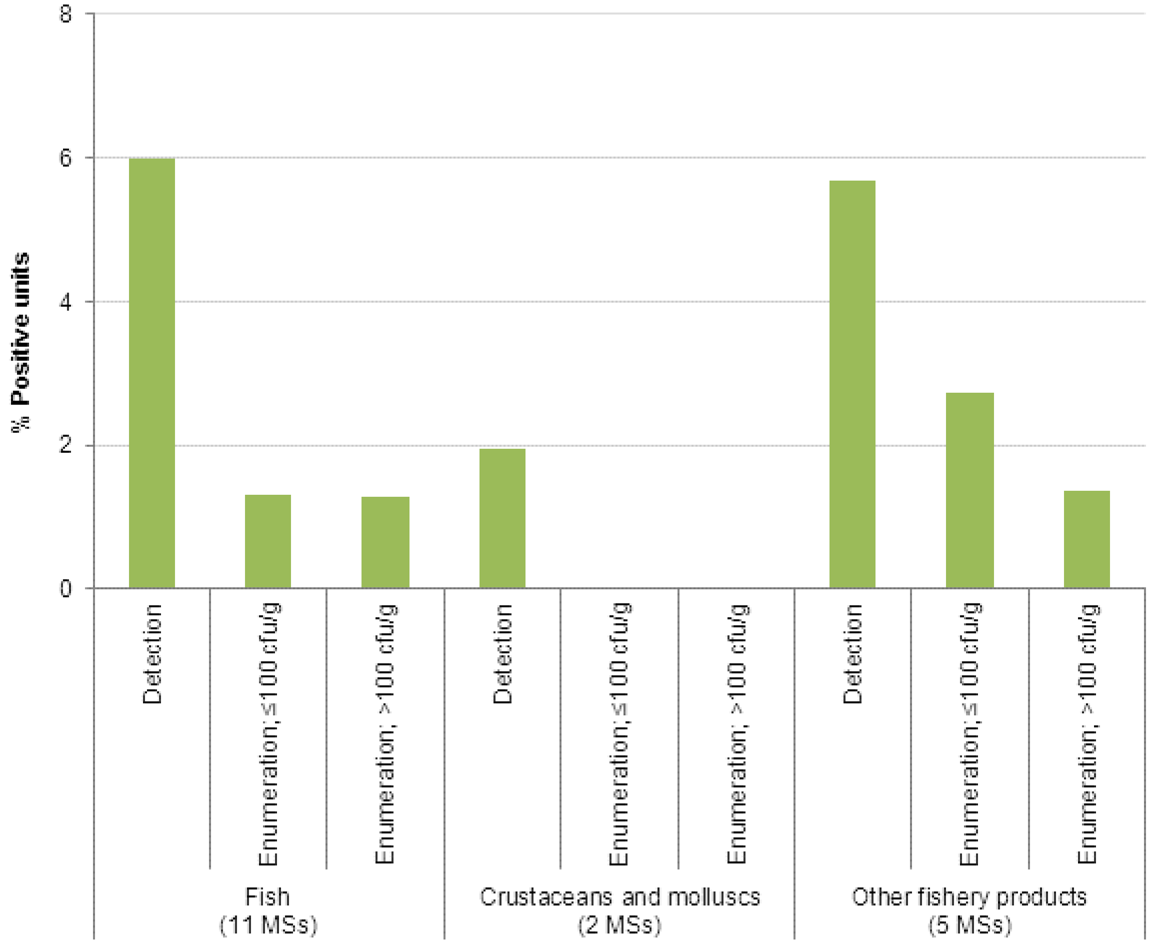
A summary of tested units and the proportion of units tested for different types of fishery products are set out in Figure LI6. Interestingly, the highest proportion of units exceeding the 100 cfu/g limit was observed in other RTE fishery products and not in RTE fish as in previous years. For further information on reported data, refer to the level 3 tables.

***Table LI11. L. monocytogenes in ready-to-eat fish and other fishery products, 2010***

| Country | Sampling unit | Description | Units tested presence N | L. m. presence in 25 g % pos | Units tested enumeration N | > detection but ≤100 cfu/g % pos | L. m. >100 cfu/g % pos |
|---|---|---|---|---|---|---|---|
| **Ready-to-eat fish** | | | | | | | |
| Bulgaria | Batch | Smoked, at retail | 39 | 0 | 257 | 0 | 0 |
| Czech Republic | Batch | Smoked, at processing plant | 69 | 0 | 26 | 0 | 7.7 |
| | Batch | Smoked, at retail | - | - | 44 | 0 | 0 |
| Denmark[1] | Batch | Smoked, at processing plant | 45 | 22.2 | 65 | 0 | 6.2 |
| | Single | Smoked, at retail | - | - | 32 | 0 | 18.8 |
| France | Single | Smoked, at retail | 297 | 7.1 | 297 | 7.1 | 0 |
| Germany | Single | Smoked, at processing plant | 203 | 2.5 | 172 | 1.2 | 1.2 |
| | Single | Smoked, at retail | 784 | 4.0 | 635 | 0.5 | 1.9 |
| Hungary | Single | Smoked, at retail | 62 | 9.7 | - | - | - |
| Ireland | Single | Smoked, at processing plant | 53 | 28.3 | 35 | 11.4 | 17.1 |
| Latvia | Single | Smoked, at processing plant | 32 | 0 | - | - | - |
| Netherlands | Single | Smoked, at retail | 1,001 | 6.1 | 1,014 | 0.4 | 0.1 |
| Poland | Batch[2] | Smoked, at processing plant | 30 | 0 | - | - | - |
| | Single[3] | Smoked, at processing plant | 224 | 12.1 | 30 | 0 | 0 |
| Romania | Batch | Cooked, at processing plant | 48 | 0 | - | - | - |
| | Batch | Cooked, at retail | 51 | 0 | - | - | - |
| **Total Fish (11 MSs)** | | | **2,938** | **6.0** | **2,607** | **1.3** | **1.3** |
| **Other RTE fishery products** | | | | | | | |
| Belgium | Batch | Cooked at processing plant | 117 | 3.4 | 41 | 0 | 2.4 |
| | Batch | Cooked at retail | - | - | 148 | 0 | 0 |
| Estonia | Single | At processing plant | 37 | 18.9 | - | - | - |
| France | Single | At retail | 213 | 2.8 | 213 | 2.8 | 0 |
| | Single | Raw, at retail | 145 | 2.1 | 145 | 2.1 | 0 |
| Ireland | Single | Cooked at retail | 132 | 1.5 | 174 | 0.6 | 0.6 |
| Spain | Single | - | 406 | 9.1 | 260 | 6.9 | 3.5 |
| | Single | Smoked at retail | 42 | 7.1 | 42 | 0 | 7.1 |
| **Total other (5 MSs)** | | | **1,092** | **5.7** | **1,023** | **2.7** | **1.4** |
| **Crustaceans** | | | | | | | |
| Germany | Single | Cooked at processing plant | 32 | 3.1 | 29 | 0 | 0 |
| Germany | Single | Cooked, at retail | 352 | 2.0 | 322 | 0 | 0 |
| **Total crustaceans (1 MS)** | | | **384** | **2.1** | **351** | **0** | **0** |
| **Molluscan shellfish** | | | | | | | |
| Hungary | Single | Cooked at retail | 81 | 1.2 | 25 | 0 | 0 |
| **Total molluscan shellfish (1 MS)** | | | **81** | **1.2** | **25** | **0** | **0** |

Note: Data are presented only for sample sizes ≥25.
1. Sampling weight 1 g or 25 g.
2. Sampling weight 25 g or 250 g.
3. Sampling weight 10 g or 25 g.

***Figure LI6. Proportion of* L. monocytogenes*-positive units in ready-to-eat fishery products categories in the EU, 2010*[1]**




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

**Fish** include data from Bulgaria, the Czech Republic, Denmark, France, Germany, Hungary, Ireland, Latvia, the Netherlands, Poland and Romania (Detection: 11 MSs, Enumeration: 7 MSs).

**Crustaceans and molluscs** include data from Germany and Hungary (Detection: 2 MSs, Enumeration: 2 MSs).

**Other fishery products** include data from Belgium, Estonia, France, Ireland and Spain (Detection: 5 MSs, Enumeration: 4 MSs).

1. Data pooled for all sampling stages for all reporting MSs (single and batch). Only investigations covering 25 or more samples are included.

## Other ready-to-eat products

A substantial number of investigations were reported on *L. monocytogenes* in other RTE products, such as bakery products, sandwiches and prepared dishes, and salads. In the categories 'RTE salads' (811 samples) and 'other RTE foods' (2,892 samples) *L. monocytogenes* was reported quite commonly in most investigations using qualitative analyses (4.2 % in RTE salads and 1.2 % in other RTE foods), and findings of levels above 100 cfu/g were also reported by a few MSs (the Czech Republic, Estonia, Hungary in RTE salads and the Czech Republic in 'other RTE foods'). The highest prevalence of *L. monocytogenes* observed in qualitative investigations was in 'sweets' from the Czech Republic (16.7 %). Hungary reported the highest level of non-compliance with the criterion ≤100 cfu/g in 'confectionary products and pastes' (2.7 %) but also in RTE salad (1.9 %). *L. monocytogenes* was also detected in bakery products in qualitative investigations by two MSs (Austria and Ireland) and in vegetables in qualitative and quantitative investigations (Hungary and Spain, respectively). No positive findings were found out of 657 infant formula samples reported by five MSs. Table LI12 shows results for other RTE products in more detail.

Seventeen MSs reported data with more than 25 samples on other dairy products (excluding cheeses) such as butter, cream, ice cream, yoghurt and dairy desserts (data not shown in table). Data on butter were reported by 10 MSs submitting more than 25 samples, and it was the most monitored product. *L. monocytogenes* was detected mostly in butter (Belgium (8.7 %), Germany (0.3 %), Hungary (2.6 %) and Ireland (2.3 %)), but also in ice cream from Poland (4.7 %) and Spain (0.6 %). Belgium also reported positive samples in cream (5.0 %) and yoghurt (3.2 %) but at levels lower than 100 cfu/g. Among all dairy products specified, no samples were reported with *L. monocytogenes* above 100 cfu/g.

For further information on reported data refer to the level 3 tables.

***Table LI12.* L. monocytogenes *in other ready-to-eat products, 2010***

| Country | Sampling unit | Description | Units tested presence | *L. m.* presence in 25 g | Units tested enumeration | > detection but ≤100 cfu/g | *L. m.* >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **Bakery products** | | | | | | | |
| Austria | Single | Cakes, deserts, pastry | 164 | 0.6 | 127 | 0 | 0 |
| Ireland | Single | Unspecified | 108 | 0.9 | 331 | 0 | 0 |
| Portugal | Batch | Cakes | - | - | 335 | 0 | 0 |
| Slovenia | Single | Cakes | 100 | 0 | 100 | 0 | 0 |
| **Total (4 MSs)** | | | **372** | **0.5** | **893** | **0** | **0** |
| **Confectionery products and pastes** | | | | | | | |
| Hungary | Single | - | 283 | 1.4 | 37 | 0 | 2.7 |
| Ireland | Single | - | 7 | 0 | 37 | 0 | 0 |
| Romania | Single | - | 44 | 0 | - | - | - |
| **Total (3 MSs)** | | | **334** | **1.2** | **74** | **0** | **1.4** |
| **Infant formula** | | | | | | | |
| Belgium | Single | - | 300 | 0 | - | - | - |
| Czech Republic | Single | - | 70 | 0 | - | - | - |
| Germany | Batch | - | 69 | 0 | - | - | - |
| Greece | Single | - | 65 | 0 | - | - | - |
| Hungary | Single | - | 153 | 0 | 26 | 0 | 0 |
| **Total (5 MSs)** | | | **657** | **0** | **26** | **0** | **0** |
| **Ready-to-eat salads** | | | | | | | |
| Austria | Single | - | 40 | 0 | 26 | 0 | 0 |
| Czech Republic | Batch | - | 185 | 4.3 | 287 | 0 | 0.7 |
| Estonia | Single | - | 28 | 7.1 | 134 | 0 | 0.7 |
| Hungary | Single | - | 336 | 5.7 | 107 | 1.9 | 1.9 |
| Slovakia | Batch | - | 95 | 2.1 | 65 | 0 | 0 |
| Slovenia | Single | - | 127 | 2.4 | 127 | 2.4 | 0 |
| **Total (6 MSs)** | | | **811** | **4.2** | **746** | **0.7** | **0.7** |
| **Sweets** | | | | | | | |
| Czech Republic | Batch | - | - | - | 230 | 0 | 0 |
| | Single | - | 36 | 16.7 | 36 | 16.7 | 0 |
| **Total (1 MS)** | | | **36** | **16.7** | **266** | **2.3** | **0** |

Table continued overleaf.

***Table LI12 (continued).* L. monocytogenes *in other ready-to-eat products, 2010***

| Country | Sampling unit | Description | Units tested presence | *L. m.* presence in 25 g | Units tested enumeration | > detection but ≤100 cfu/g | *L. m.* >100 cfu/g |
|---|---|---|---|---|---|---|---|
| | | | N | % pos | N | % pos | % pos |
| **Vegetables** | | | | | | | |
| Hungary | Single | Pre-cut | 141 | 1.4 | 35 | 0 | 0 |
| Spain | Single | Pre-cut | 245 | 0 | 516 | 1.0 | 0.6 |
| **Total (2 MSs)** | | | **386** | **0.5** | **551** | **0.9** | **0.5** |
| **Other RTE foods** | | | | | | | |
| Austria | Single | Ices and similar frozen desserts, sushi, noodles, pasta and unspecified | 61 | 0 | 26 | 0 | 0 |
| Belgium | Batch | Foodstuffs intended for special nutritional uses | 146 | 0 | - | - | - |
| Czech Republic | Batch | Sandwiches and unspecified | 300 | 1.3 | 250 | 0 | 0.8 |
| | Single | Pasta/rice salad and unspecified | 48 | 4.2 | 48 | 4.2 | 0 |
| Denmark | Single | Pasta/rice salad and unspecified | 112 | 3.6 | 234 | 0 | 0 |
| Greece | Single | Sandwiches | 36 | 0 | - | - | - |
| Hungary | Single | Sandwiches with meat | 230 | 1.7 | 53 | 0 | 0 |
| | Single | Seeds, sprouted | 74 | 0 | - | - | - |
| Ireland | Single | Sandwiches and unspecified | 415 | 1.9 | 1,515 | 0 | 0 |
| | Single | Cereals and meals | 86 | 0 | 155 | 0 | 0 |
| | Single | Sauce and dressings | 68 | 0 | 233 | 0 | 0 |
| | Single | Soups | - | - | 67 | 0 | 0 |
| Slovakia | Batch | Sandwiches and unspecified | 1,316 | 1.0 | 526 | 0.4 | 0 |
| **Total (8 MSs)** | | | **2,892** | **1.2** | **3,107** | **0.1** | **<0.1** |
| **Overall total (14 MSs)** | | | **5,488** | **1.5** | **5,663** | **0.4** | **0.2** |

Note: Data are presented only for sample sizes ≥25 after categories were merged. Only vegetables specifically recorded as RTE have been included.

### 3.3.3 *Listeria* in animals

In 2010, nine MSs reported qualitative data on *Listeria* in animals. *L. monocytogenes* was detected by several MSs from different animal species with the exception of pigs. The main *Listeria* species was *L. monocytogenes*, but most isolates were of unspecified species. Two additional *Listeria* species, *L. ivanovii* and *L. innocua*, were identified by two MSs (Estonia and Italy). As observed in 2009, the highest proportions of positive findings were found in decreasing order in goats, sheep and cattle. Germany reported data from all these species. The highest levels of *Listeria* detected were in cattle from Latvia (27.6 %) and sheep from Estonia (20.7 %), although both MSs only tested 29 samples each.

A summary of tested units and proportion of tested units for different animal species are set out in table LI13. For further information on reported data, refer to the level 3 tables.

## *Table LI13.* L. monocytogenes *and other species in animals, 2010*

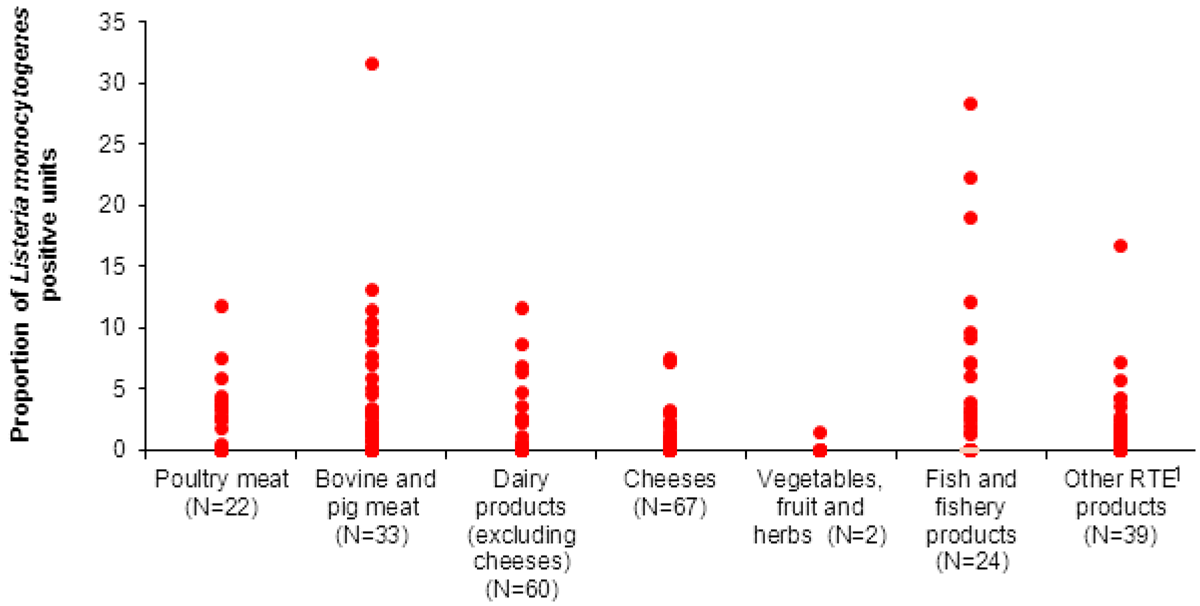
| Country | Sampling unit | Description | Units tested presence | *Listeria* presence in 25 g | *Listeria* species | | | |
|---|---|---|---|---|---|---|---|---|
| | | | N | % pos | *L. ivanovii* | *L. monocytogenes* | *L. innocua* | *L. unspecified* |
| **Cattle** | | | | | | | | |
| Estonia | Animal | - | 44 | 6.8 | 1 | 2 | 0 | 0 |
| Italy | Animal | - | 752 | 6.6 | 0 | 4 | 5 | 41 |
| Latvia | Animal | Dairy cows | 29 | 27.6 | 0 | 8 | 0 | 0 |
| Slovakia | Animal | At farm | 428 | 4.2 | 0 | 14 | 0 | 4 |
| Spain | Animal | - | 783 | 2.2 | 0 | 0 | 0 | 17 |
| Germany | Herd | Cattle and dairy cows | 588 | 8.2 | 0 | 48 | 0 | 0 |
| **Total cattle (6 MSs)** | | | **2,624** | **5.5** | **1** | **76** | **5** | **62** |
| **Fowl (*Gallus gallus*)** | | | | | | | | |
| Bulgaria | Animal | - | 55 | 0 | 0 | 0 | 0 | 0 |
| Germany | Animal | - | 1,329 | 0.5 | 0 | 6 | 0 | 0 |
| Poland | Animal | - | 28 | 0 | 0 | 0 | 0 | 0 |
| **Total fowl (3 MSs)** | | | **1,412** | **0.4** | **0** | **6** | **0** | **0** |
| **Goats** | | | | | | | | |
| Bulgaria | Animal | - | 32 | 0 | 0 | 0 | 0 | 0 |
| Germany | Herd | - | 111 | 13.5 | 0 | 15 | 0 | 0 |
| **Total goats (2 MSs)** | | | **143** | **10.5** | **0** | **15** | **0** | **0** |
| **Pigs** | | | | | | | | |
| Bulgaria | Animal | - | 45 | 0 | 0 | 0 | 0 | 0 |
| Germany | Herd | - | 309 | 0 | 0 | 0 | 0 | 0 |
| **Total pigs (2 MSs)** | | | **354** | **0** | **0** | **0** | **0** | **0** |
| **Sheep** | | | | | | | | |
| Estonia | Animal | - | 29 | 20.7 | 2 | 4 | 0 | 0 |
| Lithuania | Animal | - | 166 | 0 | 0 | 0 | 0 | 0 |
| Slovakia | Animal | At farm | 129 | 3.1 | 0 | 3 | 0 | 1 |
| Germany | Herd | - | 280 | 11.4 | 0 | 32 | 0 | 0 |
| **Total sheep (4 MSs)** | | | **604** | **7.0** | **2** | **39** | **0** | **1** |
| **Sheep and Goats** | | | | | | | | |
| Italy | Animal | At farm | 111 | 8.1 | 0 | 3 | 0 | 6 |
| **Total sheep and goats (1 MS)** | | | **111** | **8.1** | **0** | **3** | **0** | **6** |
| **Other animals** | | | | | | | | |
| Italy | Water buffalo | At farm | 54 | 3.7 | 0 | 0 | 1 | 1 |
| Spain | Rodent | Wild | 40 | 7.5 | 0 | 0 | 0 | 3 |
| **Total other animals (2 MSs)** | | | **94** | **5.3** | **0** | **0** | **1** | **4** |

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

### 3.3.4 Overview of *Listeria* in food products

Figure LI7 provides an overview of the proportions of positive samples from the qualitative investigations of different food categories. The majority of samples were collected from meat products, cheeses and dairy products.

***Figure LI7. Proportion of* L. monocytogenes*-positive samples by ready-to-eat food category, 2010***




Note: Data are based on results obtained by detection method (qualitative). Data are presented only for sample sizes ≥25.

Each point represents a MS investigation.

1. Other RTE products include bakery products, cocoa and cocoa preparations, coffee and tea, confectionery products and pastes, cereals and meals, egg products, infant formula, other food, RTE salads, sweets, sauces and dressings, sprouted seeds, soups, other products of animal origin, other processed food and other RTE foods.

Note: In bovine and pig meat, the spot shown at 31 % is from a batch of samples from Poland from raw pig meat intended to be eaten raw (official and industry sampling).

### 3.3.5 Discussion

Human listeriosis is a relatively rare but serious zoonotic disease, transmitted mainly via food, with high morbidity and mortality in vulnerable populations. In 2010, 1,602 confirmed human cases were reported in the EU, a 3.1 % decrease compared with 2009 (1,654). The reported case-fatality rate was high, 17.0 %, for those confirmed cases where this information was available.

Identified food-borne outbreaks due to *Listeria* are relatively rare, but in 2010 three strong evidence *Listeria* outbreaks were reported by two MSs. The identified food vehicles were fish, mixed meat and an unspecified source. A wide range of different foodstuffs can be contaminated with *L. monocytogenes*. For a healthy human population, foods that contain less than 100 cfu/g are considered to pose a negligible risk, and therefore the EU microbiological criterion for *L. monocytogenes* in RTE food is set as ≤100 cfu/g for RTE products on the market.

In 2010, as in previous years, MSs reported substantial numbers of food samples tested for *L. monocytogenes.* No major changes compared with previous years were detected in the proportions of RTE foods not in compliance with the EU microbiological criteria. Once again the highest proportions of units exceeding the limit of 100 cfu/g were observed in RTE fishery products and RTE meat products, at levels of 1.3 % and 0.4 %, respectively. Interestingly, though, among fishery products, the highest proportion of units exceeding the legal safety limit was observed in other RTE fishery products and not in RTE fish as in previous years. It is also worth noting that 0.7 % of the tested RTE salads contained *L. monocytogenes* at a level above the 100 cfu/g limit.

*L. monocytogenes* was also reported from various animal species in 2010, demonstrating the zoonotic nature of the bacterium. In addition to infected animals that may serve as a *L. monocytogenes* source, the bacteria are widely distributed in nature and can be found in water, soil and decaying vegetation.

## 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

### 3.4 Verotoxigenic *Escherichia coli*

Verotoxigenic *Escherichia coli* (VTEC) are a group of *E. coli* that are characterised by the ability to produce toxins that are designated verocytotoxins[35]. Human pathogenic VTEC usually harbour additional virulence factors that are important for the development of the disease in man. A large number of serogroups of *E. coli* have been recognised as verocytotoxin producers. Human VTEC infections are, however, most often associated with a minor number of O:H serogroups. Of these, the O157:H7 and the O157:H- serogroups (VTEC O157) are the ones most frequently reported to be associated with human disease.

The majority of reported human VTEC infections are sporadic cases. The symptoms associated with VTEC infection in humans vary from mild to bloody diarrhoea, which is often accompanied by abdominal cramps, usually without fever. VTEC infections can result in Haemolytic Uraemic Syndrome (HUS). HUS is characterised by acute renal failure, anaemia and lowered platelet counts. HUS develops in up to 10 % of patients infected with VTEC O157 and is the leading cause of acute renal failure in young children.

Human infection may be acquired through the consumption of contaminated food or water, or by direct transmission from person to person or from infected animals to humans.

Animals are the reservoir for VTEC, and VTEC (including VTEC O157) have been isolated from many different animal species. The gastrointestinal tract of healthy ruminants, which include cows, goats and sheep, seems to be the foremost important reservoir for VTEC, and these bacteria are shed in the animal's faeces. Foods of bovine and ovine origin are frequently reported as a source for human VTEC infections. Other important food sources include faecally contaminated vegetables and drinking water. The significance of many VTEC serogroups that can be isolated from animals and foodstuffs for infections in humans is, however, not yet clear.

Table VT1 presents the countries reporting data for 2010.

***Table VT1. Overview of countries reporting data for 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 25 | **MSs:** except CZ, PT<br>**Non-MSs:** CH, IS and NO |
| Food | 19 | **MSs:** AT, BE, BG, CZ, DE, DK, EE, ES, FR, HU, IE, IT, LU, NL, PL, PT, RO, SE, SK<br>**Non-MS:** NO |
| Animal | 16 | **MSs:** AT, BG, DE, DK, EE, ES, FI, HU, IT, LV, NL, PT, RO, SE, SI, UK |

Note: The overview table includes all data reported by MSs. However, in the following chapter, data reported as HACCP or own control are not included in the detailed tables, and, unless stated otherwise, data from import, suspect sampling and outbreak or clinical investigations are also excluded. Also, only countries reporting 25 samples or more have been included for analysis.

#### 3.4.1. VTEC in humans

In 2010, the total number of confirmed VTEC cases in the EU was 4,000, representing a 12.0 % increase compared with 2009 (N=3,573, Table VT2). The increase was mostly attributed to Germany and the Netherlands which accounted for 56.8 % and 22.0 %, respectively, of all reported increases in cases in 14 countries. Eight countries reported fewer cases in 2010 than in 2009, with the United Kingdom accounting for the majority (70.9 %) of the decreased number of cases. The number of confirmed reported cases has been increasing in the EU since 2008, although the five-year trend 2006-2010 in the notification rate in the EU was

35 Verotoxigenic *E. coli* (VTEC) is also known as verocytotoxigenic *E. coli*, verocytotoxin producing *E. coli* and shiga toxin producing *E. coli* (STEC).

not statistically significant (Figure VT3). By country, there was a significant increasing five-year trend in notification rate in Austria, Denmark, Finland, France, Luxembourg and the Netherlands, while the five-year trend was significantly decreasing in Malta. The increase in cases in the Netherlands is caused by an increase in laboratories implementing PCR for the detection of all VTEC strains.

In 2010, the fatality rate for human VTEC infection was 0.39 %, with eight deaths reported among 2,077 confirmed cases for which information was known.

The most widely used analytical method aims only at detecting VTEC O157, and not all MSs use methodologies aiming at detecting other VTEC serogroups.

***Table VT2. Reported VTEC cases in humans, 2006-2010 and notification rates for confirmed cases, 2010***

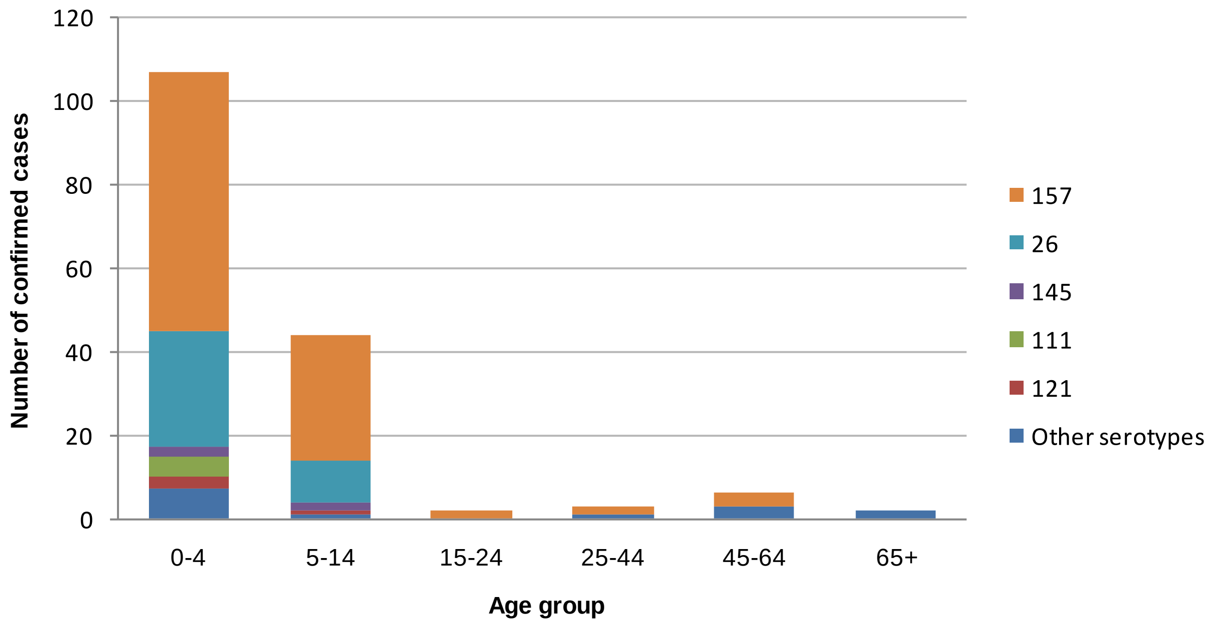
| Country | 2010 | | | | 2009 | 2008 | 2007 | 2006 |
|---|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases | Confirmed cases/ 100,000 | Confirmed cases | | | |
| Austria | C | 88 | 88 | 1.05 | 91 | 69 | 82 | 41 |
| Belgium | C | 84 | 84 | 0.77 | 96 | 103 | 47 | 46 |
| Bulgaria | U | 0 | 0 | 0 | 0 | 0 | 0 | - |
| Cyprus | U | 0 | 0 | 0 | 0 | 2 | 1 | - |
| Czech Republic | -[2] | - | - | - | - | - | - | - |
| Denmark | C | 186 | 175 | 3.16 | 160 | 161 | 156 | 146 |
| Estonia | C | 5 | 5 | 0.37 | 4 | 3 | 3 | 8 |
| Finland | C | 21 | 21 | 0.39 | 29 | 8 | 12 | 14 |
| France | C | 103 | 103 | 0.16 | 93 | 85 | 57 | 67 |
| Germany | C | 1,317 | 1,304 | 1.59 | 878 | 876 | 870 | 1,183 |
| Greece | C | 1 | 1 | 0.01 | 0 | 0 | 1 | 1 |
| Hungary | C | 7 | 7 | 0.07 | 1 | 0 | 1 | 3 |
| Ireland | C | 199 | 197 | 4.41 | 237 | 213 | 115 | 153 |
| Italy | C | 41 | 31 | 0.05 | 51 | 24 | 27 | 17 |
| Latvia | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lithuania | C | 1 | 1 | 0.03 | 0 | 0 | 0 | 0 |
| Luxembourg | C | 7 | 7 | 1.39 | 5 | 4 | 1 | 2 |
| Malta | C | 1 | 1 | 0.24 | 8 | 8 | 4 | 21 |
| Netherlands | C | 478 | 478 | 2.88 | 313 | 92 | 88 | 41 |
| Poland | C | 4 | 3 | 0.01 | 0 | 3 | 2 | 4 |
| Portugal | -[2] | - | - | - | - | - | - | - |
| Romania | C | 2 | 2 | 0.01 | 0 | 4 | - | - |
| Slovakia | C | 10 | 10 | 0.18 | 14 | 8 | 6 | 8 |
| Slovenia | C | 20 | 20 | 0.98 | 12 | 7 | 4 | 30 |
| Spain | C | 18 | 18 | 0.04 | 14 | 21 | 19 | 13 |
| Sweden | C | 334 | 334 | 3.58 | 228 | 304 | 262 | 265 |
| United Kingdom | C | 1,110 | 1,110 | 1.79 | 1,339 | 1,164 | 1,149 | 1,294 |
| **EU Total** | | **4,037** | **4,000** | **0.83** | **3,573** | **3,159** | **2,907** | **3,357** |
| Iceland | C | 2 | 2 | 0.63 | 8 | 4 | 13 | 1 |
| Liechtenstein | - | - | - | - | - | 0 | - | - |
| Norway | C | 50 | 50 | 1.03 | 108 | 22 | 26 | 50 |
| Switzerland[3] | C | 31 | 31 | 0.40 | 42 | 67 | 53 | 47 |

1. C: case-based report; U: unspecified; –: no report.
2. No surveillance system exists.
3. Switzerland provided data directly to EFSA.

The highest notification rate occurred in the age group 0-4 years (N= 1,161; 4.7 per 100,000 population) followed by children aged between 5 and 14 years old (1.2 per 100,000). However, a slight decrease was observed in the age group 0-4 years in comparison with 2009, when the notification rate was 7.2 per 100,000 population.

A total of 222 confirmed cases developed HUS; this represented a 5.5 % of the total number of confirmed cases reported in 2010. By age group, 65.8 % of the HUS cases were reported in children up to 4 years old. Of those, VTEC O157 serotype was identified in 42.5 % followed by VTEC O26 serotype in 19.2 % of cases (Figure VT1).

***Figure VT1. Haemolytic Uraemic Syndrome (HUS) by age and serogroup in reporting Member States, 2010***

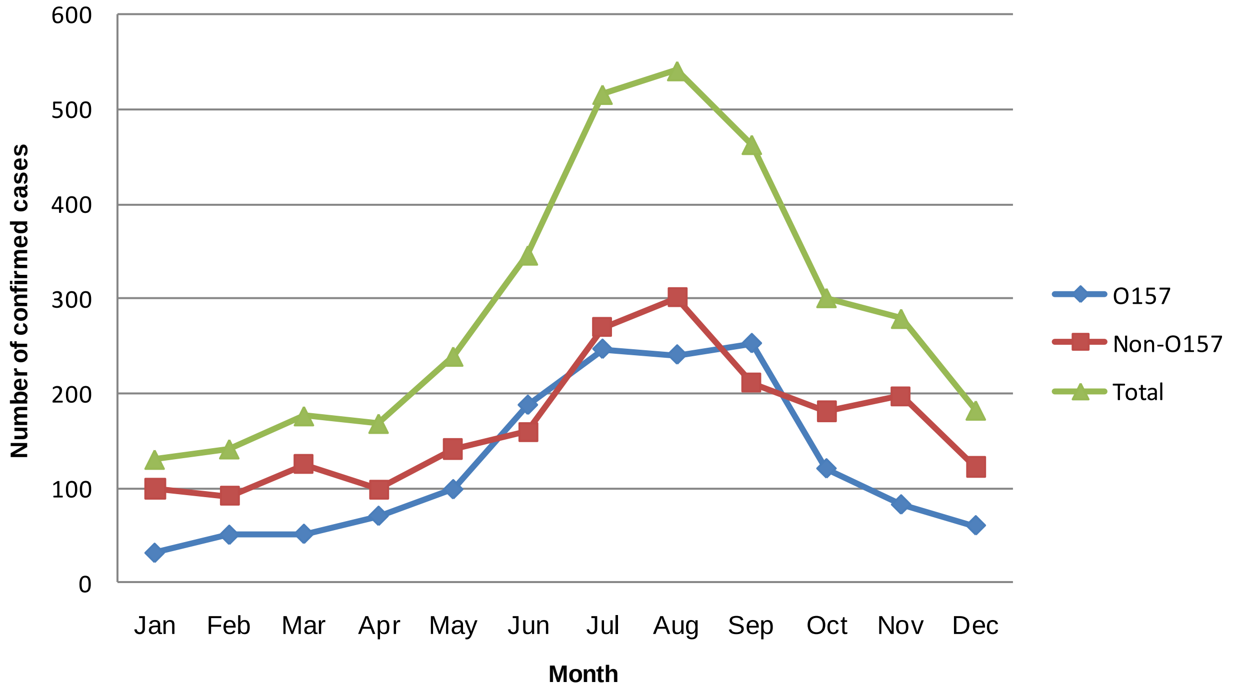



1. Source: Austria, Belgium, Denmark, France, Germany, Italy, Ireland, Netherlands, Poland, Slovenia, Sweden and United Kingdom (N=222).

The distribution of reported cases due to VTEC infection in 2010 followed a marked seasonal pattern, with a rise in case counts over the summer and early autumn months, peaking in August (Figure VT2). This seasonal pattern was influenced in 2010 by the increases in VTEC non-O157 infections during these months. The VTEC O157 confirmed cases also increased and had the highest peaks in July and September.

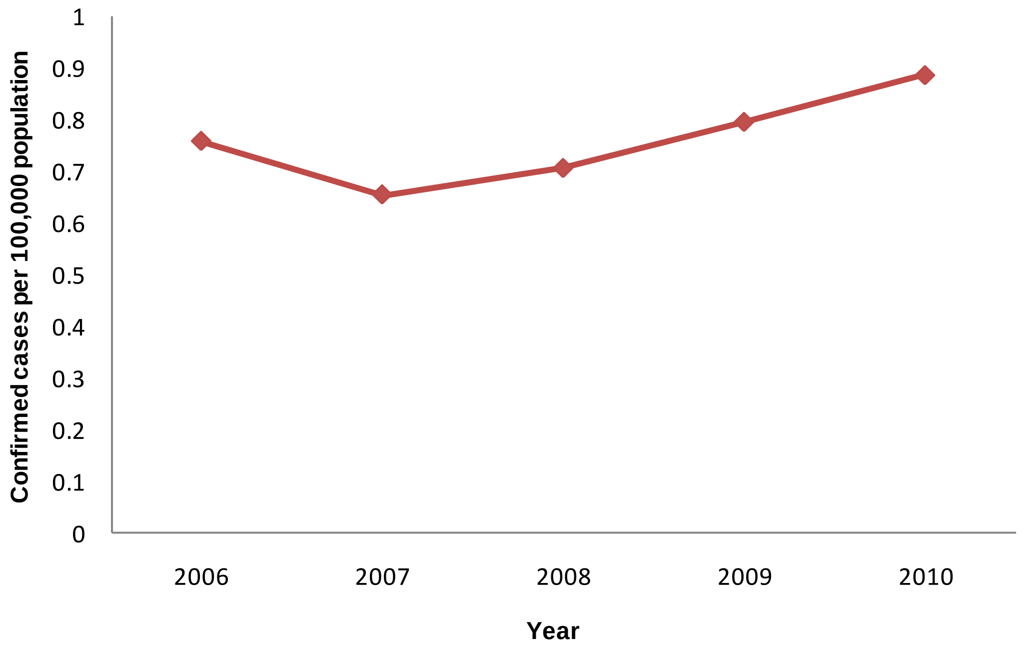
In 2010, information on transmission and suspected vehicles of transmission associated with confirmed VTEC cases was rarely reported and these data are not summarised here.

***Figure VT2. Number of reported confirmed cases of VTEC infection in humans by month, TESSy data for reporting Member States, 2010***




Source: Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Poland, Slovakia, Slovenia, Spain, Sweden and United Kingdom (N=3,553).

***Figure VT3. Trend in reported confirmed cases per 100,000 population of human VTEC infections in the EU, 2006-2010.***




Source: all MSs except Bulgaria, Czech Republic, Cyprus and Portugal.

### *VTEC Serotypes*

Full serotype data were reported for 1,288 (32 %) VTEC cases whereas data on antigen O was reported for 68 % of confirmed human infections in 2010. Almost half of the reported O serogroups were O157 (41.1 %). This represents a 18.8 % decrease compared with reported cases associated with the O157 serogroup in 2009 (1,848) (Table VT3). As in previous years, the highest percentage of O157-associated confirmed cases (78.6 %) was reported by the United Kingdom and Ireland (Table VT4). Another serotype of public health importance which was reported in lower numbers in 2010, was VTEC O104. Two confirmed cases of VTEC O104, were reported to TESSy one occurred in Austria and another in Sweden. Additionally, one confirmed case was reported to the ECDC epidemic intelligence information system (EPIS) by Finland as a case-associated with travel to Egypt.

Most cases, for which information was reported on strain virulence factors, were intimin-*eae* gene and verotoxin 2 positive, and this was particularly common for serotype O157 (867 out of 971 cases) (Table VT5). Most cases associated with serotype O103 and O26 were *eae* gene and verotoxin1 positive. Just a very small proportion of serotypes did not carry the *eae* gene (72 out of 1,626 cases). All but one reported case caused by serotype O91 - for which information was provided on virulence and virulence-associated factors - were *eae* negative.

The most commonly reported serotype was O157:H7 (162) followed by O157:H- (45) and O103:H2 (36) (Table VT6).

***Table VT3. Reported confirmed VTEC cases in humans by serogroup (top 10), 2009-2010***

| 2010 | | | 2009 | | |
|---|---|---|---|---|---|
| **Serogroup** | **No. of cases** | **% total** | **Serogroup** | **No. of cases** | **% total** |
| O157 | 1,501 | 41.1 | O157 | 1,848 | 51.7 |
| NT[1] | 1,230 | 33.7 | NT1 | 1,008 | 28.2 |
| O26 | 257 | 7.0 | O26 | 192 | 5.4 |
| O103 | 90 | 2.5 | O103 | 82 | 2.3 |
| O145 | 61 | 1.7 | O91 | 48 | 1.3 |
| O91 | 57 | 1.6 | O145 | 47 | 1.3 |
| O63 | 42 | 1.2 | O146 | 31 | 0.9 |
| O111 | 41 | 1.1 | O128 | 26 | 0.7 |
| O128 | 29 | 0.8 | O111 | 25 | 0.7 |
| O146 | 28 | 0.8 | O113 | 22 | 0.6 |
| Other[2] | 315 | 8.6 | Other [2] | 244 | 6.8 |
| **Total** | **3,651** | | **Total** | **3,573** | |

1. NT = untyped/untypeable.
2. Other included 8 (2010) and 12 (2009) confirmed cases where antigen O was reported as unknown.
Source: Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Malta, Netherlands, Poland, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom (N=3,651).

***Table VT4. VTEC serogroups in humans by country, 2010***

| Country | Serogroup | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | O157 | NT | O26 | O103 | O145 | O91 | O63 | O111 | O128 | O146 | Other |
| Austria | 11 | 4 | 16 | 9 | 3 | 0 | 0 | 6 | 0 | 1 | 38 |
| Belgium | 51 | 1 | 6 | 1 | 4 | 0 | 4 | 2 | 1 | 0 | 14 |
| Denmark | 25 | 5 | 14 | 24 | 6 | 6 | 1 | 3 | 9 | 9 | 73 |
| Estonia | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Finland | 1 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| France | 39 | 37 | 16 | 0 | 0 | 0 | 0 | 3 | 4 | 0 | 4 |
| Germany | 63 | 645 | 58 | 33 | 16 | 37 | 0 | 13 | 6 | 12 | 72 |
| Greece | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Hungary | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Ireland | 117 | 3 | 66 | 0 | 4 | 0 | 0 | 2 | 1 | 0 | 4 |
| Italy | 8 | 9 | 11 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 |
| Lithuania | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Luxembourg | 2 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| Malta | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Netherlands | 40 | 280 | 17 | 9 | 12 | 9 | 37 | 3 | 2 | 4 | 65 |
| Poland | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Romania | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Slovakia | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Slovenia | 2 | 7 | 6 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 1 |
| Spain | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Sweden | 53 | 179 | 26 | 12 | 13 | 3 | 0 | 4 | 3 | 2 | 39 |
| United Kingdom | 1,064 | 23 | 18 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 |
| **EU Total** | **1,501** | **1,230** | **257** | **90** | **61** | **57** | **42** | **41** | **29** | **28** | **315** |

***Table VT5. Virulence characteristics of main reported VTEC serogroups in 2010***

| Serotype | Virulence* characteristics | | | | | |
|---|---|---|---|---|---|---|
| | *eae, vt1* | *eae, vt2* | *eae, vt1, vt2* | *vt1* | *vt2* | *vt1, vt2* |
| O157 | 17 | 867 | 400 | 1 | 1 | 0 |
| NT | 1 | 18 | 2 | 10 | 9 | 2 |
| O26 | 62 | 25 | 19 | 3 | 1 | 0 |
| O103 | 52 | 1 | 1 | 0 | 0 | 0 |
| O145 | 3 | 30 | 0 | 0 | 0 | 0 |
| O91 | 0 | 0 | 1 | 12 | 2 | 7 |
| O63 | 0 | 18 | 3 | 0 | 0 | 0 |
| O111 | 15 | 6 | 2 | 1 | 0 | 0 |
| O128 | 1 | 5 | 4 | 3 | 3 | 5 |
| O146 | 0 | 1 | 0 | 0 | 7 | 5 |
| **Total** | **151** | **971** | **432** | **30** | **23** | **19** |

Note: **eae*, intimin -coding gene; *vt1*- verotoxin 1; *vt2*-verotoxin2

*Table VT6. VTEC O:H serotypes most commonly reported in humans by country, 2010*

| Country | Serogroup | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | O157:H7 | O157: H- | O26:H11 | O26: H- | O103:H2 | O145:H- | O145:H34 | O91:H- | O63:H6 | O111:H- | O128:H2 | O146:H21 | O146:H- |
| Austria | 2 | 0 | 10 | 0 | 8 | 0 | 0 | - | - | - | - | 0 | 0 |
| Belgium | 28 | 22 | 0 | 1 | 0 | 2 | 0 | - | 4 | 2 | 1 | - | - |
| Denmark | 17 | 8 | 10 | 4 | 23 | 1 | 5 | 6 | 1 | 3 | 5 | 4 | 3 |
| Finland | 0 | 0 | - | - | - | - | - | - | - | - | - | - | - |
| France | 6 | 11 | 0 | 0 | - | - | 0 | - | - | 0 | 0 | - | - |
| Germany | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | - | 0 | 0 | 0 | 0 |
| Hungary | 0 | 1 | 1 | 0 | - | - | - | - | - | - | 0 | - | - |
| Ireland | 0 | 0 | 0 | 0 | - | 0 | 0 | - | - | - | 1 | - | - |
| Italy | 0 | 0 | 0 | 0 | - | 0 | 0 | - | - | 0 | - | - | - |
| Lithuania | 0 | 0 | - | - | - | - | - | - | - | - | - | - | - |
| Luxembourg | 2 | 0 | 1 | 0 | 1 | - | - | 2 | - | - | 1 | - | - |
| Malta | 0 | 0 | - | - | - | - | - | - | - | - | - | - | - |
| Netherlands | 39 | 0 | 6 | 0 | 4 | 4 | 0 | 5 | 14 | 0 | 1 | 0 | 1 |
| Poland | 0 | 2 | - | - | - | - | - | - | - | - | - | - | - |
| Romania | 0 | 1 | 0 | 0 | - | - | - | - | - | - | - | - | - |
| Slovenia | 0 | 0 | 0 | 0 | 0 | - | - | - | - | 0 | 0 | - | - |
| Spain | 17 | 0 | - | - | - | - | - | - | - | - | - | - | - |
| Sweden | 51 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 |
| United Kingdom | 0 | 0 | 0 | 0 | - | 0 | 0 | - | - | - | - | - | - |
| **Total** | **162** | **45** | **28** | **5** | **36** | **7** | **5** | **13** | **19** | **5** | **8** | **4** | **4** |

### 3.4.2. VTEC in food

Nineteen MSs and one non-MS reported data on VTEC in food for 2010.

In a similar way to the information on human cases, when interpreting the data from food and animals it is important to note that data from different investigations are not directly comparable owing to differences in sampling strategies and the analytical methods applied. In fact, the most widely used analytical method aims to detect only VTEC O157, whereas fewer investigations have been conducted with analytical methods aiming at detecting all or selected non-O157 serotypes of VTEC.

#### Food of bovine origin

Bovine meat is believed to be a major source of food-borne VTEC infections for humans. In 2010, 12 MSs reported testing of 8,566 bovine meat units (from investigations of 25 or more samples) of which 0.5 % were found to be VTEC-positive and 0.1 % VTEC O157-positive (Table VT7). Many MSs reported few VTEC-positive samples, whereas Belgium, Germany and Spain detected proportions of positive units of 1.0 % or higher. The proportion of VTEC and VTEC O157-positive samples from the reporting MSs ranged from 0 % to 5.4 % and from 0 % to 1.1 %, respectively.

Compared with 2009, the overall proportion of VTEC-positive and VTEC O157-positive fresh bovine meat units at the reporting MS level was lower in 2010 but at approximately the same levels as in 2008 and 2007 (Table VT8). The higher findings in 2009 were attributable to Poland and Spain, both of which reported relatively high proportions of VTEC-positive units for that year, whereas Ireland and Spain reported the highest level of VTEC O157-positive units.

Regarding the other important human pathogenic VTEC serogroups (O26, O91, O111, O103 and O145), in 2010, serogroups O26 and O145 were detected in bovine meat by France, but overall very little information on the serogroups was provided by MSs.

Raw cow’s milk is also known to be one of the sources of human VTEC infections. In the four MSs (Bulgaria, Germany, Hungary and Slovakia) reporting on investigations of raw cow’s milk in 2010, VTEC was detected in raw milk intended for manufacture in Germany, at a moderate level of 17.6 %. This is substantially higher than reported by Germany in previous years. Germany did not detect any VTEC O157 positive raw milk units in the years 2007–2010; however, three of the positive units in 2008 were reported as VTEC O22 positive (Table VT9). Italy and Slovakia reported VTEC and VTEC O157-positive raw milk units in 2008 and 2009, respectively. None of the other reporting MSs found VTEC-positive raw milk samples in 2007-2010.

Together five MSs and one non-MS reported data from cheeses made from cow’s milk for the years 2007–2010 (Table VT11). Germany found VTEC-positive samples in 2010 from soft and semi-soft cheeses made from raw or low heat-treated cow’s milk (2.6 %, including a finding of VTEC O91), in 2009 from hard cheese made from raw or low heat-treated milk (0.7 %) and in 2007 from soft and semi-soft cheeses made from cow’s milk (0.9 %). Italy reported VTEC-positive samples in 2007 from cheese made from raw or low heat-treated cow’s milk (1.9 %).

## Table VT7. VTEC in fresh bovine meat, 2010

| Country | Description | Sample unit | Sample weight | N | VTEC % pos | VTEC O157 % pos | Additional information / serotype |
|---|---|---|---|---|---|---|---|
| **At slaughter** | | | | | | | |
| Belgium | Fresh | Single | 1,600 $cm^2$ | 375 | 1.6 | 0 | VTEC non-O157 (6) |
| Czech Republic | Fresh | Batch | 400 $cm^2$ | 632 | 0.5 | 0.5 | |
| Hungary | Fresh | Single | 25 g | 118 | 0 | 0 | |
| Romania | Fresh | Batch | 25 g | 447 | 0 | 0 | |
| Spain | Fresh | Single | 25 g | 33 | 0 | 0 | |
| **At cutting/processing plant** | | | | | | | |
| Belgium | Fresh | Batch | 25 g | 271 | 0 | 0 | |
| | Minced meat | Batch | 25 g | 267 | 0 | 0 | Intended to be eaten raw. |
| Estonia | Fresh | Single | 25 g | 113 | 0 | 0 | |
| Germany | Fresh | Single | 25 g | 180 | 1.7 | 0.6 | No serotype information. |
| | Minced meat | Single | 25 g | 77 | 3.9 | 0 | Intended to be eaten raw; No serotype information |
| Hungary | Fresh | Single | 25 g | 161 | 0 | 0 | |
| | Minced meat | Single | 25 g | 40 | 0 | 0 | Chilled; intended to be eaten cooked |
| Ireland | Fresh | Single | 25 g | 90 | 0 | 0 | |
| Romania | Fresh | Batch | 25 g | 171 | 0 | 0 | |
| | Fresh | Batch | 25 g | 186 | 0 | 0 | |
| **At retail** | | | | | | | |
| Bulgaria | Fresh | Batch | - | 82 | 0 | 0 | |
| | Minced meat | Batch | - | 346 | 0 | 0 | Intended to be eaten raw |
| France | Minced meat | Single | 25 g | 2,476 | 0.2 | <0.1 | Chilled; intended to be eaten cooked; VTEC O26:H11 (4), VTEC O157:H7 (1), VTEC O145:H28 (1) |
| Germany | Fresh | Single | 25 g | 196 | 1.0 | - | VTEC unspecified (1); VTEC non O157 (1) |
| | Minced meat | Single | 25 g | 295 | 3.1 | - | Intended to be eaten raw; VTEC unspecified (8); VTEC non O157 (1) |
| Hungary | Fresh | Single | 25 g | 81 | 0 | 0 | |
| | Minced meat | Single | 25 g | 77 | 0 | 0 | Chilled; intended to be eaten cooked |
| Netherlands | Fresh | Single | 25 g | 620 | 0 | 0 | |
| | Minced meat | Single | 25 g | 78 | 0 | 0 | Intended to be eaten cooked |
| | Minced meat | Single | 25 g | 120 | 0 | 0 | Intended to be eaten raw. |
| Romania | Fresh | Single | 25 g | 472 | 0 | 0 | |
| Spain | Fresh | Single | 25 g | 92 | 5.4 | 1.1 | VTEC unspecified (4) |
| **Level of sampling not specified** | | | | | | | |
| Bulgaria | - | Batch | - | 46 | 0 | 0 | No information on the samples taken |
| Germany[1] | - | Single | 25 g | 394 | 1.5 | 0.3 | VTEC unspecified (3), VTEC non-O157 (2) |
| Italy | - | Single | - | 30 | 0 | 0 | |
| **Total (12 MSs)** | | | | **8,566** | **0.5** | **0.1** | |

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

1. Germany: all surveillance samples.

*Table VT8. VTEC in fresh bovine meat by country and by year, 2007-2010*

| Country | 2010 | | | 2009 | | |
|---|---|---|---|---|---|---|
| | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 |
| | | % pos | % pos | | % pos | % pos |
| **At slaughter, cutting/processing plant** | | | | | | |
| Belgium | 913 | 0.7 | 0 | 1,582 | 1.0 | 0.6 |
| Bulgaria | - | - | - | - | - | - |
| Czech Republic | 632 | 0.5 | 0.5 | 220 | 0 | 0 |
| Estonia | 113 | 0 | 0 | 75 | 0 | 0 |
| France | - | - | - | - | - | - |
| Germany | 257 | 2.3 | 0.4 | 116 | 3.4 | 0 |
| Hungary | 319 | 0 | 0 | 298 | 0 | 0 |
| Ireland | 90 | 0 | 0 | 86 | 4.7 | 4.7 |
| Poland | - | - | - | 384 | 24.7 | 0 |
| Romania | 804 | 0 | 0 | 901 | 0 | 0 |
| Slovenia | - | - | - | - | - | - |
| Spain | 33 | 0 | 0 | 303 | 14.9 | 14.9 |
| **At retail** | | | | | | |
| Belgium | - | - | - | - | - | - |
| Bulgaria | 428 | 0 | 0 | 77 | 0 | 0 |
| France | 2,476 | 0.2 | <0.1 | 1,527 | 0.1 | <0.1 |
| Germany | 491 | 2.2 | 0 | 847 | 4.7 | 0 |
| Hungary | 158 | 0 | 0 | 128 | 0 | 0 |
| Ireland | - | - | - | - | - | - |
| Italy | - | - | - | - | - | - |
| Latvia | - | - | - | - | - | - |
| Luxembourg | - | - | - | 307 | 0.3 | 0.3 |
| Netherlands | 818 | 0.1 | 0.1 | 1,786 | <0.1 | <0.1 |
| Poland | - | - | - | 162 | 2.5 | - |
| Romania | 472 | 0 | 0 | 220 | 0 | 0 |
| Slovenia | - | - | - | - | - | - |
| Spain | 92 | 5.4 | 1.1 | 35 | 0 | 0 |
| United Kingdom | - | - | - | - | - | - |
| **Level of sampling not specified** | | | | | | |
| Bulgaria | 46 | 0 | 0 | - | - | - |
| Germany[1] | 394 | 1.5 | 0.3 | 231 | 3.9 | - |
| Hungary | - | - | - | - | - | - |
| Italy | 30 | 0 | 0 | | | |
| Slovakia | - | - | - | - | - | - |
| **Total (12 MSs in 2010)** | **8,566** | **0.5** | **0.1** | **9,285** | **2.3** | **0.7** |

Table continued overleaf.

*Table VT8 (continued). VTEC in fresh bovine meat by country and by year, 2007-2010*

| Country | 2008 | | | 2007 | | |
|---|---|---|---|---|---|---|
| | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 |
| | | % pos | % pos | | % pos | % pos |
| **At slaughter, cutting/processing plant** | | | | | | |
| Belgium | 2,119 | 0.6 | 0.6 | 1,897 | 0.3 | 0.2 |
| Bulgaria | - | - | - | 1,677 | 0.2 | 0 |
| Czech Republic | 516 | 0 | 0 | 536 | 0 | 0 |
| Estonia | - | - | - | - | - | - |
| France | 3,992 | 0.3 | <0.1 | 3,605 | 0.3 | 0.1 |
| Germany | 98 | 2.0 | 0 | - | - | - |
| Hungary | 219 | 0.5 | 0.5 | 144 | 0 | 0 |
| Ireland | - | - | - | - | - | - |
| Poland | 105 | 0 | 0 | - | - | - |
| Romania | 1,627 | 0 | 0 | 1,948 | 0 | 0 |
| Slovenia | 265 | 0.4 | 0.4 | 164 | 0 | 0 |
| Spain | 97 | 1.0 | 0 | 201 | 0.5 | 0.5 |
| **At retail** | | | | | | |
| Belgium | 138 | 0 | 0 | 152 | 0 | 0 |
| Bulgaria | 275 | 0.4 | 0.4 | - | - | - |
| France | - | - | - | - | - | - |
| Germany | 480 | 2.3 | 0 | 458 | 2.4 | 0 |
| Hungary | 81 | 0 | 0 | - | - | - |
| Ireland | - | - | - | 38 | 0 | 0 |
| Italy | 45 | 0 | 0 | - | - | - |
| Latvia | 131 | 0 | 0 | - | - | - |
| Luxembourg | - | - | - | - | - | - |
| Netherlands | 784 | 0.1 | 0.1 | 1,532 | 0.1 | 0.1 |
| Poland | - | - | - | - | - | - |
| Romania | 239 | 0 | 0 | - | - | - |
| Slovenia | - | - | - | 385 | 1.0 | 0 |
| Spain | 138 | 5.8 | 0 | 69 | 1.4 | 0 |
| United Kingdom | 3,249 | <0.1 | <0.1 | - | - | - |
| **Level of sampling not specified** | | | | | | |
| Bulgaria | - | - | - | - | - | - |
| Germany[1] | - | - | - | 142 | 2.8 | 0 |
| Hungary | - | - | - | 97 | 0 | 0 |
| Italy | 212 | 0.5 | 0 | 1,023 | 0 | 0 |
| Slovakia | - | - | - | 47 | 0 | 0 |
| **Total (12 MSs in 2010)** | **14,810** | **0.3** | **0.1** | **14,115** | **0.3** | **0.1** |

Note: Data are presented only for sample sizes ≥25.
Note: 13 MSs reported in 2007 and 2009, 14 in 2008 and 12 in 2010.
1. Germany: all surveillance samples including processing plant and retail.

*Table VT9. VTEC in raw cows' milk, 2007-2010*

| Country | Description | 2010 | | | 2009 | | | 2008 | | | 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 |
| | | | % pos | % pos | | % pos | % pos | | % pos | % pos | | % pos | % pos |
| Austria | Raw milk, intended for direct human consumption | - | - | - | - | - | - | - | - | - | 101 | 0 | 0 |
| Bulgaria | Raw milk, intended for manufacture of raw or low heat-treated products | 810 | 0 | 0 | - | - | - | - | - | - | - | - | - |
| Czech Republic | Raw milk, intended for direct human consumption | - | - | - | - | - | - | - | - | - | 46 | 0 | 0 |
| Germany | Raw milk, intended for manufacture[1] | 318 | 17.6 | 0 | 337 | 1.5 | 0 | 875 | 1.6 | 0 | 106 | 0 | 0 |
| | Raw, at farm. Sold with recommendation for heating | - | - | - | 88 | 6.8 | 0 | 122 | 4.9 | 0 | 209 | 1.9 | 0 |
| | Raw milk, intended for direct human consumption | 117 | 0 | 0 | 178 | 0 | 0 | 164 | 1.8 | 0 | 156 | 0.6 | 0 |
| Hungary | Raw milk | 119 | 0 | 0 | 126 | 0 | 0 | 38 | 0 | 0 | - | - | - |
| Italy | Raw milk, intended for direct human consumption | - | - | - | - | - | - | - | - | - | 38 | 0 | 0 |
| | Raw for manufacture | - | - | - | - | - | - | - | - | - | 31 | 0 | 0 |
| | Raw | - | - | - | - | - | - | 161 | 0.6 | 0.6 | 367 | 0 | 0 |
| Latvia | Raw milk, intended for direct human consumption | - | - | - | - | - | - | 79 | 0 | 0 | 25 | 0 | 0 |
| Slovakia | Surveillance/raw at farm | 319 | 0 | 0 | 269 | 0.4 | 0.4 | - | - | - | - | - | - |
| **Total (4 MSs in 2010)** | | **1,683** | **3.3** | **0** | **998** | **1.2** | **0.1** | **1,439** | **1.7** | **<0.1** | **1,079** | **0.5** | **0** |

Note: Data are presented only for sample sizes ≥25.
No additional information on serogroups was provided by MSs except for one investigation from Germany in 2008 (first row) in which 3 positive samples were VTEC O22.
In Hungary in 2009 data are for raw milk intended for direct human consumption.
1. In 2009, Germany reported data on 'milk from bulk tank'.

### Food of ovine and caprine origin

Between 2007 and 2010, seven MSs reported data on fresh sheep meat including 25 or more samples. Among those countries, only Germany reported positive samples for VTEC over that period (Table VT10). The proportion of VTEC positive samples in Germany appeared to have increased, from 5.4 % in 2007 to 21.0 % in 2010 at retail and from 7.3 % to 18.4 % at all surveillance investigations. VTEC O157 was not detected in any fresh sheep meat sample in these four years of investigations.

No VTEC positive samples were reported from raw sheep's or goat's milk in 2009–2010 by the two MSs providing data. In cheeses made from raw or low heat-treated sheep's milk, France and Slovakia reported positive findings in 2007 and 2009, mainly at low levels, but up to 17.9 % in Slovakia in 2007. However, no VTEC O157 was detected from these samples. In cheeses made from raw or low heat-treated goat's milk, France and Switzerland have detected VTEC positive samples. In France, 2009, the proportion of positive units was 0.8 % and 0.2 % for VTEC and VTEC O157. Switzerland detected VTEC positive samples only at levels of 3.4 %–5.4 %.

### Other food

A substantial number of MSs reported data on VTEC in fresh pig meat over the years 2007–2010 (Table VT12). Many of the investigations reported did not yield any positive findings, but six MSs found VTEC positive samples typically at very low to low levels (0.1 %–2.0 %). VTEC O157 was detected in three of these investigations, and the highest proportion of positive samples for VTEC O157 was 1.2 % reported by Spain.

Some data have also been submitted on VTEC in poultry meat, and four MSs reported VTEC findings at levels of 0.1 %–14.1 % (Table VT12). VTEC O157 was detected in only one investigation from Spain.

VTEC was detected also from game meat (mammals) by Austria and Germany. Germany consistently reported findings over the years 2007–2010 at levels varying between 9.1 % and 11.0 %. O157 serogroup was isolated in only one of these investigations.

Fewer VTEC data were provided from other foodstuffs. In other dairy products (excluding cheeses and raw milk), four MSs reported data on dairy products between 2007 and 2010 (Table VT11). Only Spain reported positive VTEC (5.4 % in 2010). Nine MSs provided data on VTEC in fruits, vegetables and juices in 2007–2010 (Table VT13). Five investigations yielded positive samples at very low to low levels (0.5 %–6.5 %), and VTEC O157 was detected in three investigations of vegetables, with the proportion positive units at 0.5 %–5.3 %. Two MSs reported data on VTEC in fishery products, and in one investigation VTEC was detected at the level of 4.2 %.

Refer to the level 3 tables for this additional information.

*Table VT10. VTEC in fresh ovine and goat meat, 2007-2010*

| Country | Description | Sample weight | 2010 | | | 2009 | | | 2008 | | | 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 |
| | | | | % pos | % pos | | % pos | % pos | | % pos | % pos | | % pos | % pos |
| **Ovine** | | | | | | | | | | | | | | |
| **At retail** | | | | | | | | | | | | | | |
| Bulgaria | Fresh | - | 80 | 0 | 0 | - | - | - | - | - | - | - | - | - |
| Germany | Fresh | 25 g | 62 | 21.0 | 0 | 38 | 10.5 | 0 | 61 | 8.2 | 0 | 37 | 5.4 | 0 |
| Netherlands | Fresh | 25 g | 121 | 0 | 0 | 33 | 0 | 0 | - | - | - | 97 | 0 | 0 |
| **At slaughter, cutting/processing plant** | | | | | | | | | | | | | | |
| Ireland | Carcass | - | - | - | - | 31 | 0 | 0 | - | - | - | - | - | - |
| Poland | Fresh | 1 g | - | - | - | 107 | 0 | 0 | - | - | - | - | - | - |
| Spain | fresh | 25 g | - | - | - | - | - | - | - | - | - | 83 | 0 | 0 |
| **Not specified** | | | | | | | | | | | | | | |
| Bulgaria | - | - | 44 | 0 | 0 | - | - | - | - | - | - | - | - | - |
| Germany[2] | - | 25 g | 87 | 18.4 | 0 | 39 | 10.3 | 0 | - | - | - | 41 | 7.3 | 0 |
| Italy[1] | fresh | 25 g | - | - | - | - | - | - | - | - | - | 32 | 0 | 0 |
| **Total (3 MSs in 2010)** | | | **394** | **7.4** | **0** | **248** | **3.2** | **0** | **61** | **8.2** | **0** | **290** | **1.7** | **0** |
| **Goat** | | | | | | | | | | | | | | |
| Spain | Fresh | 25 g | - | - | - | - | - | - | 90 | 0 | 0 | - | - | - |

Note: Data are presented only for sample sizes ≥25.
1. Sampling includes five samples with unspecified sample type.
2. Germany, all surveillance samples, including at retail.

***Table VT11. VTEC in milk and dairy products excluding raw cow's milk, 2007-2010***

| Country | 2010 | | | 2009 | | | 2008 | | | 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | VTEC % pos | VTEC O157 % pos | N | VTEC % pos | VTEC O157 % pos | N | VTEC % pos | VTEC O157 % pos | N | VTEC % pos | VTEC O157 % pos |
| **Milk, goats'** | | | | | | | | | | | | |
| Bulgaria | 85 | 0 | - | 2,950 | 0 | - | - | - | - | - | - | - |
| Italy | 1,004 | 0 | - | 27 | 0 | - | - | - | - | - | - | - |
| **Milk, sheep's** | | | | | | | | | | | | |
| Italy | 153 | 0 | - | 27 | 0 | - | - | - | - | - | - | - |
| **Cheeses made from cows' milk** | | | | | | | | | | | | |
| Belgium | 225 | - | - | - | - | - | - | - | - | 83 | 0 | - |
| France | - | - | - | 1,050 | 1.1 | 0 | - | - | - | 392 | 0 | - |
| Germany | 152 | 2.6 | 0 | 146 | 0.7 | 0 | - | - | - | 215 | 0.9 | 0 |
| Italy | - | - | - | - | - | - | 45 | 0 | - | 160 | 1.9 | 0 |
| Slovakia | - | - | - | - | - | - | - | - | - | 594 | 0 | - |
| Switzerland | - | - | - | - | - | - | 639 | 1.7 | 0 | 315 | 2.2 | 0 |
| **Cheeses made from goats' milk** | | | | | | | | | | | | |
| Belgium | 113 | 0 | - | - | - | - | - | - | - | 25 | 0 | - |
| France | - | - | - | 510 | 0.8 | 0.2 | - | - | - | - | - | - |
| Italy | 86 | 0 | - | 43 | 0 | - | - | - | - | - | - | - |
| Switzerland | - | - | - | - | - | - | 58 | 3.4 | 0 | 37 | 5.4 | 0 |
| **Cheeses made from sheep's milk** | | | | | | | | | | | | |
| Belgium | 109 | 0 | - | - | - | - | - | - | - | 25 | 0 | - |
| France | - | - | - | 347 | 0.3 | 0 | - | - | - | - | - | - |
| Italy | 135 | 0 | - | 81 | 0 | - | - | - | - | 50 | 0 | - |
| Portugal | - | - | - | 32 | 0 | - | - | - | - | - | - | - |
| Slovakia | - | - | - | 98 | 1.0 | 0 | - | - | - | 39 | 17.9 | 0 |
| **Cheeses, made from unspecified milk or other animal milk** | | | | | | | | | | | | |
| Belgium | - | - | - | - | - | - | 108 | 0 | - | - | - | - |
| Italy | 385 | 0 | - | 255 | 0.4 | 0.4 | - | - | - | - | - | - |
| Spain | - | - | - | - | - | - | 51 | 0 | - | - | - | - |
| **Dairy products (excluding cheeses)** | | | | | | | | | | | | |
| Belgium | 183 | 0 | - | - | - | - | 210 | 0 | - | 25 | 0 | - |
| Czech Republic | - | - | - | 36 | 0 | - | 27 | 0 | - | 39 | 0 | - |
| Slovakia | - | - | - | - | - | - | - | - | - | 57 | 0 | - |
| Spain | 74 | 5.4 | 0 | - | - | - | - | - | - | 233 | 0 | - |
| **Total (5 MSs in 2010)** | **2,704** | **0.3** | **0** | **5,602** | **0.4** | **<0.1** | **1,138** | **1.1** | **0** | **2,289** | **0.9** | **0** |

Note: Data are presented only for sample sizes ≥25.
Note: 7 MSs and 1 non-MS reported in 2007, 4 MSs and 1 non-MS in 2008, 7 MSs in 2009 and 5 MSs in 2010.
In 2009 and 2010 Bulgaria reported investigations on raw goat's milk intended for manufacture of raw or low heat-treated products.
In 2010 Germany reported the serotype VTEC O91 (1) in soft and semi-soft cheeses made from raw or low heat treated cow's milk.

## Table VT12. VTEC in fresh meat from other animal species, 2007-2010

| Country | 2010 | | | 2009 | | | 2008 | | | 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 |
| | | % pos | % pos | | % pos | % pos | | % pos | % pos | | % pos | % pos |
| **Meat from pig** | | | | | | | | | | | | |
| Belgium | - | - | - | 236 | 0.8 | 0 | - | - | - | - | - | - |
| Bulgaria | 1,380 | 0.4 | 0 | 297 | 0 | - | 213 | 0.5 | 0 | 2,214 | 0.2 | 0 |
| Czech Republic | 891 | 0 | - | 262 | 0 | - | 648 | 0 | - | 616 | 0 | - |
| Estonia | 64 | 0 | - | 80 | 0 | - | - | - | - | - | - | - |
| Germany | 202 | 0.5 | 0 | 1,246 | 1.9 | 0 | 72 | 1.4 | 0 | 38 | 0 | - |
| Italy | 71 | 0 | 0 | 73 | 0 | - | 53 | 0 | - | 1,428 | 0.4 | 0.4 |
| Netherlands | 737 | 0.1 | 0.1 | 726 | 0 | - | 1,104 | 0 | - | 318 | 0 | - |
| Poland | - | - | - | 440 | 0 | - | 3,335 | 0 | - | 72 | 0 | - |
| Portugal | 74 | 0 | - | 34 | 0 | - | - | - | - | - | - | - |
| Slovakia | - | - | - | - | - | - | - | - | - | 316 | 0 | - |
| Spain | 160 | 0.6 | 0 | 85 | 1.2 | 1.2 | 247 | 2.0 | 0 | 55 | 0 | - |
| **Meat from broilers (*Gallus gallus*)** | | | | | | | | | | | | |
| Belgium | - | - | - | 997 | 14.1 | 0 | - | - | - | - | - | - |
| Bulgaria | 1,915 | 0 | - | 468 | 0 | - | 351 | 0 | - | 962 | 0.1 | 0 |
| Germany | - | - | - | 37 | 0 | - | - | - | - | - | - | - |
| Italy | - | - | - | - | - | - | - | - | - | 185 | 0 | - |
| Latvia | - | - | - | - | - | - | 185 | 0 | - | 40 | 0 | - |
| Poland | - | - | - | 100 | 0 | - | 30 | 0 | - | - | - | - |
| Spain | 74 | 10.8 | 1.4 | - | - | - | - | - | - | - | - | - |
| **Meat from turkey** | | | | | | | | | | | | |
| Germany | 26 | 0 | - | 37 | 5.4 | 0 | - | - | - | - | - | - |
| Poland | - | - | - | 200 | 0 | - | - | - | - | - | - | - |
| **Meat from wild or farmed game - land mammals** | | | | | | | | | | | | |
| Austria | 30 | 0 | - | 85 | 2.4 | 0 | - | - | - | - | - | - |
| Germany | 176 | 9.1 | 0 | 154 | 11.0 | 0 | 422 | 9.7 | 0.2 | 130 | 10.0 | 0 |
| **Total (9 MSs in 2010)** | **5,800** | **0.6** | **<0.1** | **5,557** | **3.4** | **<0.1** | **6,660** | **0.7** | **<0.1** | **6,374** | **0.4** | **0.1** |

Note: Data are presented only for sample sizes ≥25. Note: 9 MSs reported in 2007 and 2010, 8 in 2008 and 11 in 2009.
In 2009 Belgium reported in meat from broilers and meat from pigs 141 *E. coli* non-pathogenic unspecified. In 2009 Austria reported in meat from wild or farmed game - land mammal the serotype VTEC O146:H21 (1). In 2008 Germany reported in meat from wild or farmed game - land mammals the serotypes VTEC O146 (2) and VTEC O91 (1). In 2007 Germany reported in meat from wild or farmed game - land mammals the serotypes VTEC O128 (1), VTEC O146 (1), VTEC O8 (1) and VTEC O113 (1).

*Table VT13. VTEC in other food, 2007-2010*

| Country | 2010 | | | 2009 | | | 2008 | | | 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 |
| | | % pos | % pos | | % pos | % pos | | % pos | % pos | | % pos | % pos |
| **Fruits and vegetables** | | | | | | | | | | | | |
| Austria | - | - | - | - | - | - | 96 | 0 | - | - | - | - |
| **Vegetables** | | | | | | | | | | | | |
| Belgium | 288 | 0.7 | 0.7 | - | - | - | - | - | - | - | - | - |
| Italy | 25 | 4.0 | - | - | - | - | - | - | - | 27 | 0 | - |
| Netherlands | - | - | - | - | - | - | 947 | 0.5 | 0.5 | 1,852 | 0 | - |
| Romania | - | - | - | 30 | 0 | - | 49 | 0 | - | - | - | - |
| Slovenia | - | - | - | - | - | - | - | - | - | 150 | 0 | - |
| Spain | 62 | 6.5 | 0 | - | - | - | - | - | - | 54 | 0 | - |
| Sweden | - | - | - | 57 | 5.3 | 5.3 | - | - | - | - | - | - |
| **Juice** | | | | | | | | | | | | |
| Ireland | - | - | - | - | - | - | - | - | - | 139 | 0 | - |
| **Fishery products** | | | | | | | | | | | | |
| Italy | - | - | - | 65 | 0 | - | - | - | - | - | - | - |
| Spain | 597 | 4.2 | 0 | 142 | 0 | - | - | - | - | 347 | 0 | - |
| **Other processed food products and prepared dishes** | | | | | | | | | | | | |
| Hungary | 54 | 0 | - | 46 | 0 | - | - | - | - | - | - | - |
| Italy | - | - | - | - | - | - | 27 | 0 | - | - | - | - |
| Slovenia | - | - | - | - | - | - | - | - | - | 50 | 0 | - |
| Spain | 1,780 | 0.8 | 0 | - | - | - | - | - | - | 840 | 0.1 | 0 |
| **Total (4 MSs in 2010)** | **2,806** | **1.6** | **<0.1** | **340** | **0.9** | **0.9** | **1,119** | **0.4** | **0.4** | **3,459** | **<0.1** | **0** |

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

### 3.4.3. VTEC in animals

Sixteen MSs reported data on VTEC in animals for 2010.

#### Cattle

Together 12 MSs provided data on VTEC in cattle for the year 2010. For the investigations with known sample types, the majority of VTEC data from cattle was obtained by analysing faecal samples from single animals. The overall prevalence of VTEC in animals was 13.5 %, ranging from 0 % to 53.8 % among MSs, and the overall proportion of VTEC O157-positive samples was 0.2 %, ranging from 0 % to 1.9 % (Table VT14). The prevalence at herd or holding level was 10.0 % and 4.7 % for VTEC and VTEC O157, respectively.

In the years 2007-2010, the Netherlands consistently reported data on VTEC in herds of calves (<12 months) and dairy cows (Table VT14). The VTEC and VTEC O157 prevalence in the calf herds varied between 13.2 % and 22.2 %, whereas in dairy cow herds the prevalence was at the lower levels of 1.9 %-4.5 %. Germany also reported data on calf herds in 2007–2010, finding only VTEC in 2009 and 2010 at levels of 2.6 %-6.8 % and no O157 serogroup in any of these investigations. However serogroups O26 and O103 were detected. Germany also provided data over these years from all investigated cattle herds, reporting higher VTEC prevalences of 2.7 %–13.1 % and isolations of O157, O26, O103 and O91 serogroups.

Austria also consistently reported data on VTEC in 2007–2010 with plenty of information on serogroups. Among calves under 12 months old the VTEC prevalence varied between 2.3 % and 30.6 % and that of O157 between 0 % and 2.1 %. In addition the serogroups O26, O91, O103 and O145 were detected. Austria also reported data on unspecified cattle herds between 2008 and 2010 with levels of VTEC varying between 6.5 % and 36.2 %; Serogroups O157, O91 and O103 were also reported.

Spain provided data in 2007–2010 on VTEC in slaughter batches of calves and meat production animals. The VTEC and VTEC O157 prevalence in these investigations varied between 17.0 % and 20.2 %.

Other MSs also reported some investigations of cattle in the years 2007–2010 with varying levels of VTEC findings. Finland reported in 2010 a large investigation covering 1,531 animals at slaughter with a VTEC and O157 prevalence of 0.5 %. Also Hungary carried out a large investigation of 4,037 animals, and 20.8 % of these tested VTEC positive but none was positive for O157.

| |
|---|
| In Finland, in 2010, three human Enterohaemorrhagic *E. coli* (EHEC) cases representing serotypes O157 and O26 and potentially associated with visits to cattle farms were detected. Samples were taken from the suspected farms and analysed for the presence of these serotypes. The isolated strains were genotyped with pulsed field gel electrophoresis (PFGE). Indistinguishable genotypes were found in O157 isolates from one farm and the isolate from the patient visiting that farm, thus confirming the source of the infection. |

Relatively little information was available on the VTEC serogroups, and testing is mainly aimed at detecting VTEC O157. Reporting may therefore not accurately reflect all serogroups found. Nevertheless, many MSs reported serogroups including other important human pathogenic serogroups (O26, O91, O111, O103 and O145). In addition to that described above, Slovenia detected O103 and O145 in unspecified cattle in 2010.

| |
|---|
| Spain reported a national survey in 2010 using the EFSA technical specifications for monitoring VTEC in cattle slaughter batches by testing the hide[36]. In total 18.9 % of the animals tested were VTEC positive (including VTEC O157) in this survey. |

36 EFSA (European Food Safety Authority), 2009. Technical specifications for the monitoring and reporting of verotoxigenic *Escherichia coli* (VTEC) on animals and food (VTEC surveys on animals and food) on request of EFSA. EFSA Journal, 7(11):1366, 43 pp.

### Sheep and goats

Small ruminants are also considered to be an important reservoir for VTEC. Of the five MSs that reported data (from 25 or more samples) on sheep in 2010, Germany and Hungary reported positive findings of VTEC at levels of 2.4 % and 72.7 %, and no VTEC O157 was reported (Table VT15). However, Germany reported one VTEC O91 strain. The United Kingdom reported 18 VTEC O157-positive samples out of 142 as originating from outbreak investigations in 2010.

Austria, Germany and Portugal consistently reported data on VTEC in sheep between 2007 and 2010. Overall, no or low levels (< 2.0 %) of VTEC O157 were reported during that period, and the prevalence of VTEC varied widely, with levels ranging between 0 % and 77.7 %. Most of the VTEC-positive serotypes were not specified, except for Austria, which reported a complete list when appropriate. Sweden reported low proportions (1.8 % and 1.9 %) of VTEC O157-positive sheep in 2008.

Data from goats were reported only in 2007 and 2010 by Germany and Portugal (Table VT15). In 2010, Germany found 11.8 % and 1.3 % of the goats at farm positive for VTEC and VTEC O157. In 2007 Germany and Portugal reported the prevalence of VTEC in goats as 6.1 % and 1.9 %, respectively. In 2010, the United Kingdom reported two positive samples for VTEC out of 16 goat samples originating from outbreak investigations.

### Other animals

Eight MSs reported data on VTEC from other animal species in 2007–2010 (Table VT16). The highest levels of VTEC-positive samples were reported by Hungary, in dogs (90.4 %) and pheasants (25.8 %). Although no additional information was provided it might be that these unusually high proportions positive samples were the result of specific sampling contexts. Otherwise there were relatively few findings of VTEC.

In pigs, at the animal level, between 2007 and 2010, the reported prevalence of VTEC varied between 0 % and 10.8 % among the reporting MSs, but only Germany detected VTEC O157, albeit at very low levels varying between 0.1 % and 0.6 %. From the three large investigations of poultry in Germany and Hungary, only Hungary reported VTEC findings (at a level of 3.9 %) and no O157 isolations.

Italy reported VTEC and O157 findings from water buffalo in 2009, with 17.0 % and 13.2 % of positive findings, respectively.

*Table VT14. VTEC in cattle, by country and by year, 2007-2010*

| Country | 2010 Sample unit/ sampling stage | 2010 N | 2010 VTEC % pos | 2010 VTEC O157 % pos | 2010 Additional information/ serotype (no of isolates) | 2009 Sample unit/ sampling stage | 2009 N | 2009 VTEC % pos | 2009 VTEC O157 % pos | 2009 Additional information/ serotype (no of isolates) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Calves < 12 months** | | | | | | | | | | |
| Austria | - | - | - | - | | Animal, at slaughter[1] | 94 | 27.7 | 2.1 | Mucosal swab, non-O157 (24) |
| Denmark | - | - | - | - | | - | - | - | - | |
| Germany | Herd | 426 | 6.8 | 0 | VTEC O103 (3), VTEC O26 (2), VTEC unspec. (24) | Herd | 156 | 2.6 | 0 | O:103 (1), O26 (1), VTEC unspec. (2) |
| | - | - | - | - | | Animal, at slaughter[2] | 303 | 13.5 | - | VTEC unspec. |
| Netherlands | Holding, at farm | 182 | 17.6 | 17.6 | Faeces | Herd, at farm | 175 | 16.0 | 16.0 | Faeces |
| | Herd, at farm | 864 | 7.8 | 7.8 | | - | - | - | - | |
| Spain | Slaughter batch | 53 | 18.9 | 18.9 | EFSA protocol | Slaughter batch | 258 | 20.2 | 20.2 | |
| **Dairy cows** | | | | | | | | | | |
| Estonia | Animal, at farm[3] | 192 | 0 | 0 | Faeces | - | - | - | - | |
| Germany | - | - | - | - | | - | - | - | - | |
| Ireland | - | - | - | - | | Herd, at slaughter | 86 | 2.3 | 2.3 | Rectal swabs |
| Latvia | - | - | - | - | | - | - | - | - | |
| Netherlands | - | - | - | - | | Herd, at farm | 155 | 1.9 | 1.9 | Faeces |
| Poland | - | - | - | - | | Animal, at slaughter | 130 | 48.5 | - | Swabs, VTEC unspec. |
| **Meat production animals** | | | | | | | | | | |
| Ireland | - | - | - | - | | Herd, at slaughter | 31 | 0 | 0 | Rectal swabs |
| Lithuania | - | - | - | - | | - | - | - | - | |
| Romania | Animal, at slaughter | 253 | 0 | 0 | Swabs | - | - | - | - | |
| Spain | - | - | - | - | | - | - | - | - | |

Table continued overleaf.

*Table 14 (continued). VTEC in cattle, by country and by year, 2007-2010*

| Country | 2010 | | | | | 2009 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sample unit/ sampling stage | N | VTEC | VTEC O157 | Additional information/ serotype (no of isolates) | Sample unit/ sampling stage | N | VTEC | VTEC O157 | Additional information/ serotype (no of isolates) |
| | | | % pos | % pos | | | | % pos | % pos | |
| **Not specified** | | | | | | | | | | |
| Austria | Animal, at slaughter[4] | 127 | 36.2 | 1.6 | Mucosal swabs; non O157 (6) | Animal, at slaughter[5] | 78 | 32.1 | 0 | non-O157 (25) |
| Denmark | Animal, at slaughter | 260 | 1.9 | 1.9 | Faeces | - | - | - | - | |
| Estonia | - | - | - | - | | Animal, at farm | 253 | 0.4 | 0.4 | Faeces |
| Finland | Animal, at slaughter | 1,531 | 0.5 | 0.5 | Faeces | Animal | 1,538 | 0.6 | 0.6 | |
| Germany | Herd[6] | 617 | 13.1 | 0 | VTEC O26 (3), VTEC O103 (3), VTEC O91 (1) and VTEC unspec. (74) | Herd[6] | 322 | 5.9 | 0 | O103 (1), O26 (1), VTEC unspec. (2) |
| Hungary | Animal | 4,037 | 20.8 | 0 | VTEC unspec. | - | - | - | - | |
| Italy | Animal | 26 | 53.8 | 0 | VTEC unspec. | Animal | 296 | 24.7 | - | VTEC unspec. |
| Luxembourg | - | - | - | - | | - | - | - | - | |
| Portugal | Animal | 75 | 0 | 0 | | Animal | 54 | 0 | 0 | |
| Slovenia | Animal[7] | 299 | 1.0 | 0.3 | VTEC O145 (1), VTEC O103 (1) | - | - | - | - | |
| Sweden | - | - | - | - | | Animal, at slaughter | 500 | 8.2 | 8.2 | Ear |
| | | | | | | Animal, at slaughter | 1,993 | 3.3 | 3.3 | Faeces |
| **Total (12 MSs in 2010)** | **Animal/single** | **6,800** | **13.5** | **0.2** | | **Animal/single** | **5,239** | **6.6** | **2.3** | |
| | **Herd/holding** | **2,089** | **10.0** | **4.7** | | **Herd/holding** | **925** | **6.1** | **3.6** | |
| | **Slaughter batch** | **53** | **18.9** | **18.9** | | **Slaughter batch** | **258** | **20.2** | **20.2** | |

Table continued overleaf.

*Table 14 (continued). VTEC in cattle, by country and by year, 2007-2010*

| Country | 2008 | | | | | 2007 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sample unit/ sampling stage | N | VTEC | VTEC O157 | Additional information/ serotype (no of isolates) | Sample unit/ sampling stage | N | VTEC | VTEC O157 | Additional information/ serotype (no of isolates) |
| | | | % pos | % pos | | | | % pos | % pos | |
| **Calves < 12 months** | | | | | | | | | | |
| Austria | Animal[8] | 50 | 12.0 | 0 | Faeces, non-O157 (7) | Animal, at slaughter | 44 | 2.3 | 0 | non-O157 (1), O150:H- (1), O150:H30 (1) |
| | Animal[8] | 36 | 30.6 | 0 | Mucosal swabs, non-O157 (12) | | | | | |
| Denmark | - | - | - | - | | Animal, at slaughter | 186 | 7.5 | 7.5 | |
| Germany | Single | 229 | 0 | 0 | | Animal | 371 | 0 | 0 | |
| | - | - | - | - | | - | - | - | - | |
| Netherlands | Holding, at farm | 171 | 22.2 | 22.2 | | Holding | 174 | 13.2 | 13.2 | |
| | - | - | - | - | | - | - | - | - | |
| Spain | - | - | - | - | | - | - | - | - | |
| **Dairy cows** | | | | | | | | | | |
| Estonia | - | - | - | - | | Animal, at farm | 162 | 0 | 0 | |
| Germany | Single, at farm | 617 | 0 | 0 | | Animal, at farm | 728 | 0 | 0 | |
| Ireland | - | - | - | - | | - | - | - | - | |
| Latvia | Animal, at farm | 71 | 11.3 | 0 | O26 (4), O103 (3), O145 (1) | - | - | - | - | |
| Netherlands | Holding, at farm | 157 | 4.5 | 4.5 | | Holding, at farm | 157 | 3.8 | 3.8 | |
| Poland | Single | 229 | 0.9 | 0 | non-O157 (2) | - | - | - | - | |
| **Meat production animals** | | | | | | | | | | |
| Ireland | - | - | - | - | | - | - | - | - | |
| Lithuania | - | - | - | - | | Slaughter batch | 96 | 0 | 0 | Swabs |
| Romania | - | - | - | - | | - | - | - | - | |
| Spain | Slaughter batch | 167 | 17.4 | 17.4 | Faeces | Slaughter batch | 312 | 17.0 | 17.0 | |

Table continued overleaf.

*Table 14 (continued). VTEC in cattle, by country and by year, 2007-2010*

| Country | 2008 | | | | | 2007 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sample unit/ sampling stage | N | VTEC | VTEC O157 | Additional information/ serotype (no of isolates) | Sample unit/ sampling stage | N | VTEC | VTEC O157 | Additional information/ serotype (no of isolates) |
| | | | % pos | % pos | | | | % pos | % pos | |
| **Not specified** | | | | | | | | - | - | |
| Austria | Animal, at slaughter[9] | 46 | 6.5 | 0 | Faeces, non-O157 (6) | - | - | - | - | |
| | Animal, at slaughter[9] | 34 | 29.4 | 0 | Mucosal swabs, non-O157 (12) | | | | | |
| Denmark | - | - | - | - | | - | - | - | - | |
| Estonia | - | - | - | - | | - | - | - | - | |
| Finland | Animal | 1,497 | 0.2 | 0.2 | | Animal | 1,534 | 1.2 | 1.2 | |
| Germany | Single | 1,482 | 2.8 | 0.3 | non-O157 (9), VTEC unspec. (29) | Animal | 1,204 | 2.7 | 0 | O91 (4), VTEC unspec. (29) |
| Hungary | - | - | - | - | | - | - | - | - | |
| Italy | Animal | 226 | 4.0 | 0 | | Animal | 27 | 11.1 | 3.7 | VTEC unspec. (2) |
| | | | | | | Herd | 228 | 7.0 | 2.6 | non-O157 (2), VTEC unspec. (8) |
| Luxembourg | - | - | - | - | | Animal | 240 | 22.1 | 22.1 | |
| Portugal | Animal | 35 | 2.9 | 0 | O138:K81 (1) | Animal | 52 | 0 | 0 | |
| Slovenia | Animal, at slaughter | 385 | 1.8 | 1.8 | Faeces | Animal | 198 | 6.1 | 6.1 | |
| Sweden | - | - | - | - | | - | - | - | - | |
| | - | - | - | - | | - | - | - | - | |
| **Total (12 MSs in 2010)** | **Animal/single** | **4,937** | **2.1** | **0.3** | | **Animal** | **4,746** | **2.8** | **2.1** | |
| | **Herd/holding** | **328** | **16.2** | **13.7** | | **Herd/holding** | **559** | **8.1** | **6.3** | |
| | **Slaughter batch** | **167** | **17.4** | **17.4** | | **Slaughter batch** | **408** | **13.0** | **13.0** | |

Note: Data are presented only for sample sizes ≥25 unless stated otherwise. Sample weight =25 g unless stated otherwise.

1. In 2009 Austria reported from calves less than 1 year old: O8:HNT, O17:H18, O26:H- (3), O55:H11, O55:H12 (2), O91:H-, O103:H-, O103:H2, O113:H-, O116:H-, O116:H21, O118:H16, O125ac:H4, O128abc:HNT, O130:H11, O150:H-, O157:H- (2), O168:H8, O168:HNT, O178:H19, O181:H49, Orough:H-, Orough:HNT, NT.
2. Germany: monitoring.
3. Sample weight =20 g.
4. In 2010 Austria reported from unspecified cattle at slaughter the following VTEC serotypes (including strains eae-negative): O103:H2; O103:HNT; O107:H28; O113:H18; O113:H4; O116:H- (2); O116:H21; O116:HNT; O125a,b,c:H21; O128abc:HNT; O132:H18; O142:H16; O153:H25 (5); O156:H-; O157:H-; O157:H7; O168:H8; O175:H21; O177:H-; O178:H19; O178:HNT; O179:H8 (2); O22:H11; O22:H8; O22:Hrough; O38:H21; O8:H-; O82:H8; O84:H-; O91:H21 (4); ONT:H- (2); ONT:H2; Orough:H-; Orough:H18; Orough:H21; Orough:HNT.
5. In 2009 Austria reported from cattle older than one year. O22:H8 (2), O23:H15, O39:H12, O39:HNT, O76:H19, O84:HNT, O84;Hrough, O91:H21, O100:H8, O104:H12, O104:H21, O113:H21, O134:H-, O153:H25, O166:H28, O168:H5, O172:H8, O174:H12, O177:H- (2), O177:H11, O179:H12, O181:H49 (3) ONT:H18, ONT:H19, ONT:H28 (2).
6. Germany: all cattle.
7. Sample weight =10 g
8. In 2008 Austria reported from calves, faecal samples: O116:H- (2), O145:H- (1), O8:H2 (1), O111:H- (1), O119:H4 (1), NT (1), and from mucosal swabs: O119:H- (1), ONT:H8 (1), O128abc (1), ONT:H- (1), Orough:H12 (2), ONT:H2 (1), Orough:H- (1), O119:HNT (1), O145:H- (2), NT (1).
9. In 2008 Austria reported from unspecified cattle, faecal samples: ONT:H19 (1), O174:H2 (1), O177:H- (2), O84:H2 (1), NT (2), and from mucosal swabs: ONT:H19 (1), ONT:H49 (1), ONT:H8 (1), O119:H16 (1), O177:H- (1), O103:H2 (1), ONT:H- (1), O5:H8 (1), Orough:H29 (1), NT (3).

## *Table VT15. VTEC in sheep and goats, by country and by year, 2007-2010*

| Country | 2010 | | | | | 2009 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sample unit | N | VTEC % pos | VTEC O157 % pos | Additional information/ serotype (no. of isolates) | Sample unit | N | VTEC % pos | VTEC O157 % pos | Additional information/ serotype (no. of isolates) |
| **Sheep** | | | | | | | | | | |
| Austria | Animal, at farm | 112 | 77.7 | 0 | Mucosal swab[5] | Animal | 81 | 2.5 | 0 | Fleece from the basis of an ear. O128abc:H-, O166:H28 |
| | - | - | - | - | | Animal | 88 | 70.5 | 0 | Samples from rectal swabs[3] |
| Germany | Animal, at farm | 336 | 2.4 | 0 | VTEC unspecified (7), VTEC O91 (1) | Herd | 60 | 6.7 | 0 | At farm |
| Hungary | Animal, at farm | 55 | 72.7 | 0 | VTEC unspecified | - | - | - | - | |
| Italy | - | - | - | - | - | - | - | - | - | |
| Portugal | Animal, at farm | 34 | 0 | 0 | - | Animal | 49 | 0 | 0 | |
| Romania | At slaughter | 236 | 0 | 0 | 10 g fleece | - | - | - | - | |
| Slovenia | - | - | - | - | - | Animal | 106 | 0.9 | 0.9 | Faeces |
| Sweden | - | - | - | - | - | - | - | - | - | |
| | - | - | - | - | - | - | - | - | - | |
| **Non MSs** | | | | | | | | | | |
| Norway | - | - | - | - | | - | - | - | - | |
| **Goats** | | | | | | | | | | |
| Germany | Animal, at farm | 76 | 11.8 | 1.3 | VTEC unspecified (8) | - | - | - | - | |
| Portugal | - | - | - | - | | - | - | - | - | |

Table continued overleaf.

*Table VT15 (continued). VTEC in sheep and goats, by country and by year, 2007-2010*

| Country | 2008 | | | | | 2007 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sample unit | N | VTEC | VTEC O157 | Additional information/ serotype (no. of isolates) | Sample unit | N | VTEC | VTEC O157 | Additional information/ serotype (no. of isolates) |
| | | | % pos | % pos | | | | % pos | % pos | |
| **Sheep** | | | | | | | | | | |
| Austria | - | - | - | - | - | At farm (faeces)[1] | 48 | 0 | 0 | - |
| | Animal | 38 | 26.3 | 0 | Nine serovars reported[4] | - | - | - | - | - |
| Germany | Herd at farm | 55 | 23.6 | 0 | VTEC non O157 (7); VTEC unspecified (6) | Animal at farm | 215 | 1.4 | 0 | VTEC unspecified (3) |
| Hungary | - | - | - | - | - | - | - | - | - | - |
| Italy | - | - | - | - | - | Herd | 40 | 7.5 | 0 | VTEC unspecified (3) |
| Portugal | Animal | 36 | 0 | - | - | Animal | 56 | 0 | 0 | - |
| Romania | - | - | - | - | - | - | - | - | - | - |
| Slovenia | - | - | - | - | - | Animal (abattoir)[2] | 214 | 0.9 | 0.9 | - |
| Sweden | Animal (faeces) | 492 | 1.8 | 1.8 | - | - | - | - | - | - |
| | Animal (abattoir) | 105 | 1.9 | 1.9 | - | - | - | - | - | - |
| **Non MSs** | | | | | | | | | | |
| Norway | Flock (faeces) | 585 | 2.2 | 0.9 | VTEC O26 (4) VTEC O103:H2 (4) | - | - | - | - | - |
| **Goats** | | | | | | | | | | |
| Germany | - | - | - | - | - | Animal, at farm | 66 | 6.1 | 0 | VTEC unspecified (4) |
| Portugal | - | - | - | - | - | Animal | 54 | 1.9 | 0 | VTEC unspecified (1) |

Note: Data are presented only for sample sizes ≥25.
Note: Data for 2008 and 2007 were taken from the National zoonoses country reports: http://www.efsa.europa.eu/en/reportingonzoonoses/zoonosescomsumrep.htm

1. Sample weight 1 g.
2. Sample weight 10 g.
3. Austrian VTEC serotypes and number of isolates reported from rectal swabs: O5:H- (11), O55:H-, O70:HNT, O75:H-, O75:H8 (3), O75:H12, O75:HNT, O76:H- (3), O76:H19 (5), O86:H19, O86:H28 (2), O87:H10 (2), O87:H16 (2), O87:HNT, O91:H- (6), O112ab:H2, O113:H4, O128abc:H2, O142:H16, O146:H- (3), O146:H21 (4), O154:H34, O166:H28 (4), O174:H8, O176:H- (2), O176:H4 (2) O177:H11, O181:H-, ONT:H4, ONT:H8, ONT:H21 (2), ONT:H19 (2), ONT;H- (2), Orough:H-, NT.
4. Austrian serotypes and number of isolates reported: 2 NT; 2 ONT:H21; ONT:H16; O8:H21; O78:H-; O55:H2; O5:H-; O146:H28; O125:H51.
5. Austrian VTEC serotypes reported (including strains eae-negative): O rough:H19; O112ab:H2 (3); O113:HNT; O117:H-; O122ab:H2; O125abc:Hrough; O145:H8; O146:H- (3); O146:H21 (6); O146:H32; O146:HNT; O149:HNT; O166:H28 (4); O166:HNT; O168:H7 (2); O174:H8 (2); O176:H- (2); O176:HNT; O178:H-; O178:H7; O5:H- (18); O70:H-; O70:HNT; O75:H8 (5); O75:HNT; O76:H- (2); O76:H19; O76:HNT (3); O8:H-; O81:H21; O87:H-; O87:H10; O87:H16 (4); O91:HNT; ONT:H10; ONT:H19; ONT:H2; ONT:H5; ONT:H8 (2); ONT:HNT; Orough:H-; Orough:H2; Orough:H8; Orough:HNT.

*Table VT16. VTEC in other animals by country and by year, 2007-2010*

| Country | Sample unit | 2010 | | | 2009 | | | 2008 | | | 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | VTEC % pos | VTEC O157 % pos | N | VTEC % pos | VTEC O157 % pos | N | VTEC % pos | VTEC O157 % pos | N | VTEC % pos | VTEC O157 % pos |
| **Cats** | | | | | | | | | | | | | |
| Germany | Animal | 511 | 0 | 0 | 543 | 0 | 0 | 631 | 0.3 | 0 | 436 | 0 | 0 |
| Portugal | Animal | - | - | - | - | - | - | 27 | 0 | 0 | - | - | - |
| **Deer** | | | | | | | | | | | | | |
| Italy | Wild animal | 29 | 10.3 | - | - | - | - | - | - | - | - | - | - |
| **Dogs** | | | | | | | | | | | | | |
| Germany | Animal | 838 | 0.6 | 0.1 | 646 | 0 | 0 | 851 | 0 | 0 | 668 | 0.3 | 0 |
| Hungary | Animal | 52 | 90.4 | - | - | - | - | - | - | - | - | - | - |
| Italy | Animal | - | - | - | 35 | 0 | 0 | - | - | - | 32 | 0 | 0 |
| Latvia | Animal | - | - | - | - | - | - | 338 | 1.2 | 0 | - | - | - |
| Portugal | Animal | - | - | - | - | - | - | 25 | 0 | 0 | - | - | - |
| **Pheasants** | | | | | | | | | | | | | |
| Hungary | Animal, at farm | 609 | 25.8 | - | - | - | - | - | - | - | - | - | - |
| **Pigs** | | | | | | | | | | | | | |
| Germany | Animal | 1,846 | 1.0 | 0.1 | 1,277 | 1.2 | 0.2 | 2,198 | 1.2 | 0 | 1,904 | 7.8 | 0.1 |
| Germany | Herds | 157 | 3.8 | 0.6 | 87 | 10.3 | 0 | - | - | - | - | - | - |
| Hungary | Animal | 1,447 | 7.2 | - | - | - | - | - | - | - | - | - | - |
| Latvia | Animal | - | - | - | 65 | 10.8 | 0 | 81 | 6.2 | 0 | - | - | - |
| Portugal | Animal | 53 | 0 | - | 43 | 2.3 | 0 | 39 | 2.6 | 0 | 115 | 4.3 | 0 |
| **Poultry** | | | | | | | | | | | | | |
| Bulgaria | Animal | - | - | - | - | - | - | 299 | 4.0 | 4.0 | 158 | 1.3 | 0 |
| Germany | Animal | 2,430 | 0 | - | - | - | - | - | - | - | 2,434 | 0 | 0 |
| Hungary | Animal | 26,494 | 3.9 | - | - | - | - | - | - | - | - | - | - |
| Latvia | Animal | - | - | - | - | - | - | 28 | 0 | 0 | - | - | - |

Table continued overleaf.

*Table VT16 (continued). VTEC in other animals by country and by year, 2007-2010*

| Country | Sample unit | 2010 | | | 2009 | | | 2008 | | | 2007 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 | N | VTEC | VTEC O157 |
| | | | % pos | % pos | | % pos | % pos | | % pos | % pos | | % pos | % pos |
| **Solipeds, domestic** | | | | | | | | | | | | | |
| Germany | Animal | 722 | 0.1 | - | - | - | - | 241 | 0 | 0 | 108 | 0 | 0 |
| **Water Buffalos** | | | | | | | | | | | | | |
| Italy | Animal | - | - | - | 53 | 17.0 | 13.2 | - | - | - | - | - | - |
| **Wild animals** | | | | | | | | | | | | | |
| Italy | Animal | - | - | - | 100 | 1.0 | 0 | - | - | - | - | - | - |
| **Zoo animals, all** | | | | | | | | | | | | | |
| Italy | Animal | - | - | - | 25 | 0 | 0 | - | - | - | - | - | - |
| Latvia | Animal | - | - | - | 28 | 14.3 | 0 | - | - | - | - | - | - |
| **Other animals, unspecified** | | | | | | | | | | | | | |
| United Kingdom | At farm, holding | 96 | 1.0 | 1.0 | - | - | - | - | - | - | - | - | - |
| **Total (5 MSs in 2010)** | **Animal/single** | **35,031** | **3.9** | **<0.1** | **2,902** | **1.6** | **0.3** | **4,758** | **1.1** | **0.3** | **5,855** | **2.7** | **<0.1** |
| | **Herd/holding** | **253** | **0.4** | **0.4** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** |

Note: Data are presented only for sample sizes ≥25.
Note: Sample weight not specified for Hungary (in all categories), Portugal and Italy.
In 2010, Italy reported from deer VTEC unspecified (3).
In 2010, Germany reported from dogs the serotype VTEC O157 (1) and VTEC unspecified (4).
In 2010, Hungary reported from dogs VTEC unspecified (47).
In 2010, Hungary reported from pheasants VTEC unspecified (157).
In 2010, Germany reported from pigs the following serotypes: VTEC O157 (2) and VTEC O26 (1) and also VTEC unspecified (16).
In 2010, Hungary reported from pigs VTEC unspecified (104).
In 2010, Hungary reported from poultry VTEC unspecified (1,028).
In 2010, Germany reported from solipeds VTEC unspecified (1).

### 3.4.4 Discussion

In 2010, the number of reported human cases due to VTEC infection increased by 12.0 % compared with 2009. This is the third consecutive year that the number of human VTEC cases has increased in the EU. As in previous years, children under 4 years old were the group at highest risk of developing HUS associated with infections due to VTEC O157. This was the first year that additional information on characteristics of VTEC serotypes was included in the report. In 2010, the most commonly reported serotypes was O157:H7, followed by O157:H- and O103:H2. In addition, most isolates for which information was reported on virulence factors were intimin-*eae* gene and verotoxin 2 positive and this was particularly common for serotype O157.

Similar to the information on human cases, when interpreting the data on VTEC from food and animals it is important to note that data from different investigations are not directly comparable owing to differences in sampling strategies and applied analytical methods. Many MSs analyse only for O157, and therefore results do not represent the true situation. Indeed, the most widely used analytical method aims only at detecting VTEC O157, whereas fewer investigations have been conducted with analytical methods aiming at detecting all or selected non-O157 serotypes of VTEC, with the result that the proportion of VTEC non-O157 strains may be largely under-reported.

In food, most information on VTEC was reported on fresh bovine meat in 2007–2010, in which both VTEC and VTEC O157 were mainly detected at low to very low levels. The other human pathogenic serogroups were also isolated. Less information is available from other foodstuffs, but some positive VTEC findings were made from raw cow's milk, cheeses from raw milk, sheep meat, pig meat, broiler meat, vegetables and fishery products. The human pathogenic serogroups were occasionally also detected in these foodstuffs.

Among animals, most reported data on VTEC were from cattle and sheep, in which the reported VTEC and VTEC O157 prevalence varied widely between the MSs. In addition, other human pathogenic serogroups were reported from cattle. Less information was provided for the other animal species but VTEC and VTEC O157 were sometimes detected also from dogs, pigs, poultry, solipeds and water buffalo by MSs, mainly at low to very low levels.

The VTEC data from food and animals reported at EU level are not comparable enough among the years to enable any conclusions to be made on trends over the years. However, it appears that VTEC and the human pathogenic serogroups may be found from a range of different animal species and food categories. The levels of positive VTEC findings seem to vary also strongly among the MSs.

According to the opinion from EFSA's BIOHAZ Panel on the monitoring of VTEC[37], the serogroups that are currently considered the most important regarding pathogenicity to humans are: O26, O91, O103, O111, O145 and O157. Monitoring should be extended to include these serogroups in the future. Only four MSs provided data on the VTEC serogroups other than O157 in 2010, and detected O26, O91, O103 and O145 from bovine meat, cheeses, cattle, sheep or pigs. These VTEC serotypes were also the most commonly isolated from human cases in the EU in 2010. Furthermore, in order to improve the quality of the data from VTEC monitoring in the EU, EFSA issued technical specifications for the monitoring and reporting of VTEC in animals and food in 2009[38]. These guidelines were developed to facilitate the generation of data that can enable a more thorough analysis of VTEC in food and animals in the future. The specifications encourage MSs to monitor and report data on serogroups defined by BIOHAZ panel as most important regarding human pathogenicity.

37 EFSA (European Food Safety Authority), 2007. Scientific Opinion of the Panel on Biological Hazards (BIOHAZ) on monitoring of verotoxigenic *Escherichia coli* (VTEC) and identification of human pathogenic VTEC types. The EFSA Journal, 579, 1-61.

38 EFSA (European Food Safety Authority), 2009. Scientific Report of EFSA on technical specifications for the monitoring and reporting of verotoxigenic *Escherichia coli* (VTEC) on animals and food (VTEC surveys on animals and food). EFSA Journal, 7(11):1366, 43 pp.

The general findings in food and animals are in line with the recently published joint EFSA-ECDC report that summarised the reported Shiga toxin/verotoxin-producing *E. coli* (STEC/VTEC) prevalence and incidence in humans, food and animals[39]. In this report a special reference was given to the strain STEC O104:H4, which has been isolated as the causative agent for the largest outbreak of HUS ever reported, occurred in Germany in May 2011, and included several cases linked to the outbreak from other EU/EEA and non-EU countries. It was concluded that, prior to 2010, the serotype of the outbreak strain STEC O104:H4 was very rare and only a few case reports in humans had been diagnosed and reported. Furthermore, the serotype has never been reported in animals or food. Also, in 2010 this strain was not reported in any food or animal samples.

39 European Centre for Disease Prevention and Control and European Food Safety Authority. Shiga toxin/verotoxin-producing *Escherichia coli* in humans, food and animals in the EU/EEA, with special reference to the German outbreak strain STEC O104. Stockholm: ECDC; 2011.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.5 *Yersinia*

The bacterial genus *Yersinia* comprises three main species that are known to cause human infections: *Yersinia enterocolitica*, *Yersinia pseudotuberculosis* and *Yersinia pestis* (plague). The third and last *Yersinia pestis* pandemic started in the mid nineteenth century in China, causing sporadic plague outbreaks in Europe until 1920. Today it is believed that it no longer exists in Europe. *Yersinia pseudotuberculosis* and pathogenic biotypes of *Y. enterocolitica* cause food-borne enteric infections in humans. This chapter describes only infections caused by *Y. enterocolitica* and *Y. pseudotuberculosis*.

Yersiniosis caused by *Y. enterocolitica* most often causes diarrhoea, at times bloody, and occurs mostly in young children. In elderly persons and in patients with underlying conditions (iron overload, cirrhosis, diabetes, cancer, etc.) systemic forms of the disease are often observed. Symptoms typically develop four to seven days after exposure and last an average of one to three weeks. In older children and adults, right-sided abdominal pain and fever may be the predominant symptoms and can often be confused with appendicitis. Other symptoms such as a rash, joint pain and/or bacteraemia may occur. Infection is most often acquired by eating contaminated food, particularly raw or undercooked pig meat. The bacterium is able to grow below +4°C and makes contaminated refrigerated food a probable source of infection. Untreated water can also transmit the organism.

Yersiniosis caused by *Y. pseudotuberculosis* shows many similarities to the disease pattern of *Y. enterocolitica*. *Y. pseudotuberculosis* infections are more frequent in adults than those caused by *Y. enterocolitica*. They also more frequently cause abdominal pain resembling appendicitis and less frequently diarrhoea. The infection is also often more severe.

*Y. enterocolitica* is closely related to a large array of *Yersinia* spp. without any reported public health significance. Within *Y. enterocolitica*, the majority of isolates from food and environmental sources are non-pathogenic types. It is, therefore, crucial that investigations discriminate between which strains are pathogenic for humans. Biotyping of the isolates is essential to determine whether or not isolates are pathogenic to humans, and this method is ideally complemented by serotyping. Pathogenicity can also be determined using PCR methods. In Europe, the majority of human pathogenic *Y. enterocolitica* belong to biotype 4 (serotype O:3) or, less commonly, biotype 2 (serotype O:9, O:5,27).

Pigs are considered to be the primary reservoir for the human pathogenic types of *Y. enterocolitica,* mainly biotype 4 (serotype O:3). Biotype 2 (serotype O:9) has been isolated from other animal species, such as cattle, sheep and goats. Clinical disease in animal reservoirs is uncommon. Infections of *Y. pseudotuberculosis* are caused by the ingestion of the bacteria from raw vegetables, other contaminated foodstuffs or water or direct contact with infected animals.

An overview of data reported for 2010 is given in tables and figures. Additional information on the data provided by MSs on *Yersinia* in 2010 is presented in the level 3 tables.

Table YE1 presents the countries reporting *Yersinia* data for 2010.

***Table YE1. Overview of countries reporting data on* Yersinia *spp., 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 24 | **All MSs** exept GR, NL, PT |
| Food | 10 | **MSs:** AT, BE, DE, EE, ES, IT, LT, PT, RO, SE |
| Animal | 11 | **MSs:** DE, EE, ES, HU, IE, IT, LV, NL, PL, PT, SK<br>**Non-MS:** CH |

Note: The overview table includes all data reported by MSs. However, in the following chapter, data reported as HACCP or own control are not included in the detailed tables, and, unless stated, data from import, suspect sampling and outbreak or clinical investigations are also excluded. Also only countries reporting 25 samples or more have been included for analyses.

### 3.5.1 Yersiniosis in humans

A total of 6,776 confirmed cases of yersiniosis were reported in the EU in 2010. The number of cases declined by 10 % compared with 2009 (N=7,533). The number of reported yersiniosis cases in humans has continued to decrease since 2006, representing a statistically significant decreasing five-year trend in the EU (Figure YE1). Yersiniosis is still the third most numerously reported zoonosis in the EU, with an overall notification rate of 1.58 per 100,000 population in 2010 (Table YE2).

The highest country-specific notification rates were observed in Lithuania and Finland (12.9 and 9.8 cases per 100,000 population, respectively). In individual MSs, statistically significant decreasing five-year trends were noted in Austria, Belgium, the Czech Republic, Germany, Latvia, Slovenia, Spain and Sweden, while increasing trends were noted in Hungary, Luxembourg, and Slovakia (Table YE2 and Figure YE2).

*Y. enterocolitica* was the most common species reported in human cases by MSs, isolated from 91.0 % of all confirmed cases in 2010, followed by *Y. pseudotuberculosis,* which represented only 1.7 % of all isolates, while the remaining 7.3 % were other species, unspecified or unknown (N=6,776). Almost half of the isolates (N=3,310; 48.8 %) from confirmed cases were serotyped, whereas only 1.3 % of isolates (N=86) were biotyped. Based on known data only (N=86), the most common bioserotype combination was 4/O:3 (N=71; 83 %) followed by bioserotype 2/O:9 (N=12; 15 %).

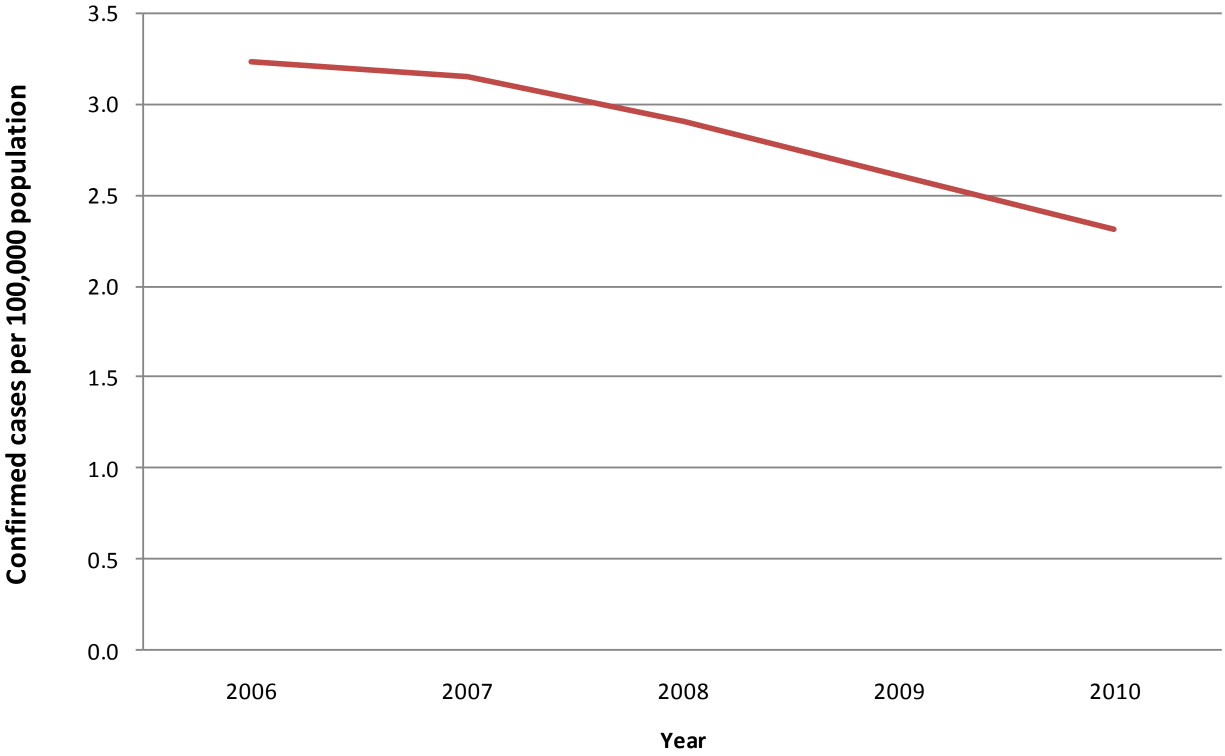
The age distribution was stated for 6,703 (98.9 %) confirmed cases, showing that most of the cases occurred in age groups 0-4 and 5-14 years, representing 31 % and 25 % of all reported cases, respectively. Most of the confirmed cases with known importation status were domestic, 79 %, compared with only 3 % imported (reported for 78.7 %, N=5,336). The case fatality rate of yersiniosis was 0; no deaths were reported in 2010.

*Table YE2. Reported cases of yersiniosis in humans in 2006-2010, and notification rates in 2010*

| Country | 2010 | | | | 2009 | 2008 | 2007 | 2006 |
|---|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases | Confirmed cases/ 100,000 | Confirmed cases | | | |
| Austria | C | 84 | 84 | 1.00 | 140 | 93 | 142 | 158 |
| Belgium | C | 216 | 216 | 1.99 | 238 | 273 | 248 | 264 |
| Bulgaria | A | 5 | 5 | 0.07 | 8 | 10 | 8 | 5 |
| Cyprus | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Czech Republic | C | 447 | 447 | 4.25 | 463 | 557 | 576 | 535 |
| Denmark | C | 193 | 193 | 3.49 | 238 | 331 | 274 | 215 |
| Estonia | C | 58 | 58 | 4.33 | 54 | 42 | 76 | 42 |
| Finland | C | 522 | 522 | 9.75 | 633 | 608 | 480 | 795 |
| France | A | 238 | 238 | 0.37 | 208 | 213 | - | 0 |
| Germany | C | 3,368 | 3,346 | 4.09 | 3,731 | 4,352 | 4,987 | 5,161 |
| Greece | - | - | - | - | - | - | - | - |
| Hungary | C | 87 | 87 | 0.87 | 51 | 40 | 55 | 38 |
| Ireland | C | 3 | 3 | 0.07 | 3 | 3 | 6 | 1 |
| Italy | C | 15 | 15 | 0.02 | 11 | - | - | 0 |
| Latvia | C | 23 | 23 | 1.02 | 45 | 50 | 41 | 94 |
| Lithuania | C | 428 | 428 | 12.86 | 438 | 536 | 569 | 411 |
| Luxembourg | C | 35 | 35 | 6.97 | 36 | 17 | 22 | 5 |
| Malta | C | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Netherlands | - | - | - | - | - | - | - | - |
| Poland | C | 206 | 205 | 0.54 | 288 | 214 | 182 | 111 |
| Portugal | -[2] | - | - | - | - | - | - | - |
| Romania | C | 27 | 27 | 0.13 | 5 | 9 | 0 | - |
| Slovakia | C | 168 | 166 | 3.06 | 167 | 70 | 71 | 83 |
| Slovenia | C | 16 | 16 | 0.78 | 27 | 31 | 32 | 79 |
| Spain[3] | C | 325 | 325 | 2.83 | 291 | 315 | 381 | 375 |
| Sweden | C | 281 | 281 | 3.01 | 397 | 546 | 567 | 558 |
| United Kingdom | C | 55 | 55 | 0.09 | 61 | 48 | 86 | 65 |
| **EU Totals** | | **6,801** | **6,776** | **1.58** | **7,533** | **8,358** | **8,803** | **8,995** |
| Iceland | -[2] | - | - | - | - | - | - | - |
| Liechtenstein | - | - | - | - | 0 | - | - | - |
| Norway | C | 52 | 52 | 1.07 | 60 | 50 | 71 | 86 |

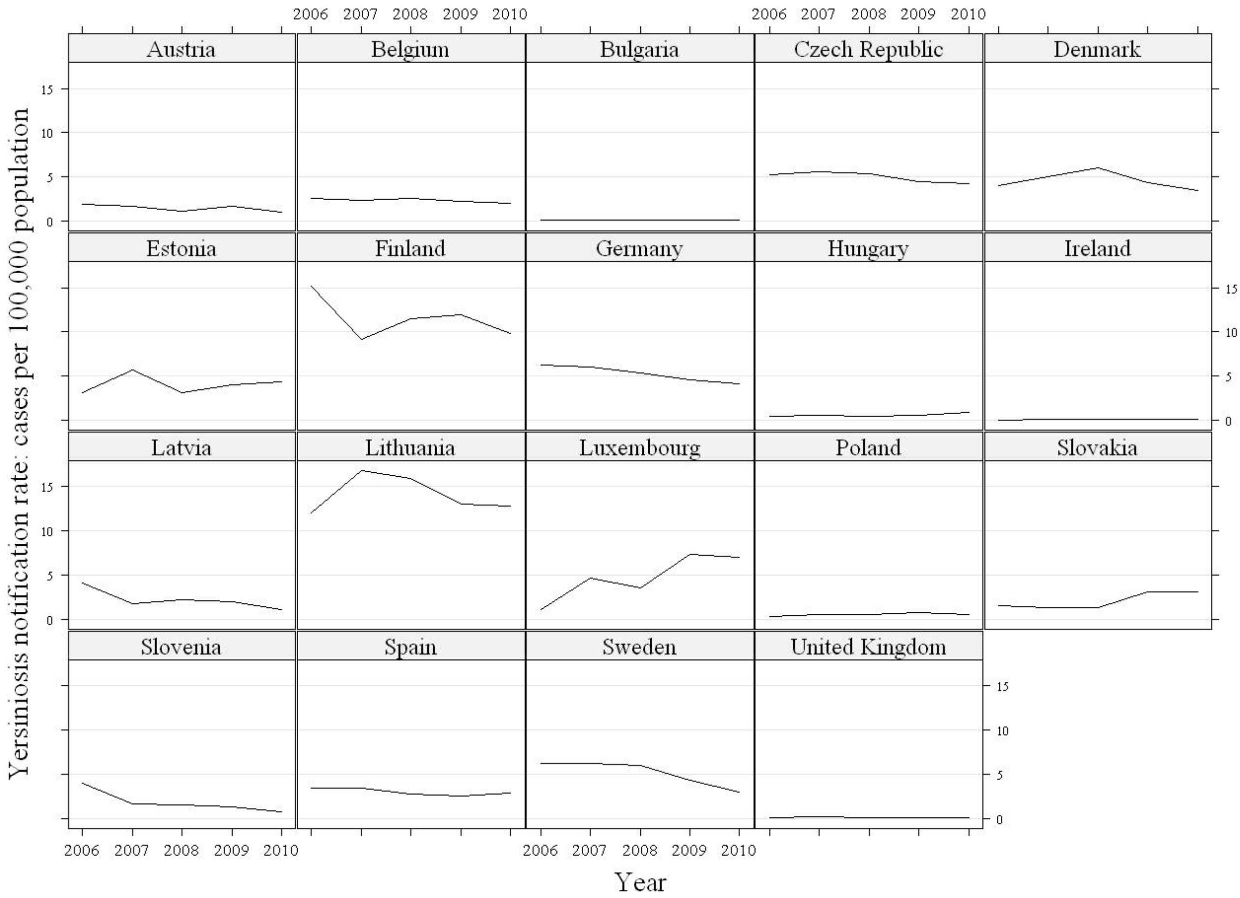
1. A: aggregated data report; C: case-based report; U: unspecified; –: no report.
2. No surveillance system exists.
3. Surveillance system covers only 25 % of the total population.

***Figure YE1. Notification rate of reported confirmed cases of human yersiniosis in the EU 2006-2010***




Source: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, Germany, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Poland, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

***Figure YE2. Notification rates of reported confirmed cases of human yersiniosis in Member States (cases per 100,000 population), 2006–2010***




## 3.5.2 *Yersinia* in food

In 2010, seven MSs provided data concerning the testing of food items for *Yersinia,* and particularly for *Y. enterocolitica*. The data reported for 2008-2010 regarding the most relevant food categories are shown in Tables YE3-YE6.

### Pig meat

The most important food source for *Y. enterocolitica* infections in humans is assumed to be pig meat and products thereof. The results of the testing for *Yersinia* in this food category are presented in Table YE3. In 2010, seven MSs reported data on *Yersinia* in pig meat and products thereof. Overall, 4.2 % and 4.1 % of pig meat samples and products thereof tested positive for *Yersinia* spp. and *Y. enterocolitica*, respectively. In total, four out of the seven MSs reported positive findings of *Yersinia* in 2010.

Portugal found 52.0 % of tested minced meat samples to be *Y. enterocolitica* positive in 2010, although the number of samples tested was low (25). Portugal made similar findings in 2009 and 2008, when it reported 40.0 % and 2.7 % of the minced meat samples as positive, respectively. The isolations of serotype O:3 and O:9 were reported in 2010 and 2008, respectively. Portugal also reported some findings of *Yersinia* from fresh pig meat in 2009.

Germany reported data consistently over the years 2008-2010 for several pig meat categories. *Y. enterocolitica* was detected in all these years from fresh pig meat at levels of 3.1 %, 9.4 % and 5.1 %. In meat products intended to be consumed cooked the bacterium was detected at levels of 2.0 %, 5.2 % and 4.3 % in 2008, 2009 and 2010, respectively. In minced meat, positive findings were made in 2008 and 2009, at levels of 1.7 % and 2.3 %, respectively, but not in 2010. The human pathogenic serotypes O:3 and O:9 were detected in some of these investigations.

Spain reported data on fresh pig meat at slaughter, retail and unspecified sampling stage between 2008 and 2010. In 2010, *Y. enterocolitica* was detected in 1.2 % and 14.1 % of samples at slaughter and at retail, respectively. This compares with 0 % positive at slaughter and 48.0 % positive at retail in 2009, although the sample size for the latter was considerably smaller than in 2010.

Italy reported *Y. enterocolitica* findings from fresh pig meat and meat preparations and products in 2008 and the proportion of positive units varied between 3.5 % and 6.7%. Also, both Austria and the United Kingdom found *Y. enterocolitica* in 2008, Austria from meat products (1.6 %) and the United Kingdom from fresh pig meat (9.2 %). Both these MSs reported isolations of biotype 1A, and the United Kingdom also reported biotype 3 and serotypes O:5, O:9 and O:5,27.

### Other food

In 2010, three MSs tested bovine meat or products thereof for *Yersinia* and none of the samples tested positive (Table YE4). The same applies to 2009, when the two reporting MSs did not detect *Yersinia* from bovine meat or product thereof. In 2008, however, three MSs reported *Y. enterocolitica* in five out of the six investigations carried out. The highest proportion of positive units was detected by Spain, which found 22.7 % positive from 44 meat product samples. The United Kingdom reported a large investigation of fresh bovine meat in which 12.1 % samples were positive for *Y. enterocolitica,* and it also isolated biotype 1A and serotype O:5 from the samples. Italy reported 2.0 %-8.0 % of the samples positive from fresh bovine meat and minced meat.

In 2008, the United Kingdom tested 601 samples of fresh sheep meat, of which 11.3 % were positive for *Y. enterocolitica*. The biotypes 1A and 3 and serotype O:5 were detected in these samples.

Two MSs provided data concerning *Yersinia* in milk and dairy products in 2010, and Germany reported 6.7 % *Y. enterocolitica*-positive samples from raw milk of cows (Table YE5). Germany also detected *Y. enterocolitica* from raw cow's milk in 2009 and 2008 but at slightly lower levels. In 2008, serotypes O:5 and O:8 were detected. In 2008, Italy found *Y. enterocolitica*-positive samples only in cheeses, with 0.3 % of units testing positive.

In 2008, Italy tested 55 batches of raw molluscan shellfish, none of which tested positive for *Yersinia*.

Italy tested 62 samples of unspecified vegetables in 2010, none of which were found to test positive for *Yersinia*. Italy also tested 26 vegetable samples in 2009 and found two of these positive for *Yersinia* and one positive for *Y. enterocolitica*. Lithuania also tested five batches of 25 g of vegetables in 2009, none of which were found to be positive for *Yersinia.*

There were no findings of *Y. pseudotuberculosis* in any food items tested during 2008-2010.

*Table YE3. Yersinia spp. in pig meat and products thereof, 2008-2010*

| Country | Description | Unit | Sample weight | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | N | *Y. spp.*[1] % pos | *Y. e.*[2] % pos | *Y. e.*[3] isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) |
| **At slaughter** | | | | | | | | | | | | | | | |
| Estonia | Carcass | Single | Swabs | 108 | 0 | 0 | | - | - | - | | - | - | - | |
| | Fresh | Single | Swabs | - | - | - | | 80 | 0 | 0 | | - | - | - | |
| Romania | Fresh | Batch | 10 g | - | - | - | | - | - | - | | 3,093 | 0 | 0 | |
| | Fresh | Batch | 25 g | - | - | - | | 457 | 0 | 0 | | - | - | - | |
| | Offal | Batch | 10 g | 374 | 2.7 | 2.7 | O:3 (10) | - | - | - | | - | - | - | |
| Spain | Fresh | Single | 25 g | 86 | 1.2 | 1.2 | | 83 | 0 | 0 | | - | - | - | |
| **At processing plant** | | | | | | | | | | | | | | | |
| Portugal | Fresh | Single | 25 g | - | - | - | | 61 | 1.6 | 0 | | - | - | - | |
| | Meat preparation[4] | Single | 25 g | 74 | 0 | 0 | | - | - | - | | - | - | - | |
| | Meat products | Single | 25 g | - | - | - | | 33 | 0 | 0 | | - | - | - | |
| Romania | Fresh | Batch | 25 g | - | - | - | | 358 | 0 | 0 | | - | - | - | |
| **At retail** | | | | | | | | | | | | | | | |
| Austria | Meat products[5] | Single | 25 g | - | - | - | | - | - | - | | 62 | 1.6 | 1.6 | Biotype 1A (1) |
| Portugal | Minced meat | Single | 25 g | 25 | 52.0 | 52.0 | O:3 (1) | 25 | 40.0 | 40.0 | | 75 | 2.7 | 2.7 | O:9 (2) |
| Romania | Fresh | Single | 25 g | - | - | - | | 81 | 0 | 0 | | - | - | - | |
| | Minced meat | Batch | 10 g | - | - | - | | - | - | - | | 28 | 0 | 0 | |
| Spain | Fresh | Single | 25 g | 78 | 16.7 | 14.1 | | 25 | 48.0 | 48.0 | | - | - | - | |
| United Kingdom | Fresh | Single | Swabs | - | - | - | | - | - | - | | 654 | 11.5 | 9.2 | Biotype 1A (58); Biotype 3 (2); O:5 (6); O:5,27 (2); O:9 (1) |

Table continued overleaf.

*Table YE3 (continued). Yersinia spp. in pig meat and products thereof, 2008-2010*

| Country | Description | Unit | Sample weight | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | N | *Y. spp.*[1] % pos | *Y. e.*[2] % pos | *Y. e.*[3] isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) |
| **Sampling level not stated** | | | | | | | | | | | | | | | |
| Belgium | Minced meat | Batch | 1 g | 45 | 0 | 0 | | - | - | - | | - | - | - | |
| Germany | Fresh | Single | 25 g | 156 | 5.1 | 5.1 | O:3 (4) | 395 | 9.4 | 9.4 | O:3 (30) | 160 | 3.1 | 3.1 | |
| | Fresh, monitoring | Single | 25 g | - | - | - | | - | - | - | | 134 | 0.7 | 0.7 | |
| | Meat products[6] | Single | 25 g | 230 | 4.3 | 4.3 | O:3 (7); O:9 (2) | 233 | 5.2 | 5.2 | O:3 (1) | 205 | 2.0 | 2.0 | O:3 (2); O:9 (2) |
| | Minced meat | Single | 25 g | 27 | 0 | 0 | | 43 | 2.3 | 2.3 | | 58 | 1.7 | 1.7 | |
| Italy | Fresh | Batch | - | - | - | - | | 135 | 0 | 0 | | 115 | 5.2 | 3.5 | |
| | Meat preparation | Single | 25 g | - | - | - | | - | - | - | | 94 | 12.8 | 5.3 | |
| | Meat products | Single | - | 43 | 0 | 0 | | 31 | 0 | 0 | | 45 | 17.8 | 6.7 | |
| Portugal | Fresh | Single | 25 g | 58 | 0 | 0 | | 61 | 1.6 | 1.6 | | - | - | - | |
| | Meat products | Single | 25 g | - | - | - | | 33 | 0 | 0 | | - | - | - | |
| Spain | Fresh | Single | 25 g | - | - | - | | - | - | - | | 91 | 4.4 | 2.2 | |
| **Total (7 MSs in 2010)** | | | | **1,304** | **4.2** | **4.1** | | **2,134** | **3.5** | **3.4** | | **4,814** | **2.5** | **1.8** | |

Note: Data are presented only for sample sizes ≥25.
1. *Yersinia* spp.
2. *Yersinia enterocolitica*
3. *Yersinia enterocolitica* serotypes/biotypes (number of isolates)
4. Intended to be eaten cooked.
5. Fermented sausages.
6. Intended to be eaten cooked.

*Table YE4. Yersinia spp. in meat from bovine and ovine animals and products thereof, 2008-2010*

| Country | Description | Unit | Sample weight | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | N | *Y. spp.*[1] % pos | *Y. e.*[2] % pos | *Y. e.*[3] isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) |
| **Bovine** | | | | | | | | | | | | | | | |
| **At retail** | | | | | | | | | | | | | | | |
| United Kingdom | Fresh | Single | Swab | - | - | - | | - | - | - | | 1,174 | 15.5 | 12.1 | O:5 (4); Biotype 1A (142) |
| **Sampling level not stated** | | | | | | | | | | | | | | | |
| Belgium | Minced meat | Batch | 1 g | 38 | 0 | 0 | | - | - | - | | - | - | - | |
| Germany | Minced meat | Single | 25 g | 66 | 0 | 0 | | - | - | - | | - | - | - | |
| Italy | Fresh | Batch | 25 g | - | - | - | | - | - | - | | 25 | 8.0 | 8.0 | |
| Italy | Fresh | Batch | 500 g | - | - | - | | 111 | 0 | 0 | | - | - | - | |
| Italy | Fresh | Single | - | - | - | - | | - | - | - | | 54 | 0 | 0 | |
| Italy | Fresh | Single | 25 g | - | - | - | | - | - | - | | 51 | 2.0 | 2.0 | |
| Italy | Meat products | Single | - | - | - | - | | 31 | 0 | 0 | | - | - | - | |
| Italy | Minced meat | Single | 25 g | - | - | - | | - | - | - | | 28 | 20 | 8 | |
| Spain | Meat products | Single | 25 g | 31 | 0 | 0 | | - | - | - | | 44 | 22.7 | 22.7 | |
| **Total (3 MSs in 2010)** | | | | **135** | **0** | **0** | | **142** | **0** | **0** | | **1,376** | **15.6** | **11.8** | |
| **Ovine** | | | | | | | | | | | | | | | |
| **At retail** | | | | | | | | | | | | | | | |
| United Kingdom | Fresh | Single | Swab | - | - | - | | - | - | - | | 601 | 16.0 | 11.3 | O:5 (6); Biotype 1A (67); Biotype 3 (1) |

Note: Data are presented only for sample sizes ≥25.
Belgium also tested the following samples of minced meat from bovine animals and pigs: in 2010, 27 batches (1 g), of which none tested positive; in 2009, 217 batches (1 g), of which none tested positive; in 2008, 115 single (1 g) samples at retail, of which none tested positive.
1. *Yersinia* spp.
2. *Yersinia enterocolitica.*
3. *Yersinia enterocolitica* serotypes/biotypes (number of isolates).

*Table YE5. Yersinia spp. in milk and dairy products, 2008-2010*

| Country | Description | Unit | Sample weight | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | N | *Y.* spp.[1] % pos | *Y. e.*[2] % pos | *Y. e.*[3] isolates (N) | N | *Y.* spp. % pos | *Y. e.* % pos | *Y. e.* isolates (N) | N | *Y.* spp. % pos | *Y. e.* % pos | *Y. e.* isolates (N) |
| **At farm** | | | | | | | | | | | | | | | |
| Italy | Milk, cows' (raw) | Batch | - | - | - | - | | - | - | - | | 36 | 0 | 0 | |
| **At processing plant** | | | | | | | | | | | | | | | |
| Italy | Cheeses made from cows' milk | Single | - | 36 | 0 | 0 | | - | - | - | | - | - | - | |
| | Cheeses made from unspecified milk or other animal milk | Single | - | - | - | - | | - | - | - | | 351 | 0.3 | 0.3 | |
| | Milk from other animal species or unspecified | Single | - | 67 | 0 | 0 | | - | - | - | | - | - | - | |
| **Sampling level not stated** | | | | | | | | | | | | | | | |
| Germany | Milk, cows' (raw)[4] | Single | 25 g | 75 | 6.7 | 6.7 | | 71 | 1.4 | 1.4 | | 85 | 2.4 | 2.4 | O:5 (1); O:8 (1) |
| Italy | Milk, cows' (raw) | Single | - | - | - | - | | 29 | 0 | 0 | | - | - | - | |
| **Total (2 MSs in 2010)** | | | | **178** | **2.8** | **2.8** | | **100** | **1.0** | **1.0** | | **472** | **0.6** | **0.6** | |

Note: Data are presented only for sample sizes ≥25.
1. *Yersinia* spp.
2. *Yersinia enterocolitica.*
3. *Yersinia enterocolitica* serotypes/biotypes (number of isolates).
4. Sum of all types of raw milk (1 positive sample out of 29 samples of certified milk).

### 3.5.3 *Yersinia* in animals

In 2010, four MSs submitted data regarding the testing of animals for *Yersinia.* The results of the reported data for animals in 2008-2010 are shown in Tables YE6-YE8.

Four MSs provided data regarding *Yersinia* in pigs in 2010, with an overall proportion of *Yersinia* spp. and *Y. enterocolitica*-positive units of 12.3 % (Table YE6). Italy and Latvia both reported no positive animals, whereas Germany and Spain reported, respectively, 2.7 % positive herds and 39.0 % positive slaughter batches. Most of the porcine isolates that tested positive for *Y. enterocolitica* in 2010 were reported together with serotype information. All of the positive isolates from Spain were serotype O:3. Germany also reported serotypes O:3 and O:9 from their positive porcine isolates, with only two unspecified *Y. enterocolitica*. Germany tested pig herds for *Yersinia* each year in 2008-2010. In 2008 and 2009, the observed prevalence of *Y. enterocolitica* was slightly lower, 1.0 % in both years. Spain has also investigated slaughter batches for all three years, and the prevalence of *Y. enterocolitica* varied between 20.0 % and 48.4 %. Slovenia reported data from slaughter batches for 2008 and 2009 and detected very similar prevalences of 19.3 % and 19.8 %, respectively. The Netherlands carried out a large survey in 2008, finding 0.4 % of pigs *Y. enterocolitica*-positive. Italy detected *Y. enterocolitica* only in 2008 (10.2 % of animals positive).

*Yersinia* and *Y. enterocolitica* were also detected by MSs in other animal species, even though quite few data were reported over the years 2008-2010 (Table YE7). As for cattle, Germany tested animals and herds for *Yersinia* in 2008-2010 and reported some positive findings for *Y. enterocolitica* (0.5 %-1.4 % of herds and 2.8 % of individual animals tested) and also isolations of O:3 and O:9 serotypes. Ireland carried out large investigations in both 2008 and 2009 without any positive findings. Italy and Estonia reported relatively high prevalences of *Y. enterocolitica*: up to 54.1 % in Estonia and 15.0 % in Italy in 2009. Italy also detected human pathogenic *Y. enterocolitica* serotypes and *Y. pseudotuberculosis*.

In sheep and goats, *Y. enterocolitica* was seldom detected in the few investigations reported in 2008-2010, although Germany also reported some isolations of O:3 and O:9 serotypes from sheep (Table YE7). In particular, Ireland reported large investigations in sheep without positive findings.

In poultry both Germany and Ireland reported investigations with large sample sizes but no positive findings. The same MSs also investigated horses; Ireland reported no positive animals in either 2008 or 2009, while Germany found one positive horse in 2008 but none in either of the subsequent two years.

A range of other animal species, including wildlife and pets, were tested for *Yersinia* between 2008 and 2010. The results are presented in Table YE8. The highest prevalence for *Y. enterocolitica* in 2010 was reported from wild boar (21.4 %) and deer (14.3 %) by Italy. Germany reported serotype O:3 from dogs in 2009 and 2008.

Additional information regarding *Yersinia* may be found in the level 3 tables.

*Table YE6.* **Yersinia** *spp. in pigs, 2008-2010*

| Country | Unit | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | *Y. spp.*[1] % pos | *Y. e.*[2] % pos | *Y. e.*[3] isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) |
| Germany | Herd | 339 | 2.7 | 2.7 | O:3 (4); O:9 (3) | 525 | 1.0 | 1.0 | O:3 (1) | 5,450 | 1.0 | 1.0 | O:3 (7); O:9 (32) |
| Ireland | Animal | - | - | - | | 391 | 0 | 0 | | 480 | 0 | 0 | |
| Italy | Animal | 125 | 0 | 0 | | 34 | 0 | 0 | | 98 | 12.2 | 10.2 | O:3 (1) |
| Latvia | Animal | 68 | 0 | 0 | | - | - | - | | - | - | - | |
| Netherlands | Animal | - | - | - | | - | - | - | | 3,721 | 0.4 | 0.4 | |
| Slovenia | Slaughter batch | - | - | - | | 131 | 19.8 | 19.8 | | 384 | 19.3 | 19.3 | |
| Spain | Slaughter batch | 213 | 39.0 | 39.0 | O:3 (83) | 277 | 48.4 | 48.4 | O:3 (134) | 145 | 20.0 | 20.0 | Biotype 4 (29) |
| **Total (4 MSs in 2010)** | | **745** | **12.3** | **12.3** | | **1,358** | **12.2** | **12.2** | | **10,278** | **1.8** | **1.8** | |

Note: Data are presented only for sample sizes ≥25.
1. *Yersinia* spp.
2. *Yersinia enterocolitica.*
3. *Yersinia enterocolitica* serotypes/biotypes (number of isolates).

*Table YE7. Yersinia spp. in domestic livestock species other than pigs, 2008-2010*

| Country | Unit | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | *Y. spp.*[1] % pos | *Y. e.*[2] % pos | *Y. e.*[3] isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) | N | *Y. spp.* % pos | *Y. e.* % pos | *Y. e.* isolates (N) |
| **Cattle (bovine animals)** | | | | | | | | | | | | | |
| Estonia | Animal | - | - | - | | 61 | 54.1 | 54.1 | | - | - | - | |
| Germany | Animal | - | - | - | | - | - | - | | 4,180 | 2.8 | 2.8 | O:3(5); O:9 (100) |
| | Herd | 836 | 1.4 | 1.4 | O:3 (9) O:9 (11) [4] | 217 | 0.5 | 0.5 | | - | - | - | |
| Ireland | Animal | - | - | - | | 10,272 | 0 | 0 | | 9,613 | 0 | 0 | |
| Italy | Animal | 501 | 13.8 | 10.8 | | 460 | 20.9 | 15.0 | | 865 | 9.5 | 9.5 | O:3 (1); O:9 (13); O5;27 (1) |
| **Total (2 MSs in 2010)** | | **1,337** | **6.1** | **4.9** | | **11,010** | **1.2** | **0.9** | | **14,658** | **1.4** | **1.4** | |
| **Goats** | | | | | | | | | | | | | |
| Germany | Animal | 75 | 1.3 | 1.3 | | 26 | 0 | 0 | | 225 | 0 | 0 | |
| Ireland | Animal | - | - | - | | 103 | 0 | 0 | | 106 | 0 | 0 | |
| Italy | Animal | - | - | - | | - | - | - | | - | - | - | |
| | Herd | - | - | - | | 26 | 30.8 | 0 | | - | - | - | |
| **Total (1 MS in 2010)** | | **75** | **1.3** | **1.3** | | **155** | **5.2** | **0** | | **331** | **0** | **0** | |
| **Sheep** | | | | | | | | | | | | | |
| Germany | Animal | 293 | 0.7 | 0.7 | O:3 (2) O:9 (2)[5] | - | - | - | | 642 | 0.3 | 0.3 | O:9 (2) |
| | Herd | - | - | - | | 59 | 0 | 0 | | - | - | - | |
| Ireland | Animal | - | - | - | | 1,279 | 0.3 | 0 | | 1,065 | 0 | 0 | |
| Italy | Animal | - | - | - | | 218 | 25.2 | 0 | | - | - | - | |
| **Total (1 MS in 2010)** | | **293** | **0.7** | **0.7** | | **1,556** | **3.8** | **0** | | **1,707** | **0.1** | **0.1** | |

Table continued overleaf.

*Table YE7 (continued).* ***Yersinia*** *spp. in domestic livestock species other than pigs, 2008-2010*

| Country | Unit | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | *Y.* spp.[1] % pos | *Y. e.*[2] % pos | *Y. e.*[3] isolates (N) | N | *Y.* spp.[1] % pos | *Y. e.*[2] % pos | *Y. e.* isolates (N) | N | *Y.* spp. % pos | *Y. e.* % pos | *Y. e.* isolates (N) |
| **Sheep and goats** | | | | | | | | | | | | | |
| Italy | Animal | 333 | 0 | 0 | | - | - | - | | 26 | 73.1 | 73.1 | |
| **Total (1 MS in 2010)** | | **333** | **0** | **0** | | **-** | **-** | **-** | | **26** | **73.1** | **73.1** | |
| **Solipeds, domestic** | | | | | | | | | | | | | |
| Germany | Animal | 890 | 0 | 0 | | 2,531 | 0 | 0 | | 2,393 | <0.1 | <0.1 | O:9 (1) |
| Ireland | Animal | - | - | - | | 671 | 0 | 0 | | 1,160 | 0 | 0 | |
| **Total (1 MS in 2010)** | | **890** | **0** | **0** | | **3,202** | **0** | **0** | | **3,553** | **0** | **0** | |
| **Poultry, unspecified** | | | | | | | | | | | | | |
| Germany | Animal | 1,094 | 0 | 0 | | 1,122 | 0 | 0 | | 1,379 | 0 | 0 | |
| Ireland | Animal | - | - | - | | 562 | 0 | 0 | | 198 | 0 | 0 | |
| **Total (1 MS in 2010)** | | **1,094** | **0** | **0** | | **1,684** | **0** | **0** | | **1,577** | **0** | **0** | |

Note: Data are presented only for sample sizes ≥25.
1. *Yersinia* spp.
2. *Yersinia enterocolitica.*
3. *Yersinia enterocolitica* serotypes/biotypes (number of isolates).
4. There were 8 double isolations.
5. There were 2 double isolations.

*Table YE8. Yersinia spp. in other animal species, 2008-2010*

| Country | Unit | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | *Y.* spp.[1] % pos | *Y. e.*[2] % pos | *Y. e.*[3] isolates (N) | N | *Y.* spp. % pos | *Y. e.* % pos | *Y. e.* isolates (N) | N | *Y.* spp. % pos | *Y. e.* % pos | *Y. e.* isolates (N) |
| **Cats** | | | | | | | | | | | | | |
| Germany | Animal | 202 | 0 | 0 | | 1,100 | 0 | 0 | | 1,084 | 0 | 0 | |
| Ireland | Animal | - | - | - | | 44 | 0 | 0 | | 68 | 0 | 0 | |
| **Total (1 MS in 2010)** | | **202** | **0** | **0** | | **1,144** | **0** | **0** | | **1,152** | **0** | **0** | |
| **Dogs** | | | | | | | | | | | | | |
| Germany | Animal | 246 | 2.4 | 2.4 | | 1,687 | 0.2 | 0.2 | O:3 (1) | 1,694 | 0.5 | 0.5 | O:3 (1) |
| Ireland | Animal | - | - | - | | 505 | 0 | 0 | | 535 | 0 | 0 | |
| **Total (1 MS in 2010)** | | **246** | **2.4** | **2.4** | | **2,192** | **0.2** | **0.2** | | **2,229** | **0.5** | **0.5** | |
| **Deer (wild)** | | | | | | | | | | | | | |
| Italy | Animal | 28 | 17.9 | 14.3 | | - | - | - | | 107 | 8.4 | 8.4 | |
| Sweden | Animal | - | - | - | | - | - | - | | - | - | - | |
| **Hares** | | | | | | | | | | | | | |
| Italy | Animal | - | - | - | | 65 | 10.8 | 1.5 | | - | - | - | |
| **Water buffalo** | | | | | | | | | | | | | |
| Italy | Animal | - | - | - | | 383 | 41.8 | 8.9 | | - | - | - | |
| **Wild boars** | | | | | | | | | | | | | |
| Italy | Animal | 196 | 34.2 | 21.4 | | - | - | - | | 40 | 17.5 | 2.5 | |
| **Zoo animals** | | | | | | | | | | | | | |
| Ireland | Animal | - | - | - | | 64 | 10.9 | 3.1 | | - | - | - | |

Note: Data are presented only for sample sizes ≥25.
1. *Yersinia* spp.
2. *Yersinia enterocolitica.*
3. *Yersinia enterocolitica* serotypes/biotypes (number of isolates).

### 3.5.4 Discussion

Yersiniosis is the third most commonly reported zoonosis in the EU, despite the continuous decreasing five-year trend since 2006. In 2010, 6,776 confirmed human cases were reported in the EU, a 10 % decrease compared with the previous year. *Y. enterocolitica* was the species most commonly reported associated with human yersiniosis at the EU level, isolated from 91.0 % of all confirmed cases. The most common serotypes in human infections were O:3 and O:9, and the most common bioserotype combinations were 4/O:3 and 2/O:9. However, only 1.3 % of the isolates were biotyped.

Over the years 2008-2010*, Y. enterocolitica* and also its human pathogenic biotypes and serovars have been relatively often detected in pig meat and products thereof. However, not all investigations yielded positive samples. Fewer investigations were reported from bovine meat, sheep meat, milk and dairy products, but some positive findings were also made from these foodstuffs. In animals, *Y. enterocolitica* was most often detected in pigs, but findings were also made from cattle, sheep, dogs, horses and some wildlife species. Even though there are few reported data, there seem to be important differences in the occurrence of *Y. enterocolitica* in the MSs. The data from food and animals reported to EU level are not comparable enough among the years to enable any conclusions to be made on trends over the years.

According to the scientific opinion published by the BIOHAZ Panel in 2007[40], it is well-documented that pigs can harbour human pathogenic *Y. enterocolitica* with a very high prevalence, especially biotype 4 (serotype O:3). Reservoirs other than pigs may also play a role in the epidemiology of human yersiniosis. Evidence suggests that ruminants (e.g. cattle) may play a role as reservoirs for biotype 2 (serotypes O:9 and O:5,27). The opinion further states that *Y. enterocolitica* is widely distributed in the environment, in aquatic and terrestrial ecosystems, as well as in animal reservoirs. Most strains isolated from environmental samples are non-pathogenic.

The opinion from the BIOHAZ Panel concluded that the majority of human pathogenic *Y. enterocolitica* strains in Europe belong to biotype 4 (serotype O:3), followed by biotype 2 (serotype O:9). Biotypes 1B, 3 and 5 are also human pathogenic, whereas biotype 1A is not. Therefore, it is crucial to provide the biotype of each *Y. enterocolitica* isolate in order to gauge its public health significance.

The MSs have improved the reporting of the biotyping and serotyping data in recent years, which has eased the interpretation of the findings in animals and food. *Y. enterocolitica* serotypes and biotypes that are recognised as pathogenic for humans were regularly isolated from pigs and pig meat in 2008-2010. However, pathogenic strains of *Y. enterocolitica* were also detected in bovine and sheep meat, cow's milk and cattle, sheep, horses and dogs, indicating that these food and animal species may contribute to the human infections.

Following a request from the EC, the Panels on Biological Hazards (BIOHAZ), on Contaminants in the Food Chain (CONTAM) and on Animal Health and Welfare (AHAW) were asked to deliver a series of Scientific Opinions on the public health hazards (biological and chemical) to be covered by inspection of meat for several animal species; the first Opinion dealt with swine[41]. *Y. enterocolitica* was deemed to be of medium relevance in the EU at present and one of the most relevant biological hazards in the context of meat inspection of swine, alongside *Salmonella* spp., *Toxoplasma gondii* and *Trichinella* spp.

40 EFSA Panels on Biological Hazards (BIOHAZ), on Contaminants in the Food Chain (CONTAM), and on Animal Health and Welfare (AHAW), 2011. Scientific Opinion on the public health hazards to be covered by inspection of meat (swine). EFSA Journal, 9(10):2351, 198 pp.

41 EFSA (European Food Safety Authority), 2007. Scientific Opinion of the Panel on Biological Hazard (BIOHAZ) on monitoring and identification of human enteropathogenic *Yersinia* spp. The EFSA Journal, 595, 1-30.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.6 Tuberculosis due to *Mycobacterium bovis*

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

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

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

***Table TB1. Overview of countries that reported data for tuberculosis due to* M. bovis *for humans (2009) and animals (2010)***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human[1] | 26 | **All MSs** except FR<br>**Non MSs:** CH, IS, NO |
| Animal | 27 | **All MSs**<br>**Non-MSs:** CH, NO |

Note: In the following chapter, only countries reporting 25 samples or more have been included in analyses.
1. Includes 2009 data for M. bovis reported to TESSy. Data from 2010 were not available in TESSy at the time of production of this report.

### 3.6.1 *M. bovis* in humans

*M. bovis* cases in 2010 had not been reported to the European Surveillance System (TESSy) database by July 2011, at the time of the production of this report. Therefore the figures set out below are based on 2009 data as available in TESSy.

The number of confirmed cases of human tuberculosis due to *M. bovis* increased by 9.0 % in 2009 (N=133) compared with 2008 (N=122) and by 22.0 % compared with 2007 (N=109) (Table TB2). The total number of cases was reported by 10 MSs; 16 MSs reported no cases. As in 2008, five countries, Germany, Ireland, the Netherlands, Spain and the United Kingdom accounted for the majority of confirmed cases (87 %) reported in 2009.

The overall notification rate for human tuberculosis due to *M. bovis* remained low (0.03 cases per 100,000 population) in 2009. There has been a slight increase in the overall notification rate in the EU since 2007, although this trend was not significant and 2007 was the first year that MSs reported cases to TESSy rather than to EuroTB (Figure TB1). There were seven deaths due to *M. bovis* all reported by Germany. The overall case fatality rate was 5.3 % in 2009. As in previous years, the highest notification rate of tuberculosis due to *M. bovis* was in individuals aged 65 and over (0.12 confirmed cases per 100,000 population). The youngest affected individual was a 2 year old girl from Morocco who was resident in Spain as part of a household outbreak.

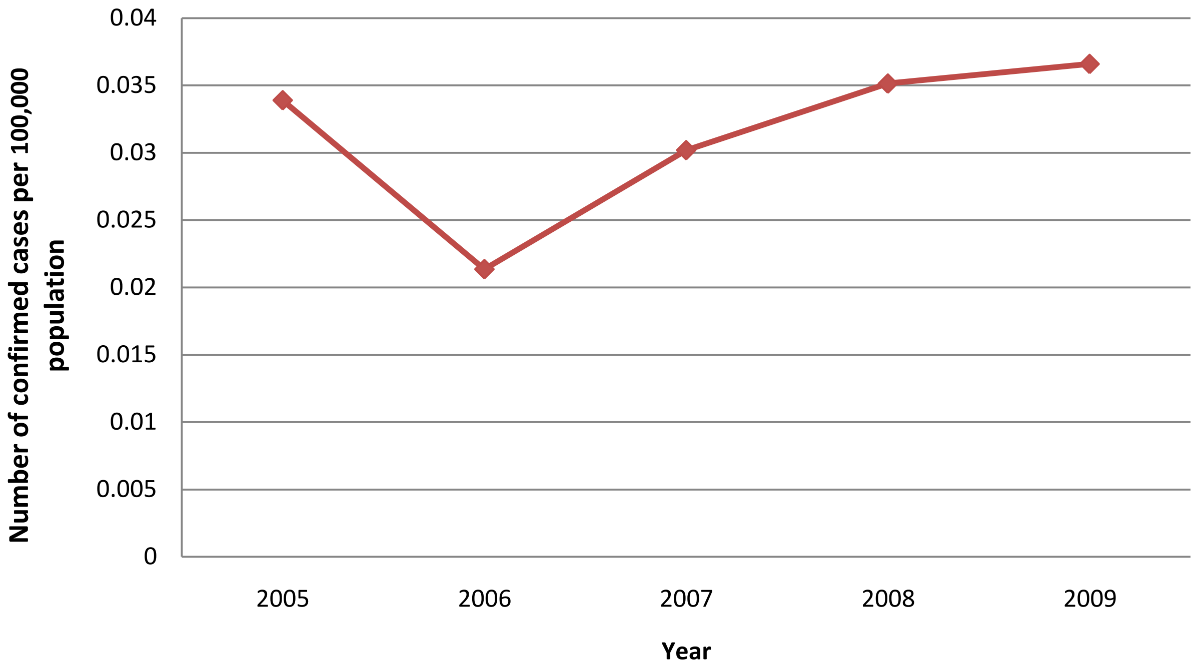
Wide variability in reporting exists among countries, thereby limiting meaningful data interpretation.

***Table TB2. Reported tuberculosis cases due to* M. bovis *in humans and notification rates[1] for confirmed cases in 2007-2009 (TESSy) and in 2005-2006 (EuroTB). OTF[2] status is indicated***

| Country | 2009 (TESSy) | | | | 2008 | 2007 | 2006 | 2005 |
|---|---|---|---|---|---|---|---|---|
| | Report Type[3] | Cases | Confirmed cases | Confirmed cases/100,000 population | TESSy | | EuroTB | |
| Austria (OTF) | C | 2 | 2 | 0.02 | 3 | 2 | 4 | 6 |
| Belgium (OTF) | C | 3 | 3 | 0.03 | 2 | 0 | 2 | 2 |
| Bulgaria | U | 0 | 0 | 0 | 0 | 0 | - | - |
| Cyprus | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Czech Republic (OTF) | U | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Denmark (OTF) | U | 0 | 0 | 0 | 1 | 1 | 3 | 0 |
| Estonia | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Finland(OTF) | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| France (OTF) | - | - | - | - | 0 | 0 | - | - |
| Germany (OTF) | C | 61 | 57 | 0.07 | 48 | 43 | 0 | 48 |
| Greece | U | 0 | 0 | 0 | 0 | 1 | - | - |
| Hungary | U | 0 | 0 | 0 | 0 | 0 | 0 | - |
| Ireland | C | 8 | 7 | 0.16 | 12 | 6 | 5 | 4 |
| Italy[4] | C | 6 | 6 | 0.01 | 1 | 6 | 2 | 3 |
| Latvia | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lithuania | U | 0 | 0 | 0 | 0 | 0 | - | - |
| Luxembourg (OTF) | U | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Malta | U | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Netherlands (OTF) | C | 11 | 11 | 0.07 | 20 | 10 | 16 | 12 |
| Poland | U | 0 | 0 | 0 | 0 | 0 | - | - |
| Portugal | C | 1 | 1 | 0.01 | 1 | 0 | 1 | 0 |
| Romania | U | 0 | 0 | 0 | 0 | 0 | 0 | |
| Slovakia (OTF) | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Slovenia | U | 0 | 0 | 0 | 0 | 2 | 0 | - |
| Spain | C | 17 | 17 | 0.04 | 11 | 11 | - | 0 |
| Sweden (OTF) | C | 5 | 5 | 0.05 | 2 | 4 | 2 | 4 |
| United Kingdom | C | 24 | 24 | 0.04 | 21 | 22 | 31 | 25 |
| **EU Total** | | **138** | **133** | **0.03** | **122** | **109** | **67** | **106** |
| Iceland[5] | U | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Norway (OTF) | C | 1 | 1 | 0.02 | 0 | 2 | 0 | 2 |
| Switzerland[6] | C | 4 | 4 | 0.05 | 5 | 6 | 8 | 4 |

1. EU total is based on population in reporting countries.
2. OTF: Officially bovine tuberculosis Free.
3. C: case-based report, U: unspecified, -: no report.
4. In Italy, in 2009, four regions and 17 provinces were OTF.
5. In Iceland, which has no special agreement concerning animal health (status) with the EU, the last outbreak of bovine tuberculosis was in 1959.
6. Switzerland provided data directly to EFSA.

***Figure TB1. Notification rate of reported confirmed cases of human tuberculosis due to* M. bovis *in the EU, 2005-2009***




Source: All MSs except Bulgaria, Greece, Hungary, Lithuania, Poland, Slovenia and Spain.

## 3.6.2 Tuberculosis due to *M. bovis* in animals

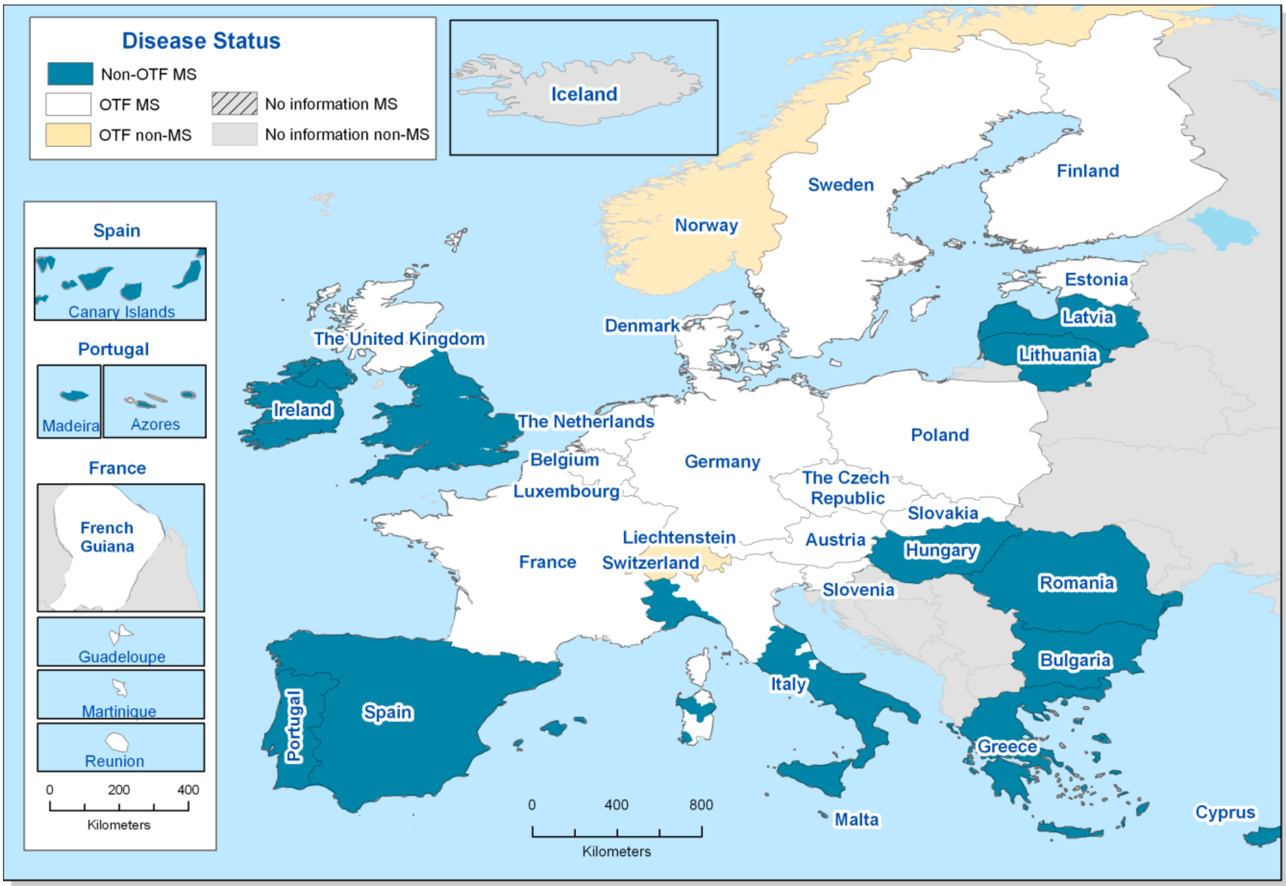
### Cattle

The status regarding freedom from bovine tuberculosis (Officially Tuberculosis Free, OTF) and the occurrence of the disease in MSs and non-MSs in 2010 are presented in Figures TB2 and TB3. As in 2009, Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Poland, Slovakia, Slovenia, Sweden, Norway and Switzerland were OTF in accordance with EU legislation. In Iceland, which has no special agreement concerning animal health (status) with the EU, the last outbreak of bovine tuberculosis was in 1959. In 2010, Estonia also achieved OTF status (Decision 2010/695/EC[42]). Moreover in Italy the regions of Lombardia and Toscana, and the provinces of Cagliari, Medio-Campidano, Ogliastra and Olbia-Tempio in the Sardegna region were declared OTF (Decision 2010/391/EC). Italy now has six OTF regions and 10 OTF provinces. In the United Kingdom, Scotland is OTF.

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

All data submitted by MSs and other reporting countries are presented in the level 3 tables of the report.

***Figure TB2. Status of bovine tuberculosis, 2010***




42 Commission Decision 2010/695/EU of 17 November 2010 amending the Annexes to Decision 93/52/EEC as regards the recognition of Estonia, Latvia and the Autonomous Community of the Balearic Islands in Spain as officially free of brucellosis (*B. melitensis*) and amending Annexes I and II to Decision 2003/467/EC as regards the declaration of Estonia as officially tuberculosis-free and officially brucellosis-free as regards bovine herds. OJ L 303, 19.11.2010, p. 14–17.

***Figure TB3. Proportion of existing cattle herds infected with or positive for* M. bovis*, country based-data, 2010***


**Trend indicators for tuberculosis**

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

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

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

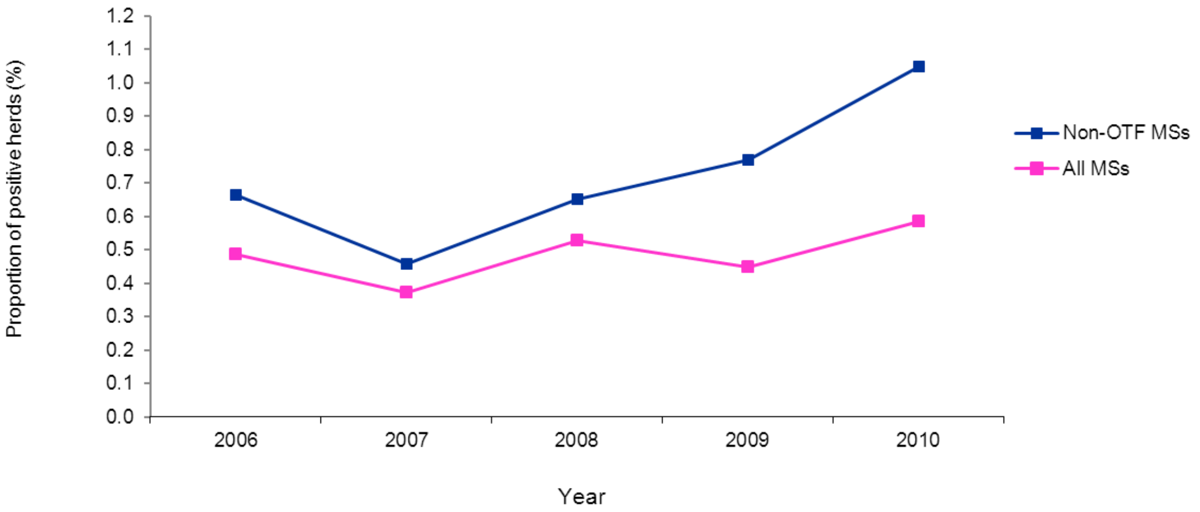
**Infected herds** means all herds under control, which are not officially tuberculosis free at the end of the reporting period. This figure summarises the results of different activities (tuberculin testing, meat inspection, follow-up investigations and tracing). Data for infected herds are reported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

**Positive herds** are herds with at least one bacteriological or tuberculin skin test-positive animal during the reporting year, independent of the number of times the infection status of each herd has been checked. Data for positive herds are reported from countries and regions that receive EU co-financing for eradication programmes.

During the years 2006-2010, the proportion of existing cattle herds infected or positive for *M. bovis* in the EU was relatively stable, at a very low level of around 0.4 %-0.6 %, ranging from 0.37 % in 2007 to 0.59 % in 2010 (Figure TB4). In 2009, the EU proportion of existing cattle herds infected or positive for *M. bovis* decreased from 0.53 % to 0.45 %, while the proportion in the non-OTF MSs slightly increased (from 0.65 % in 2008 to 0.77 % in 2009). However, this development was primarily because the two former non-OTF MSs, Poland and Slovenia, which were declared OTF during 2009 and had a very low number of infected herds, did not contribute to the non-OTF MSs figure from 2009.

In 2010, the proportion of infected or positive herds in both the EU and the non-OTF MSs, increased to 0.59 % and 1.05 %, respectively. This recent increase is largely due to an increase in the number of reported positive herds from Great Britain (the United Kingdom). In Great Britain, a 74 % increase in the proportion of positive herds was seen in 2010 compared with 2009; however this is largely due to non harmonized reporting between 2010 and previous years, and does not represent a genuine increase of that magnitude. For further information regarding these figures please refer to the United Kingdom text box.

***Figure TB4. Proportion of existing cattle herds infected with or positive for* M. bovis*, 2006-2010***




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

Data from Bulgaria only for 2008 and 2009, Romania for 2007-2009. Data are missing from Lithuania (2007) and Malta (2006).

### Officially bovine tuberculosis-free Member States and non-Member States

Bovine tuberculosis was not detected in cattle herds in 10 of the 14 OTF MSs and Norway and Switzerland, during 2010. In total, out of the 1,378,199 existing herds in the OTF countries, 203 herds were positive for *M. bovis*; in France (166 herds), Germany (11 herds), Poland (20 herds) and the Netherlands (six herds).

### Non-Officially bovine tuberculosis-Free Member States

All reporting non-OTF MSs have national eradication programmes for bovine tuberculosis in place. Table TB3 shows the reported results from MSs that did not receive EU co-financing for their eradication programmes in 2010, while Table TB4 shows results from those MSs with eradication programmes co-financed by the EU. In 2010, Ireland, Italy, Portugal, Spain and the United Kingdom received EU co-financing (Decision 2009/883/EC[43] as amended by Decision 2010/732/EU[44]). The proportion of herds under

43 Commission Decision 2009/883/EC of 26 November 2009 approving annual and multi-annual programmes and the financial contribution from the Community for the eradication, control and monitoring of certain animal diseases and zoonoses presented by the Member States for 2010 and following years. OJ L 317, 3.12.2009, p. 36–45.

44 Commission Decision 2010/732/EU of 30 November 2010 approving certain amended programmes for the eradication and monitoring of animal diseases and zoonoses for the year 2010 and amending Decision 2009/883/EC as regards the financial contribution by the Union for programmes approved by that Decision. OJ L 315, 1.12.2010, p. 43–47.

eradication programme in the co-financed areas of non-OTF MSs varied from 72.5 % in Italy to 100 % in Ireland and the United Kingdom (Great Britain and Northern Ireland).

Five non-OTF MSs, Bulgaria, Cyprus, Latvia, Lithuania and Malta, did not report any infected herds during 2010 (Table TB3).

In total, the 13 non-OTF MSs reported 1,700,394 existing bovine herds. In 2010, 1.05 % of them were reported infected with *M. bovis* or positive for *M. bovis* compared with 0.77 % in 2009.

Compared with 2009, all non-co-financed non-OTF MSs, except Greece and Hungary, reported the same level of infected herds (Table TB3). In Greece and Hungary, the number of infected herds slightly increased in 2010 compared with 2009, but not to the levels seen in 2008, with infected herds in Hungary remaining a rare event (below 0.1 %). Both Northern Ireland and Great Britain started to receive co-financing in 2010.

***Table TB3.* M. bovis *in cattle herds in non-co-financed non-OTF Member States, 2008-2010***

| Non-officially free MSs | 2010 | | | 2010 | 2009 | 2008 |
|---|---|---|---|---|---|---|
| | No of existing herds | No of officially free herds | No of infected herds | % Existing herds infected | | |
| Bulgaria | 129,454 | 0 | 0 | 0 | 0 | 0 |
| Cyprus | 361 | 213 | 0 | 0 | 0 | 0 |
| Greece | 24,229 | 14,341 | 140 | 0.58 | 0.45 | 0.70 |
| Hungary | 17,620 | 17,608 | 6 | 0.03 | 0.02 | 0.04 |
| Ireland[1] | - | - | - | - | - | 5.97 |
| Latvia | 36,835 | 36,835 | 0 | 0 | 0 | 0 |
| Lithuania | 106,506 | 106,506 | 0 | 0 | 0 | 0 |
| Malta | 358 | 148 | 0 | 0 | 0 | 0 |
| Romania | 829,503 | 829,423 | 80 | 0.01 | 0.01 | 0 |
| United Kingdom (Great Britain)[2,3] | - | - | - | - | 5.41 | 5.83 |
| United Kingdom (Northern Ireland)[3,4] | - | - | - | - | 6.12 | 2.88 |
| **Total (9 MSs in 2010)** | **1,144,866** | **1,005,074** | **226** | **0.02** | **0.43** | **0.78** |

1. In 2009 and 2010, Ireland received co-financing; results from this year can be found in table TB4.
2. During 2009, Scotland obtained status as OTF (Decision 2009/761/EC); Great Britain includes results for England, Scotland and Wales.
3. For the United Kingdom in 2009, the overall proportion of infected/positive herds was 5.58 % (6,182 herds out of 110,802 existing herds). Moreover, in 2010 the United Kingdom received co-financing; results from this year can be found in table TB4.
4. In 2009, Northern Ireland, reported data as receiving co-financing for its eradication programme. The number of infected herds presented in the table is the reported number of herds testing positive for *M. bovis.*

Compared with 2009, there was a substantial overall increase in both indicators (the proportions of positive herds among the existing herds and among the tested herds) in the co-financed non-OTF MSs (from 1.85 % and 2.51 %, respectively, in 2009, to 3.17 % and 4.26 % respectively, in 2010). However, this increase was mainly due to the inclusion of data from the United Kingdom, which in 2010 received co-financing for the first time in many years and had the highest percentages of existing positive herds and herds testing positive (9.53 % and 13.17 %, respectively, in Great Britain and 5.72 % and 6.29 %, respectively, in Northern Ireland) (Table TB4). In Italy, the percentage of existing herds testing positive has continued to decrease, with a slight rise in the percentage of tested herds positive, whereas Portugal observed an increase in both indicators, although they remained at very low levels and comparable with recent years. In Ireland and Spain, both indicators decreased.

In the United Kingdom data were reported separately for Northern Ireland and for Great Britain (England, Scotland (OTF) and Wales). In Great Britain the prevalence of positive herds increased in 2010 compared with 2009. This increase in the proportion of existing cattle herds positive for *M. bovis* in Great Britain is caused by a change in the way in which positive herds are reported. Prior to 2010, the number of existing cattle herds positive in Great Britain was reported as 'the number of new herd bovine tuberculosis incidents'. In 2010, the number of positive herds comprises all herds that had their OTF status withdrawn or suspended at some time during 2010 because of a bovine tuberculosis incident (7,971, Table TB4). This includes both new and ongoing incidents, and is therefore not comparable with previous data. The comparable figure for the number of new herd bovine tuberculosis incidents in Great Britain in 2010 was 4,703, a 2.8 % increase from 2009 (4,574 new herd bovine tuberculosis incidents).

Although the prevalence in Great Britain is currently increasing, a reduction in the rate of increase has been seen in recent years. From 1986 to 2001 herd incidents doubled approximately every 5 years, whereas from 2003 to 2010 the number of incidents doubled approximately every 10 years. Additionally, the presence of *M. bovis* in cattle herd in Great Britain is highly clustered in the south-west and the West Midlands of England and the South and West of Wales, with 92 % of all herds in Great Britain retaining their OTF status in 2010. The risk of tuberculosis infection from cattle to humans in the United Kingdom is very low as a result of mandatory milk pasteurisation from non-OTF herds. The majority of any incidents of human tuberculosis caused by *M. bovis* in the United Kingdom, either have been contracted abroad or are due to the reactivation of a latent infection that was acquired before widespread pasteurisation of milk. Scientific evidence also suggests that there is a significant threat in the United Kingdom of tuberculosis being contracted by cattle owing to persistent infection within the wildlife reservoir, primarily in the Eurasian badger (*Meles meles*).

Observing trends since 2004, in Portugal, the percentage of tuberculosis-positive herds has consistently been at very low levels. In Italy, during the years 2004-2008 the proportion of positive herds among the tested herds was low, decreasing to very low in 2009 and 2010. The proportion of positive herds among existing herds in Italy was also very low and decreasing during the years 2004-2010. In Spain, both indicators have been at low levels since 2004, and it is interesting to note that in dairy herds *M. bovis* is close to eradication (herd prevalence 0.49 %), whereas the prevalence of *M. bovis* in meat herds is higher at 1.79 %. This difference may be due to differences in herd management practices and cattle interaction with wildlife and goats which are also considered a source of infection[45].

In 2010, the overall percentage of OTF herds in the co-financed MSs was 89 %, and had not changed since 2009. In Italy, Poland and Spain, the percentage of OTF herds remained stable or increased slightly in 2010 compared with 2009.

45 Spain National Zoonoses Summary Report, 2010.

*Table TB4.* M. bovis *in cattle herds in co-financed non-OTF Member States[1], 2008-2010*

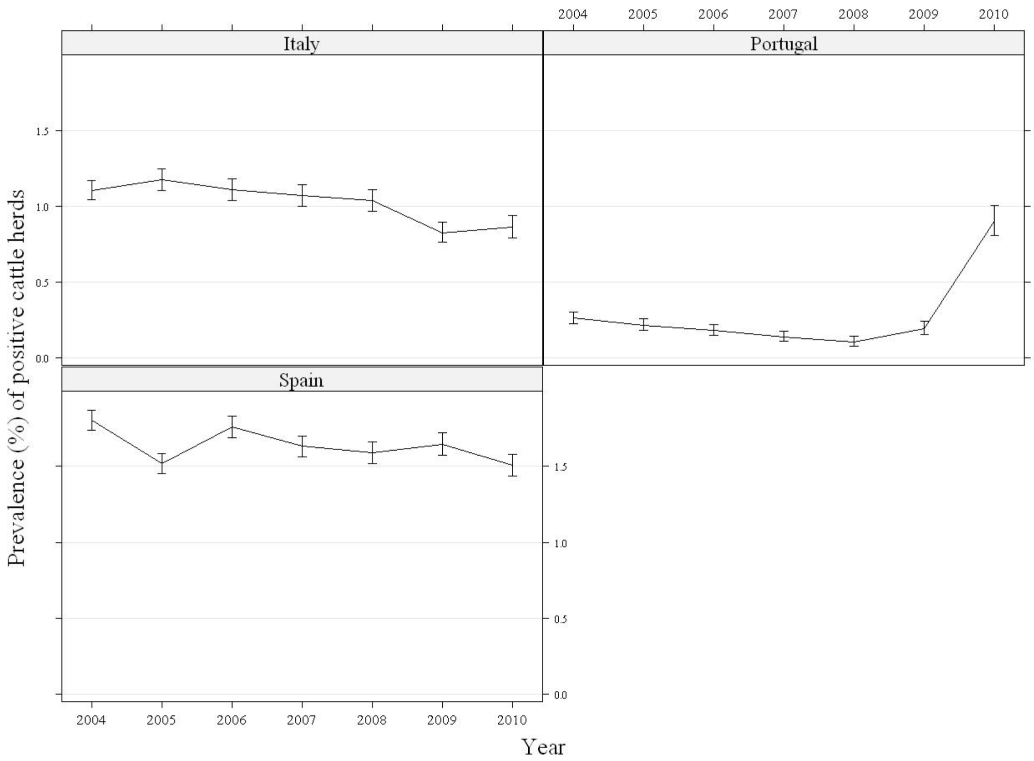
| Non-officially free MS | 2010 | | | | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|---|
| | No of existing herds | No of tested herds | No of positive herds | % existing herds positive | % tested herds positive | % existing herds positive | % tested herds positive | % existing herds positive | % tested herds positive |
| Ireland | 116,815 | 114,011 | 5,520 | 4.73 | 4.84 | 5.17 | 5.27 | - | - |
| Italy[2] | 134,984 | 62,466 | 538 | 0.40 | 0.86 | 0.42 | 0.82 | 0.53 | 1.03 |
| Poland[3] | - | - | - | - | - | - | - | 0.01 | 0.03 |
| Portugal | 62,537 | 35,535 | 320 | 0.51 | 0.90 | 0.11 | 0.20 | 0.08 | 0.11 |
| Spain | 131,623 | 116,399 | 1,755 | 1.33 | 1.51 | 1.41 | 1.65 | 1.39 | 1.59 |
| United Kingdom (Great Britain)[4,5] | 83,636 | 60,523 | 7,971 | 9.53 | 13.17 | - | - | - | - |
| United Kingdom (Northern Ireland)[5] | 25,933 | 23,595 | 1,484 | 5.72 | 6.29 | - | - | - | - |
| **Total (5 MSs in 2010)** | **555,528** | **412,529** | **17,588** | **3.17** | **4.26** | **1.85** | **2.51** | **0.25** | **0.64** |

1. Only tested and positive herds from regions that have co-financed eradication programmes are included. The number of existing herds includes all herds in the MS.
2. In Italy, six regions and 10 provinces are OTF. In the provinces that are OTF or do not have a co-financed eradication programme, 11 of the 47,965 existing herds were found to be infected.
3. Poland received co-financing in 2009, but was granted status as OTF during the year (Decision 2009/342/EC).
4. During 2009, Scotland obtained status as OTF (Decision 2009/761/EC). Great Britain includes data for England, Wales and Scotland.
5. In 2010, the overall proportion of existing herds positive in the United Kingdom was 8.63 % (9,455 herds out of 109,569 existing herds).

The MS-specific trends in test-positive herds in three co-financed non-OTF MSs from 2004 to 2010 are shown in Figure TB5. Over the seven years reported, the trends seem to be decreasing slightly in Italy and Spain, with a very slight increase in prevalence observed in Italy in 2010 (0.86 %) compared with 2009 (0.82 %). An increase in prevalence was observed in Portugal from 2008 (0.11 %) through 2009 (0.20 %) to 2010 (0.90 %), following a decreasing trend until 2008.

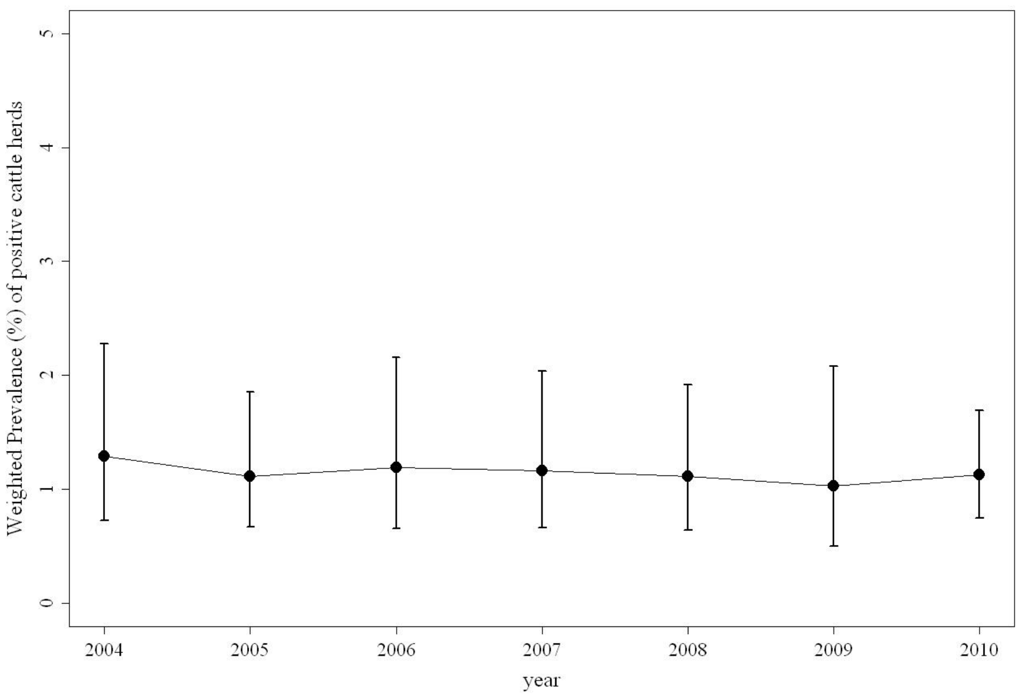
As shown in Figure TB6 and also confirmed by logistic regression analysis, no statistical trend in the co-financed non-OTF MS-group weighted prevalence was observed from 2004 to 2010. See Chapter 6, Materials and methods, section 6.2, for a description of the statistical methodology.

***Figure TB5. Prevalence and 95 % confidence interval of* M. bovis *test-positive cattle herds, at Member State level, in three co-financed non-OTF Member States, 2004-2010*[1]**




1. Vertical bars indicate the exact binomial 95 % confidence interval.

***Figure TB6. Weighted prevalence*[1] *and 95 % confidence interval of* M. bovis *test-positive cattle herds, overall for three co-financed non-OTF Member States, 2004-2010*[2]**




Note: Vertical bars indicate 95 % confidence intervals.
1. The MS group prevalence is estimated using weights. The MS-specific weight is the ratio between the number of existing herds and the number of herds tested, per year.
2. Data included from: Italy, Portugal and Spain.

### Animal species other than cattle

Where performed, surveillance of tuberculosis due to *M. bovis* in all animal species other than cattle mainly entails post-mortem meat inspection. In addition, results from clinical investigations or from other specific local studies are reported for smaller numbers of animals. Findings of *M. bovis* in all animals are notifiable in Denmark, Finland, Latvia, Norway, Portugal and Sweden.

The most intensively sampled animal species, other than cattle, was pig, with 16 MSs and two non-MS (Norway and Switzerland) sampling 25,433,208 animals. About 22 % of those samples were indicated as originating from meat inspection, in three MSs (Austria, France and the United Kingdom). Latvia reported the results of 19,289 pigs examined on farm using the intradermal tuberculin test. Pigs had the lowest overall proportion of positive tests for *M. bovis*, with only 37 positive samples from four MSs (<0.01 %). Individually, the four MSs detecting *M. bovis*-positive pigs reported a very low (Germany), low (France and the United Kingdom) or moderate (Portugal) proportion of positive samples.

The next most intensively sampled species were wild boar, goats and sheep, with 318,203; 125,940 and 123,918 animals sampled, respectively. Overall the proportion of positive samples in these categories was very low (0.2 %), low (1.1 %) and rare (0.01%) with 552; 1,410 and 18 samples found positive for *M. bovis*, respectively. Amongst the MSs reporting positive samples from wild boars, the proportion of positive samples varied from rare in Italy (<0.01 %), to low in France (2.7 %), moderate in Hungary (12.4 %) and Spain (12.0 %) and very high in Portugal (67.8 %), where the sampling context was unreported. For MSs reporting positive samples from goats, the proportion of positive samples ranged from very low in Ireland (0.32 %) to low in Spain (1.2 %) and the United Kingdom (7.1 %), and moderate in Portugal (10.5 %) (Table TB5). *M. bovis* was also reported in sheep in Ireland and the United Kingdom at moderate levels, respectively 26.3 % and 33.3 %.

The highest occurrence of *M. bovis* in species other than cattle was reported by Poland in zoo animals, which had an extremely high level of infection (88.9 %); however only nine animals were sampled in this instance. In addition Germany reported *M. bovis*-positive zoo animals, but at very low levels (0.6%).

Tuberculosis in wildlife is notifiable in Denmark, Finland, France, Norway, Portugal and Sweden. Portugal reported an extremely high proportion of positive samples in deer (77.8 %), while in the United Kingdom the proportion of positives in deer was very high (52.1 %). *M. bovis* was reported in wildlife by one OTF MS, France. While a high proportion of positive samples was detected in badgers tested in relation to suspect sampling (33.3 %), *M. bovis* was detected at low levels in all wildlife categories sampled under routine surveillance (badgers (4.9 %), deer (1.2 %), foxes (1.7 %) and wild boar (2.7 %)). *M. bovis* was also detected at high levels by three non-OTF MSs in species other than cattle, goats or sheep: Hungary in deer (21.2 %), Ireland in badgers (23.8 %), and the United Kingdom in alpacas (27.8 %), cats (26.7 %) and dogs (22.2 %). In the United Kingdom, the findings of *M. bovis* in species other than cattle were reported through clinical investigations or from man unknown sampling context (Table TB5).

Table TB 5 shows that in wildlife populations *M. bovis* was reported in badgers (France, Ireland, Spain and the United Kingdom), deer (France, Hungary, Ireland, Portugal, Spain and the United Kingdom), foxes (France and Hungary), mouflons (Spain), wild animals other than badgers, deer (the United Kingdom) and wild boar (France, Hungary, Italy, Portugal and Spain). Thus the occurrence of *M. bovis* in wildlife and domestic animals other than cattle to a very large extent seems to reflect the status of the MSs regarding freedom from bovine tuberculosis, demonstrating the difficulties MSs might encounter when eradicating this disease from the cattle population, where there is a risk of a natural reservoir of *M. bovis* being present in wildlife (Table TB5).

**Bovine tuberculosis in wildlife in France**. For 50 years now, tuberculosis due to *M. bovis* has been described in wildlife species of several countries throughout the world. Depending on the context, wild animals can be considered as sentinel or reservoirs for cattle and/or humans. In France, tuberculosis was discovered in 2001 in wild ungulates in the Brotonne Forest, Normandy. Despite the implementation of adapted control measures, in 2006 the infection was still present in 20 % of red deer and 30 % of wild boars. Thus, the exceptional measure of total depopulation of wild red deer, considered the main reservoir of tuberculosis was implemented and seems to have been effective. In Burgundy, where tuberculosis in cattle has re-emerged since 2002, grouped cases have been identified in wild boars since 2007 and in badgers since 2009. As a preventive measure, it was decided to make a large reduction in these species' populations to reduce the risk of spillback to cattle. Elsewhere in France, sporadic detection of tuberculosis cases in wild boar seems to indicate the persistence of the infection either in cattle and/or in the environment. In each of these situations, the same *M. bovis* strains were isolated from wildlife and cattle, showing that tuberculosis evolves in a multi-host system, hampering the sanitary management of this notifiable disease, which has nevertheless nearly been eradicated from cattle. More information can be found at www.anses.fr/bulletin-epidemiologique/Documents/BEP-mg-BE38.pdf.

Surveillance of tuberculosis due to *M. bovis* in farmed deer is also carried out mainly through post-mortem meat inspection, but some MSs also apply the intradermal tuberculin test in herds. *M. bovis* is notifiable in farmed deer in Austria, Denmark, Finland, France, Norway, Portugal, Sweden and the United Kingdom. A compulsory control programme is in place in Finland, Denmark, Norway and Sweden.

In 2010, data were submitted by six MSs (Belgium, Finland, France, Lithuania, Sweden and the United Kingdom) on the sampling of farmed deer. *M. bovis*–positive animals were reported by France and the United Kingdom (Table TB5).

### *Table TB5.* M. bovis *in species other than cattle, 2010*

| Country | Species | Sampling context | Number of animals tested | Number of animals positive | % pos |
|---|---|---|---|---|---|
| Austria (OTF) | Goats | Control and eradication programmes | 5,301 | 0 | 0 |
| | Pigs | Control and eradication programmes | 5,577,579 | 0 | 0 |
| | Sheep | Control and eradication programmes | 122,053 | 0 | 0 |
| Belgium | Land game mammals | Surveillance | 28 | 0 | 0 |
| | Other mustelids | Surveillance | 34 | 0 | 0 |
| Czech Republic (OTF) | Goats | - | 1,712 | 0 | 0 |
| Denmark (OTF) | Pigs | - | 19,793,743 | 0 | 0 |
| Estonia (OTF) | Pigs | - | 2,178 | 0 | 0 |
| | Zoo animals, all | - | 4 | 0 | 0 |
| Finland (OTF) | Deer (farmed) | Control and eradication programmes | 2 | 0 | 0 |
| France (OTF) | Badgers | Surveillance[1] | 921 | 45 | 4.9 |
| | | Suspect sampling | 78 | 26 | 33.3 |
| | Coypu | Survey[2] | 91 | 0 | 0 |
| | Deer (farmed) | Surveillance | 2,824 | 1 | <0.1 |
| | Deer (wild) | Clinical investigations | 11 | 0 | 0 |
| | | Survey[3] | 323 | 4 | 1.2 |
| | Foxes | Survey[2] | 119 | 2 | 1.7 |
| | Pigs | Surveillance | 44 | 1 | 2.3 |
| | Wild boars | Survey[4] | 1,031 | 28 | 2.7 |
| | Pet animals, all | Clinical investigations | 13 | 0 | 0 |
| | Zoo animals, all | Clinical investigations | 35 | 0 | 0 |
| Germany (OTF) | Goats | - | 44 | 0 | 0 |
| | Pigs | - | 1,040 | 4 | 0.4 |
| | Sheep | - | 1,318 | 0 | 0 |
| | Zoo animals, all | - | 692 | 4 | 0.6 |
| Hungary (non-OTF) | Badgers | - | 1 | 0 | 0 |
| | Deer | Survey | 52 | 11 | 21.2 |
| | Foxes | Survey | 11 | 1 | 9.1 |
| | Pigs | - | 8 | 0 | 0 |
| | Sheep | - | 1 | 0 | 0 |
| | Wild boars | Survey | 210 | 26 | 12.4 |
| Ireland (non-OTF) | Badgers | Surveillance | 101 | 24 | 23.8 |
| | | - | 930 | 117 | 12.6 |
| | Birds | - | 7 | 0 | 0 |
| | Deer | Surveillance | 6 | 1 | 16.7 |
| | Goats | Clinical investigations | 10 | 2 | 20.0 |
| | | Control and eradication programmes | 1,214 | 0 | 0 |
| | | - | 16 | 2 | 12.5 |
| | Pigs | - | 1 | 0 | 0 |
| | Sheep | Clinical investigations | 1 | 0 | 0 |
| | | - | 18 | 5 | 27.8 |

Table continued overleaf.

***Table TB5 (continued).* M. bovis *in species other than cattle, 2010***

| Country | Species | Sampling context | Number of animals tested | Number of animals positive | % pos |
|---|---|---|---|---|---|
| Italy (non-OTF) | Badgers | Clinical investigations | 1 | 0 | 0 |
| | Birds | Clinical investigations | 10 | 0 | 0 |
| | | Control and eradication programmes | 3 | 0 | 0 |
| | Cantabrian chamois | Control and eradication programmes | 150 | 0 | 0 |
| | Cats | Clinical investigations | 1 | 0 | 0 |
| | | Control and eradication programmes | 2 | 0 | 0 |
| | | Survey | 9 | 0 | 0 |
| | Deer (farmed) | Clinical investigations | 3 | 0 | 0 |
| | Deer | Clinical investigations | 7 | 0 | 0 |
| | | Control and eradication programmes | 246 | 0 | 0 |
| | | Survey | 2 | 0 | 0 |
| | Dogs | Clinical investigations | 1 | 0 | 0 |
| | | Control and eradication programmes | 1 | 0 | 0 |
| | Ducks | Survey | 1 | 0 | 0 |
| | Elephants | Clinical investigations | 3 | 0 | 0 |
| | *Gallus gallus* (fowl) | Clinical investigations | 1 | 0 | 0 |
| | Hares | Clinical investigations | 3 | 0 | 0 |
| | | Control and eradication programmes | 1 | 0 | 0 |
| | Hedgehogs | Clinical investigations | 1 | 0 | 0 |
| | Parrots | Control and eradication programmes | 2 | 0 | 0 |
| | Pigeons | Clinical investigations | 1 | 0 | 0 |
| | Pigs | Clinical investigations | 3 | 0 | 0 |
| | | Control and eradication programmes | 1 | 0 | 0 |
| | | Survey | 483 | 0 | 0 |
| | Poultry, unspecified | Clinical investigations | 2 | 0 | 0 |
| | | Control and eradication programmes | 1 | 0 | 0 |
| | Rabbits | Survey | 1 | 0 | 0 |
| | Rats | Survey | 1 | 0 | 0 |
| | Rodents | Control and eradication programmes | 1 | 0 | 0 |
| | Wild animals | Control and eradication programmes | 2 | 0 | 0 |
| | Wild boars | Clinical investigations | 355 | 0 | 0 |
| | | Control and eradication programmes | 312,642 | 0 | 0 |
| | | Survey | 248 | 3 | 1.2 |
| Latvia (non-OTF) | Goats | - | 3 | 0 | 0 |
| | Pigs | - | 19,289 | 0 | 0 |
| | Sheep | - | 64 | 0 | 0 |
| Lithuania (non-OTF) | Deer (farmed red deer) | - | 24 | 0 | 0 |
| | Pigs | - | 33,569 | 0 | 0 |
| Netherlands (OTF) | *Gallus gallus* (fowl) | Clinical investigations | 1,544 | 0 | 0 |
| | Goats | Clinical investigations | 206 | 0 | 0 |
| | Pet animals, all | Clinical investigations | 163 | 0 | 0 |
| | Pigs | Clinical investigations | 3,505 | 0 | 0 |
| | Sheep | Clinical investigations | 403 | 0 | 0 |
| Poland (OTF) | Pigs | - | 1,189 | 0 | 0 |
| | Zoo animals, all | Survey | 9 | 8 | 88.9 |
| | | - | 6 | 0 | 0 |

Table continued overleaf.

*Table TB5 (continued).* M. bovis *in species other than cattle, 2010*

| Country | Species | Sampling context | Number of animals tested | Number of animals positive | % pos |
|---|---|---|---|---|---|
| Portugal (non-OTF) | Badgers | - | 4 | 0 | 0 |
| | Birds | - | 17 | 0 | 0 |
| | Deer | - | 72 | 56 | 77.8 |
| | Foxes | - | 31 | 0 | 0 |
| | Goats | - | 19 | 2 | 10.5 |
| | Pigs | - | 18 | 3 | 16.7 |
| | Sheep | - | 4 | 0 | 0 |
| | Wild boars | - | 87 | 59 | 67.8 |
| | Zoo animals, all | - | 4 | 0 | 0 |
| Slovakia (OTF) | Capricorns | Clinical investigations | 1 | 0 | 0 |
| | Pigs | Clinical investigations | 6 | 0 | 0 |
| Spain (non-OTF) | Badgers | - | 69 | 3 | 4.3 |
| | Cantabrian chamois | Surveillance | 50 | 0 | 0 |
| | Deer | Surveillance | 3,019 | 125 | 4.1 |
| | Foxes | - | 31 | 0 | 0 |
| | Goats | - | 117,401 | 1,403 | 1.2 |
| | Mouflons | - | 7 | 1 | 14.3 |
| | Wild boars | Surveillance | 3,629 | 436 | 12.0 |
| Sweden (OTF) | Alpacas | - | 1 | 0 | 0 |
| | Birds | - | 1 | 0 | 0 |
| | Deer (farmed) | Control and eradication programmes | 11 | 0 | 0 |
| | | - | 11 | 0 | 0 |
| | Dogs | - | 1 | 0 | 0 |
| | Moose | - | 1 | 0 | 0 |
| | Pigs | - | 102 | 0 | 0 |
| | Sheep | - | 15 | 0 | 0 |
| | Solipeds, domestic | - | 1 | 0 | 0 |
| | Wild boars | - | 1 | 0 | 0 |
| United Kingdom (non-OTF) | Alpacas | Clinical investigations | 151 | 42 | 27.8 |
| | Badgers | - | 103 | 14 | 13.6 |
| | Cats | Clinical investigations | 86 | 23 | 26.7 |
| | Deer (farmed) | Control and eradication programmes | 95 | 14 | 14.7 |
| | Deer (wild) | Clinical investigations | 48 | 25 | 52.1 |
| | Dogs | Clinical investigations | 9 | 2 | 22.2 |
| | Fish | - | 1 | 0 | 0 |
| | Goats | - | 14 | 1 | 7.1 |
| | Lamas | Clinical investigations | 7 | 0 | 0 |
| | Pigs | - | 341 | 29 | 8.5 |
| | Sheep | - | 39 | 13 | 33.3 |
| | Wild animals | Clinical investigations | 5 | 1 | 20.0 |
| **Total (20 MSs)** | **All Animals** | **All sampling contexts** | **26,013,481** | **2,567** | **0.01** |
| Norway (OTF) | Dogs | - | 3 | 0 | 0 |
| | Pigs | - | 103 | 0 | 0 |
| | Sheep | - | 1 | 0 | 0 |
| | Solipeds, domestic | - | 1 | 0 | 0 |
| Switzerland (OTF) | Other animals | Clinical investigations | 6 | 0 | 0 |
| | Pigs | Clinical investigations | 6 | 0 | 0 |
| | Sheep | Clinical investigations | 1 | 0 | 0 |

1. Survey in five districts: Côte d'Or, Dordogne, Ariège, Pyrénées-Atlantique and Landes during hunting seasons 2009-2010 and 2010 to the beginning of 2011.
2. Survey in two districts: Cote d'Or and Dordogne during hunting seasons 2009-2010 and 2010 to the beginning 2011.
3. Survey in three districts: Côte d'Or, Dordogne and Ariège during hunting season 2010 to the beginning 2011. These data include one wild roe deer which tested positive for *M. bovis* where the sampling context was surveillance but the survey details were not specified.
4. Survey in five districts: Côte d'Or, Dordogne, Ariège, Pyrénées-Atlantique and Landes during hunting seasons 2009-2010 and 2010 to the beginning 2011.

### 3.6.3 Discussion

Although the number of reported human cases due to *M. bovis* is low in the EU, in 2009 the number of cases was 9.0 % higher than in 2008, following a previous increase in 2007. As in 2008, five MSs, Germany, Ireland, the Netherlands, Spain and the United Kingdom accounted for the majority of confirmed cases (87 %) reported in 2009. This suggests that human cases due to *M. bovis* are limited to a small proportion of MSs. As in previous years, the majority of reported human cases occurred in people aged 65 years or older, in both OTF and non-OTF countries. Among the reasons for this could be occupational-associated exposure and a long incubation period before clinical onset.

Fourteen MSs have officially free bovine tuberculosis (OTF) status and four of these reported a few infected cattle herds. However, owing to the very low number of positive herds, their status as OTF countries was retained.

Five of the 13 non-OTF MSs reported no infected cattle herds in 2010. Of the eight non-OTF MSs reporting positive or infected herds, Ireland and the United Kingdom accounted for the highest prevalence. The increase in the prevalence in the United Kingdom can be partly attributed to a change in the reporting of positive herds by Great Britain, from only newly infected herds in 2009, to all positive herds in 2010.

In most of the non-OTF MSs the prevalence of bovine tuberculosis remained at a level comparable to 2009. No statistically significant trend was observed in the grouped weighted prevalence for three co-financed non-OTF MSs Italy, Portugal and Spain, during 2004-2010.

A number of MSs reported findings of *M. bovis* in animal species other than cattle and only one OTF MS reported such findings. These findings demonstrate that wild animals are contaminated and may constitute a reservoir for *M. bovis*, which is in line with a technical report submitted to EFSA in October 2009[46] on the presence of bovine tuberculosis within wildlife populations in relation to controlling the infection in cattle populations. Within the report badgers, deer and wild boar are considered to be the wildlife species posing the greatest potential risk to cattle in 2010. *M. bovis* was also detected in non-cattle domestic animal species by six MSs. This pool of infection may also be considered a risk to cattle populations, although to a lesser extent than the wildlife reservoir. A few findings of *M. bovis* in other domestic animals (alpacas, cats and dogs) were also reported and two countries reported *M. bovis* in farmed deer.

The occurrence of *M. bovis* in wildlife and domestic animals other than cattle thus seems to a very large extent to reflect the status of the MSs regarding freedom from bovine tuberculosis. This demonstrates the difficulties that many MSs might encounter when attempting to eradicate the disease from the cattle population where there is a risk of a natural reservoir of *M. bovis* present in wildlife.

46 Technical report submitted to EFSA. Scientific review on Tuberculosis in wildlife in the EU. Question number: EFSA-Q-2008-04992.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.7 *Brucella*

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

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

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

Table BR1 presents the countries reporting data for 2010.

***Table BR1. Overview of countries reporting* Brucella *data, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 26 | **All MSs** except DK<br>**Non MSs:** CH, IS, NO |
| Food | 3 | **MSs:** ES, IT, PT |
| Animal | 27 | **All MSs**<br>**Non-MSs:** CH, NO |

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

### 3.7.1 Brucellosis in humans

In 2010, 26 MSs provided information on brucellosis in humans. Ten MSs (Belgium, Cyprus, Estonia, Finland, Hungary, Latvia, Lithuania, Malta, Poland and Slovenia) reported no human cases. In total, 356 confirmed cases of human brucellosis were reported in the EU in 2010 (Table BR2). As in previous years, MSs with the status officially free of brucellosis in cattle (OBF) as well as in sheep and goats (ObmF) reported low numbers of cases, whereas the non-OBF/non-ObmF MSs, Greece, Portugal and Spain, accounted for 74 % of all confirmed cases in 2010 (Table BR2)/

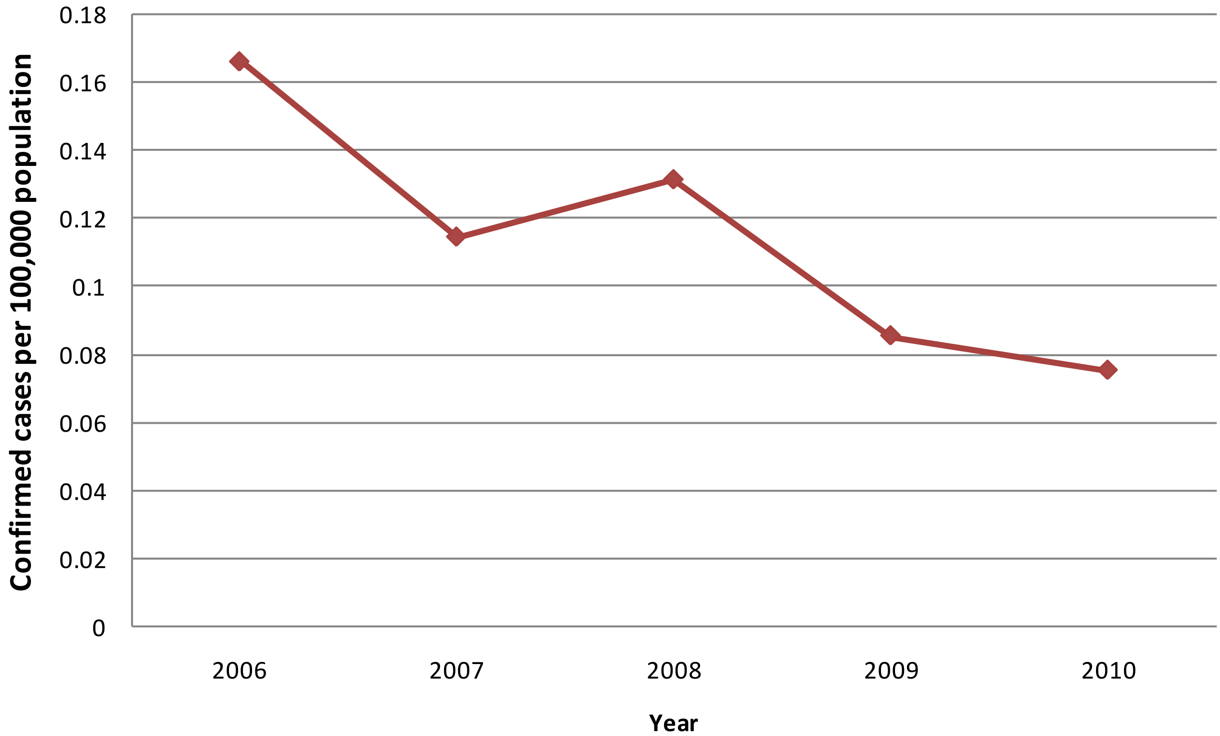
In the EU, as the number of reported confirmed cases decreased 11.7 % in 2010 compared with 2009, the notification rate of brucellosis was 0.07 cases per 100,000 population in 2010. Furthermore, a statistically significant decreasing trend was observed during a five-year period, 2006-2010, at EU level. This was based on data received from 22 MSs that reported consistently during these years and were included in the trend analysis (Figure BR1).

***Table BR2. Reported brucellosis cases in humans, 2006-2010, and notification rates for confirmed cases in 2010. OBF and ObmF status* is indicated***

| Country | 2010 | | | | | 2009 | 2008 | 2007 | 2006 |
|---|---|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases | (Imported) | Confirmed cases/ 100,000 | Confirmed cases | | | |
| Austria (OBF/ObmF) | C | 3 | 3 | (2) | 0.04 | 2 | 5 | 0 | 1 |
| Belgium (OBF/ObmF) | U | 0 | 0 | (0) | 0 | 1 | 1 | 3 | 2 |
| Bulgaria | A | 2 | 2 | | 0.03 | 3 | 8 | 9 | 3 |
| Cyprus | U | 0 | 0 | (0) | 0 | 0 | 0 | 0 | 0 |
| Czech Republic (OBF/ObmF) | U | 1 | 1 | (1) | 0 | 0 | 1 | 0 | - |
| Denmark[2] (OBF/ObmF) | - | - | - | - | - | - | - | - | - |
| Estonia | U | 0 | 0 | (0) | 0 | 0 | 0 | 0 | 0 |
| Finland (OBF/ObmF) | U | 0 | 0 | (0) | 0 | 0 | 0 | 2 | 0 |
| France[3](OBF) | C | 20 | 20 | (18) | 0.03 | 19 | 21 | 14 | 24 |
| Germany (OBF/ObmF) | C | 22 | 22 | (15) | 0.03 | 19 | 24 | 21 | 37 |
| Greece | C | 97 | 97 | (2) | 0.86 | 106 | 304 | 101 | 119 |
| Hungary (ObmF) | U | 0 | 0 | (0) | 0 | 0 | 0 | 1 | - |
| Ireland (ObmF) | C | 1 | 1 | | 0.02 | 0 | 2 | 7 | 4 |
| Italy[4] | C | 10 | 10 | | 0.02 | 23 | 163 | 179 | 318 |
| Latvia | U | 0 | 0 | (0) | 0 | 0 | 0 | 0 | 0 |
| Lithuania | U | 0 | 0 | (0) | 0 | 1 | 0 | 0 | 0 |
| Luxembourg (OBF/ObmF) | C | 1 | 1 | | 0.20 | 0 | 0 | 0 | - |
| Malta | U | 0 | 0 | (0) | 0 | 0 | 0 | 0 | 0 |
| Netherlands (OBF/ObmF) | C | 6 | 6 | (6) | 0.04 | 3 | 3 | 2 | 0 |
| Poland (ObmF) | U | 0 | 0 | (0) | 0 | 3 | 1 | 1 | 0 |
| Portugal[5] | C | 88 | 88 | | 0.83 | 80 | 56 | 74 | 76 |
| Romania (ObmF) | C | 2 | 2 | (2) | 0.01 | 3 | 2 | 2 | 1 |
| Slovakia (OBF/ObmF) | C | 1 | 1 | | 0.02 | 0 | 1 | 0 | 0 |
| Slovenia (ObmF) | U | 0 | 0 | (0) | 0 | 2 | 2 | 1 | 0 |
| Spain[6] | C | 103 | 78 | | 0.17 | 114 | 120 | 201 | 162 |
| Sweden (OBF/ObmF) | C | 12 | 12 | (10) | 0.13 | 7 | 8 | 8 | 4 |
| United Kingdom (OBF/ObmF)[7] | C | 12 | 12 | (9) | 0.02 | 17 | 13 | 13 | 16 |
| **EU Totals** | | **381** | **356** | | **0.07** | **403** | **735** | **639** | **767** |
| Iceland[8] | U | 0 | 0 | (0) | 0 | 0 | 0 | 0 | 0 |
| Liechtenstein (OBF/ObmF) | - | - | - | - | - | - | 0 | 0 | 0 |
| Norway (OBF/ObmF) | C | 2 | 2 | (2) | 0.04 | 0 | 0 | 0 | 3 |
| Switzerland[9] (OBF/ObmF) | C | 5 | 5 | (5) | 0.06 | 14 | 5 | 1 | 3 |

* OBF/ObmF: Officially Brucellosis Free in cattle/Officially *B. melitensis* Free in sheep/goats.
1. A: aggregated data report; C: case-based report; U: unspecified; –: no report.
2. No surveillance system exists.
3. In France, 64 departments are ObmF and no cases of brucellosis have been reported in small ruminants since 2003.
4. In Italy, 10 regions and six provinces are OBF and also 10 regions and six provinces are ObmF.
5. In Portugal, six islands of the Azores are OBF whereas all nine Azores islands are ObmF.
6. In Spain, two provinces of the Canary Islands are OBF/ObmF and the Balearic Islands are ObmF.
7. In the United Kingdom, only Great Britain is OBF.
8. In Iceland, which has no special agreement concerning animal health (status) with the EU, brucellosis (*B. abortus, B. melitensis, B. suis*) has never been reported.
9. Switzerland provided data directly to EFSA.

***Figure BR1. Notification rate of reported confirmed cases of human brucellosis in the EU, 2006-2010***



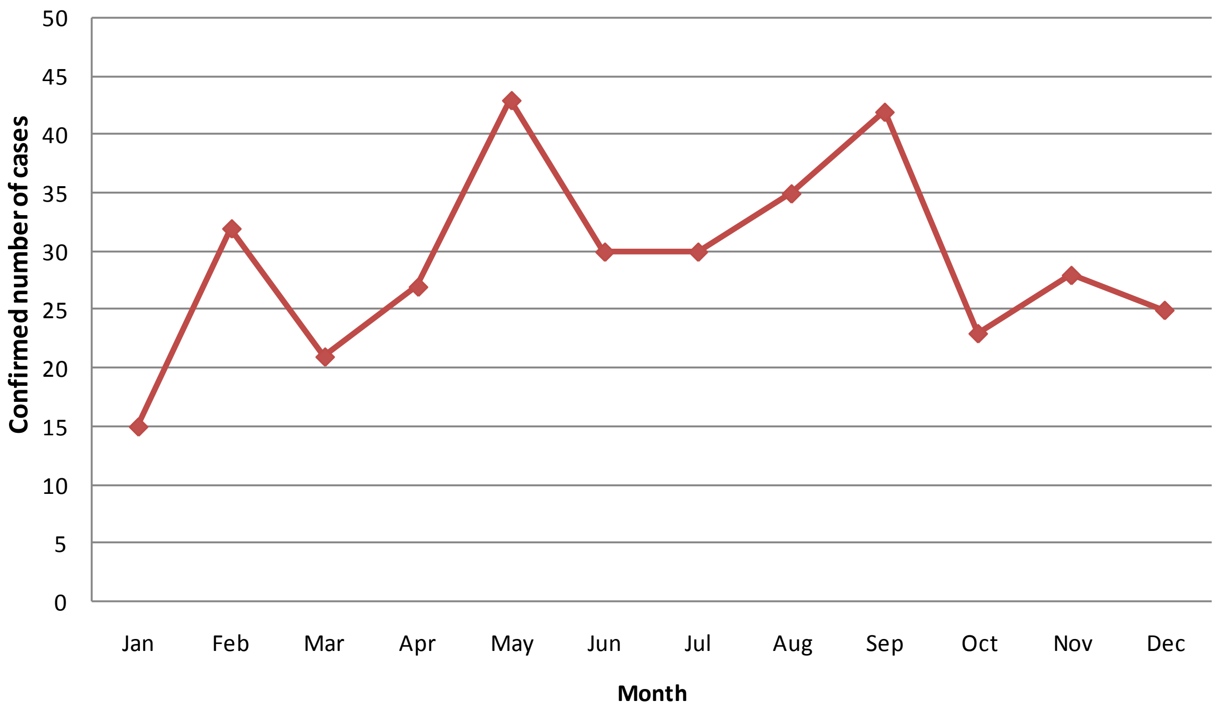

Note: Includes total number of confirmed cases from 2006 to 2010.
Data source: Austria, Belgium, Czech Republic, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Spain, Slovakia, Slovenia, Sweden and United Kingdom.

In 2010, the highest number of confirmed cases was in the 45-64 years age group (0.1 per 100,000 population) followed by the 25-44 years age group (0.09 per 100,000 population).

In 2010, *B. melitensis* was responsible for 27.1 % of the confirmed cases followed by *B. abortus* in 3.6 % of cases while no cases due to *B. suis* were reported in the EU as in previous years. Information on specific *Brucella* species was reported in only 19.1 % of the total number of confirmed cases (N=356) in the EU.

Brucellosis did not exhibit a marked seasonal pattern in 2010. Most cases were reported in February, May and September 2010 (Figure BR2). No death due to brucellosis was reported in 2010, however, 34.5 % of patients with confirmed infection were hospitalised because of the disease.

***Figure BR2. Seasonal distribution of reported confirmed human cases of brucellosis in reporting Member States, 2010***




Source: Austria, Bulgaria, Czech Republic, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Romania, Slovakia, Spain, Sweden and United Kingdom (N=351)

Fifteen MSs provided information about whether the confirmed cases were imported or domestically acquired in 2010. As in previous years, 54.2 % of reported cases were domestically acquired infections. The highest percentages were noted in MSs that are not brucellosis free in their domestic ruminant populations such as Spain and Greece (Table BR2). The geographical origin was reported as unknown for 27.4 % of confirmed cases of brucellosis.

### 3.7.2 *Brucella* in food

Two MSs (Italy and Spain) provided information on *Brucella* in milk, cheese and dairy products in 2010 (with a sample size ≥25). It was not indicated whether these samples were from raw or pasteurised/heat-treated milk. The majority of these samples were from Italy (N=1,142), half of which were from milk from cows, a quarter were samples from milk from other or unspecified animal species, and the final quarter were samples from cheeses made from milk from unspecified animal species. Spain provided 43 samples of unspecified dairy products (excluding cheeses). None of these milk, cheese or dairy product samples were found to be contaminated with *Brucella*.

All data on *Brucella* in food submitted by MSs are presented in the level 3 tables of the report.

### 3.7.3 *Brucella* in animals

#### Cattle

The status regarding freedom of bovine brucellosis (Officially Brucellosis Free, OBF) and the occurrence of the disease in MSs and non-MSs in 2010 are presented in Figures BR3 and BR4. As in 2009, Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Ireland, Luxembourg, the Netherlands, Poland, Slovakia, Slovenia and Sweden, as well as Norway and Switzerland were OBF in accordance with EU legislation. In addition, Estonia was granted OBF status during 2010 (Decision 2010/695/EC). Moreover, in the non-MS Iceland, which has no special agreement concerning animal health (status) with the EU, brucellosis (*B. abortus, B. melitensis, B. suis*) has never been reported. In the United Kingdom, Great Britain has been classified as OBF (Decision 2003/467/EC). In Italy, Campobasso in Molise was recognised as OBF during 2010 (Decision 2010/391/EC) so there are now 10 regions and six provinces OBF in Italy. In Portugal, six of the nine islands of the Azores (Pico, Graciosa, Flores, Corvo, Faial and Santa Maria) are OBF (Decision 2003/467/EC and Decision 2009/600/EC)[47]. In Spain, two provinces of the Canary Islands (Santa Cruz de Tenerife and Las Palmas) are OBF (Decision 2009/600/EC).

All data submitted by MSs and other reporting countries are presented in the level 3 tables of the report.

47 Commission Decision 2009/600/EC of 5 August 2009 amending Decision 2003/467/EC as regards the declaration that certain Member States and regions thereof are officially free of bovine brucellosis. OJ L 204, 6.8.2009, p. 39–42.

***Figure BR3. Status of bovine brucellosis, 2010***

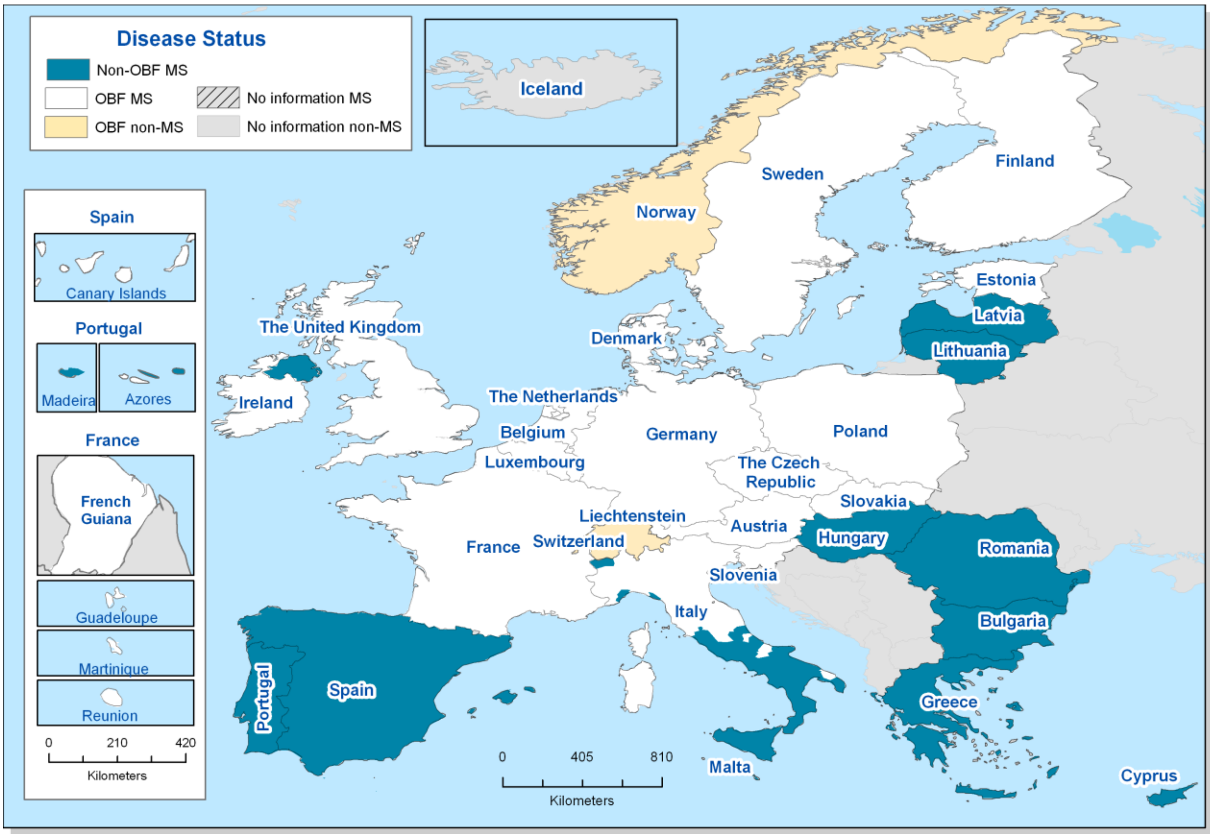



***Figure BR4. Proportion of existing cattle herds infected with or positive for* Brucella*, country-based data, 2010***

**Trend indicators for brucellosis**

To assess the annual EU trends in bovine and ovine/caprine brucellosis and to complement the MS-specific figures, two epidemiological trend indicators have been used since 2005.

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

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

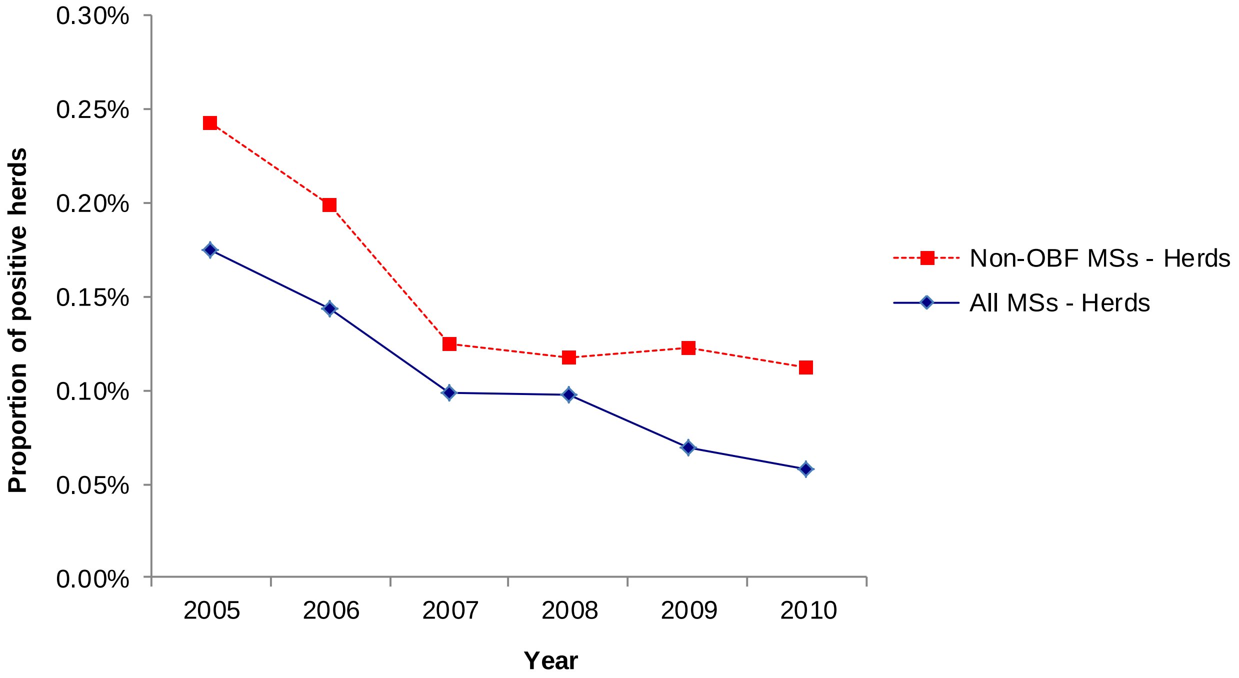
**Infected herds** are all herds under control that are not free or officially free at the end of the reporting period. This figure summarises the results of different activities (notification of clinical cases, routine testing, meat inspection, follow-up investigations and tracing). Infected herds are reported by countries and regions that do not receive EU co-financing for eradication programmes.

**Positive herds** are herds with at least one positive animal during the reporting year, independent of the number of times the herds have been checked. Positive herds are reported from countries and regions that receive EU co-financing for eradication programmes.

During the years 2005-2010, the overall proportion of existing brucellosis-infected or -positive cattle herds in the EU steadily decreased to very low levels, and since 2007 it has been rare, with the proportion of positive herds in 2010 being 0.06 % (Figure BR5). The percentage of existing infected/positive herds in the non-OBF MSs also decreased between 2005 (0.24 %) and 2007 (0.12 %), after which the proportion stabilised until 2010 when there was a further slight decrease to 0.11 %.

When comparing data from all or non-OBF MSs (Figure BR5) it is worthwhile mentioning that the observed decrease from 2006 to 2007 was mainly due to the inclusion of data from Romania, which joined the EU in 2007 and had more than 1.2 million cattle herds (35 % of all herds in the EU in 2007), none of which were reported infected with bovine brucellosis.

***Figure BR5. Proportion of existing cattle herds infected with or positive for* Brucella*, 2005-2010*[1]**




1. Missing data from OBF MSs: Germany (2008), and non-OBF MSs: Hungary (2005), Malta (2006) and Lithuania (2007). Romania included data for the first time in 2007 and Bulgaria in 2008.

### OBF Member States and non-Member States

With the exception of one herd in Belgium, the infection was not detected in any cattle herd in the 15 OBF MSs, or in either Norway or Switzerland, during 2010.

### Non-OBF Member States and non-Member States

In 2010, the 12 non-OBF MSs reported a total population of 1,565,759 bovine herds, of which 0.11 % were found infected with or positive for bovine brucellosis, which was comparable to the level reported in 2007–2009.

In 2010, Greece was the only non-OBF MS without an EU co-financed eradication programme in which positive herds were detected. The percentage of positive existing cattle herds in Greece was 0.77 %; the level in 2009 was 0.81 %. The remaining five non-co-financed non-OBF MSs (Bulgaria, Hungary, Latvia, Lithuania and Romania) reported no positive cattle herds out of 1,120,758 existing bovine herds in 2010.

Bovine brucellosis infection remains a significant animal health problem in several areas of Greece. As an additional preventive measure intended to rapidly reduce the prevalence of bovine brucellosis, a vaccination policy using the RB-51 vaccine (*B. abortus* strain) was implemented in a specific high risk area (Thessaloniki), in order to facilitate the progress of the existing brucellosis eradication programme in bovine (dairy) herds. During 2010, 12,235 cattle from 124 bovine herds were vaccinated.

Overall, the percentage of existing positive herds in the non-OBF MSs with EU co-financed eradication programmes decreased compared with previous years (0.46 % in 2010 compared with 0.57 % in 2009 and 0.60 % in 2008) (Table BR3). The percentage of tested herds that were positive also decreased relative to previous years (0.71 % compared with 0.85 % in 2009 and 0.78 % in 2008). Two of the six non-OBF MSs with EU co-financed eradication programmes (Cyprus and Malta) reported no positive cattle herds in 2010. In Cyprus, 291 out of its 322 cattle herds have been declared officially brucellosis free. In the United

Kingdom (Northern Ireland), there was a very minor increase in both indicators, whereas in all the other co-financed non-OBF MSs (Italy, Portugal and Spain) both indicators decreased relative to 2009. As in the previous year, 2010, the highest proportion of existing positive herds was reported from the co-financed areas in Italy, although this prevalence is still considered to be very low.

In the co-financed non-OBF MSs with no OBF regions (Cyprus and Malta), the majority (89 %-100 %) of the existing cattle herds were under control programmes. For further details see level 3 tables.

***Table BR3.* Brucella *in cattle herds in six co-financed non-OBF Member States[1], 2008-2010***

| Non-officially free MSs | 2010 | | | | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|---|
| | No of existing herds | No of tested herds | No of positive herds | % existing herds positive | % tested herds positive | % existing herds positive | % tested herds positive | % existing herds positive | % tested herds positive |
| Cyprus | 361 | 281 | 0 | 0 | 0 | 0 | 0 | 0.29 | 0.35 |
| Ireland[2] | - | - | - | - | - | - | - | 0.09 | 0.10 |
| Italy[3] | 122,708 | 42,657 | 1,035 | 0.84 | 2.43 | 1.03 | 2.67 | 1.29 | 3.09 |
| Malta | 358 | 210 | 0 | 0 | 0 | 0 | 0 | - | - |
| Portugal[4] | 65,104 | 41,913 | 235 | 0.36 | 0.56 | 0.49 | 0.72 | 0.61 | 0.69 |
| Spain[5] | 131,603 | 115,248 | 229 | 0.17 | 0.20 | 0.27 | 0.32 | 0.35 | 0.40 |
| United Kingdom (Northern Ireland) | 25,933 | 22,531 | 77 | 0.30 | 0.34 | 0.29 | 0.33 | 0.72 | 0.82 |
| **Total (6 MSs in 2010)** | **346,067** | **222,840** | **1,576** | **0.46** | **0.71** | **0.57** | **0.85** | **0.60** | **0.78** |

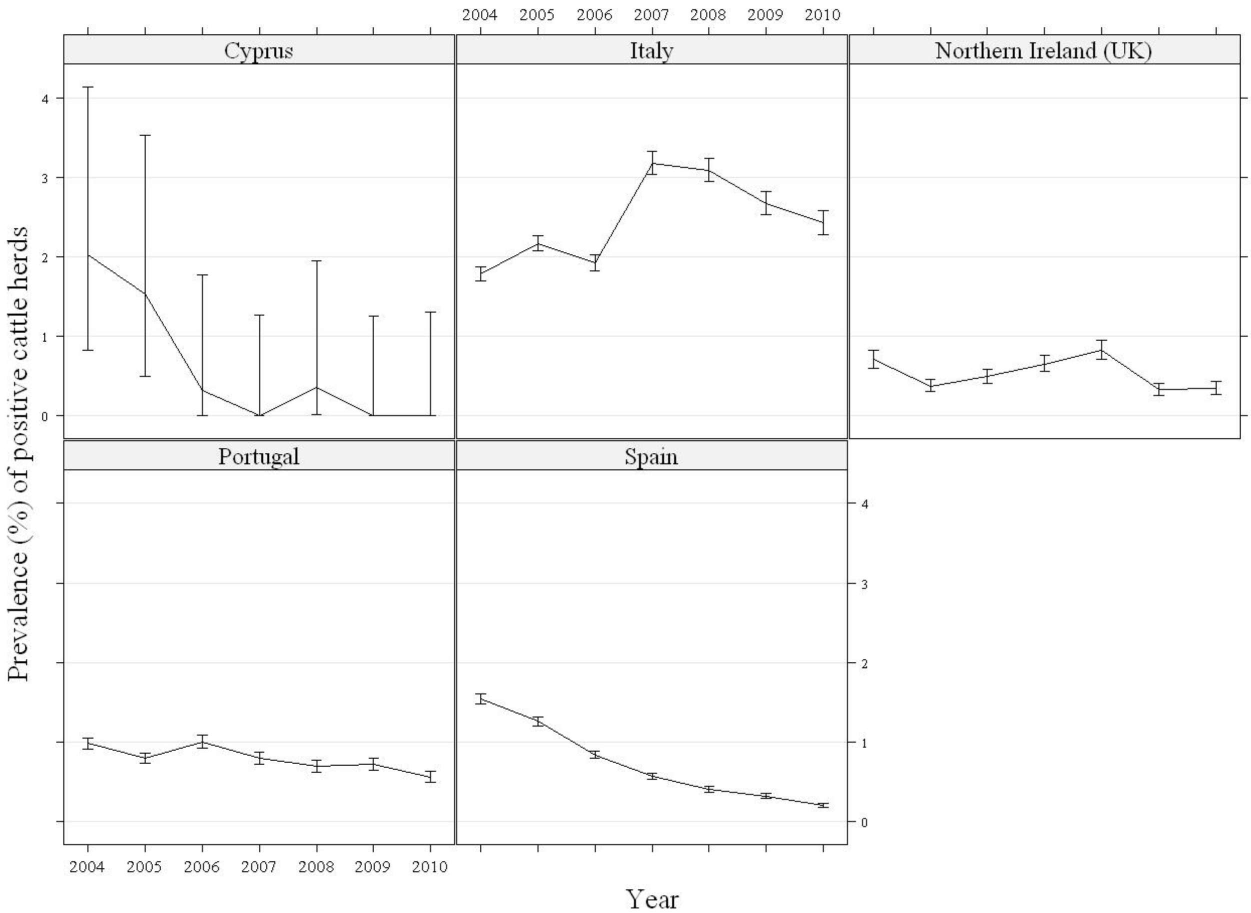
1. Only positive herds from regions that have co-financed eradication programmes are included, whereas existing herds include all herds in the MS.
2. Ireland was declared OBF during 2009 (Decision 2009/600/EC).
3. In Italy, 10 regions and six other provinces are officially brucellosis-free. In the provinces that are OBF or do not have a co-financed eradication programme, four of the 68,147 existing herds were found infected.
4. In Portugal, Madeira does not have a co-financed eradication programme, and the Azores islands of Santa Maria, Pico, Graciosa, Faial, Flores and Corvo are OBF. None of their 2,567 existing herds were found to be infected. No data were available for Madeira.
5. In Spain, the two provinces of the Canary Islands, Santa Cruz de Tenerife and Las Palmas, are OBF. None of their existing 1,105 herds tested positive during 2010 (no information provided regarding whether they were infected).

The MS specific trends in test-positive herds in five co-financed non-OBF MSs from 2004 to 2010 are shown in Figure BR6.

Since 2004, the prevalence of brucellosis test-positive cattle herds (the second epidemiological indicator) appears to have decreased or remained at a low level in most of the co-financed non-OBF MSs (Cyprus, Northern Ireland, Portugal and Spain). The exception is Italy, where a considerable increase in prevalence was observed between 2006 and 2007, which has been followed by a decrease since 2008. In Italy, several provinces have been declared OBF between 2004 and 2010, and in some other provinces the occurrence was so low that they did not receive co-financing for eradication programmes. Therefore, Italian data reflect the results of regions having the highest prevalence instead of the situation in the whole country.

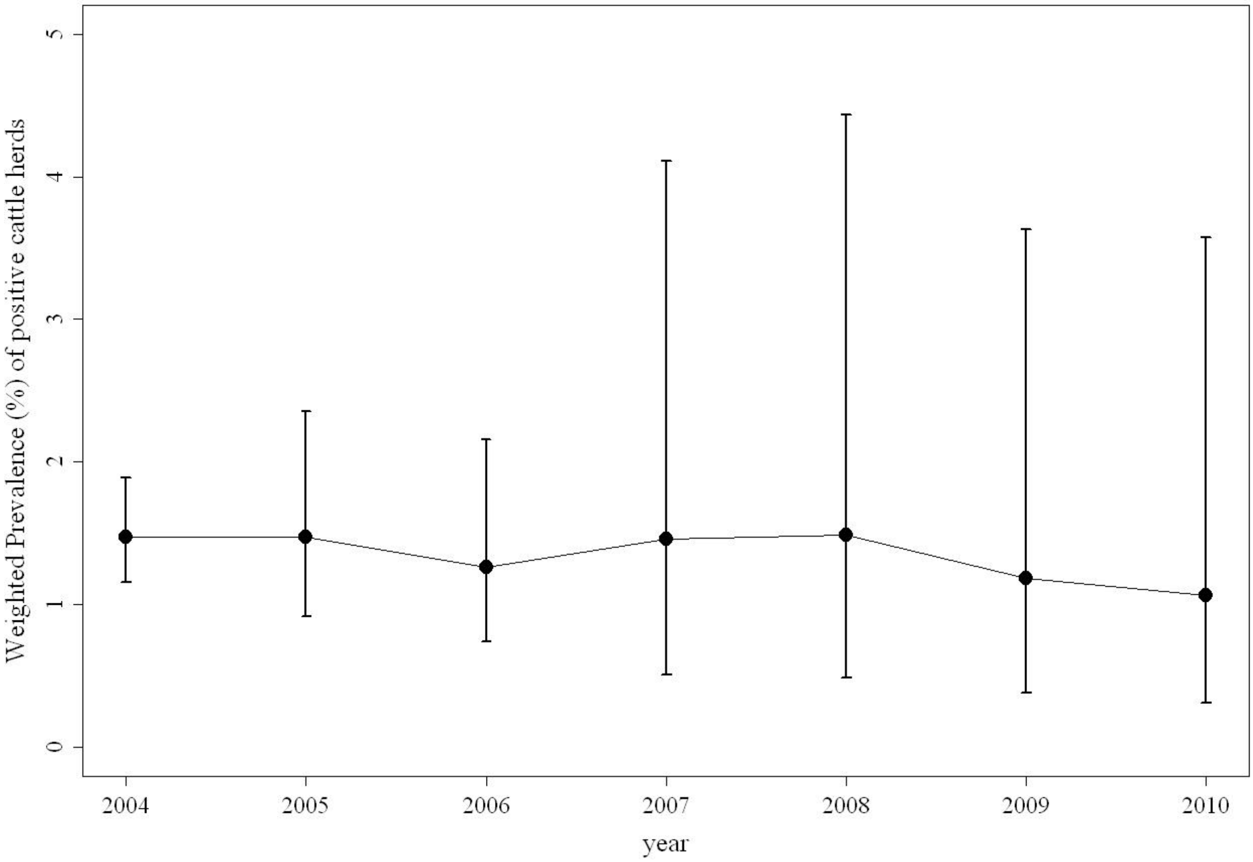
As shown in Figure BR7 and also confirmed by logistic regression analysis, no significant trend in the MS group weighted prevalence was observed from 2004 to 2010. See Chapter 6, Materials and methods, section 6.2, for a description of the statistical methodology.

***Figure BR6. Prevalence and 95 % confidence interval[1] of* Brucella *test-positive cattle herds, at Member State level, in five non-OBF co-financed Member states, 2004-2010***




1. Vertical bars indicate the exact binomial 95 % confidence interval.

***Figure BR7. Weighted prevalence[1] and 95 % confidence interval[2] of* Brucella *test-positive cattle herds, overall for five co-financed non-OBF Member States[3], 2004-2010***



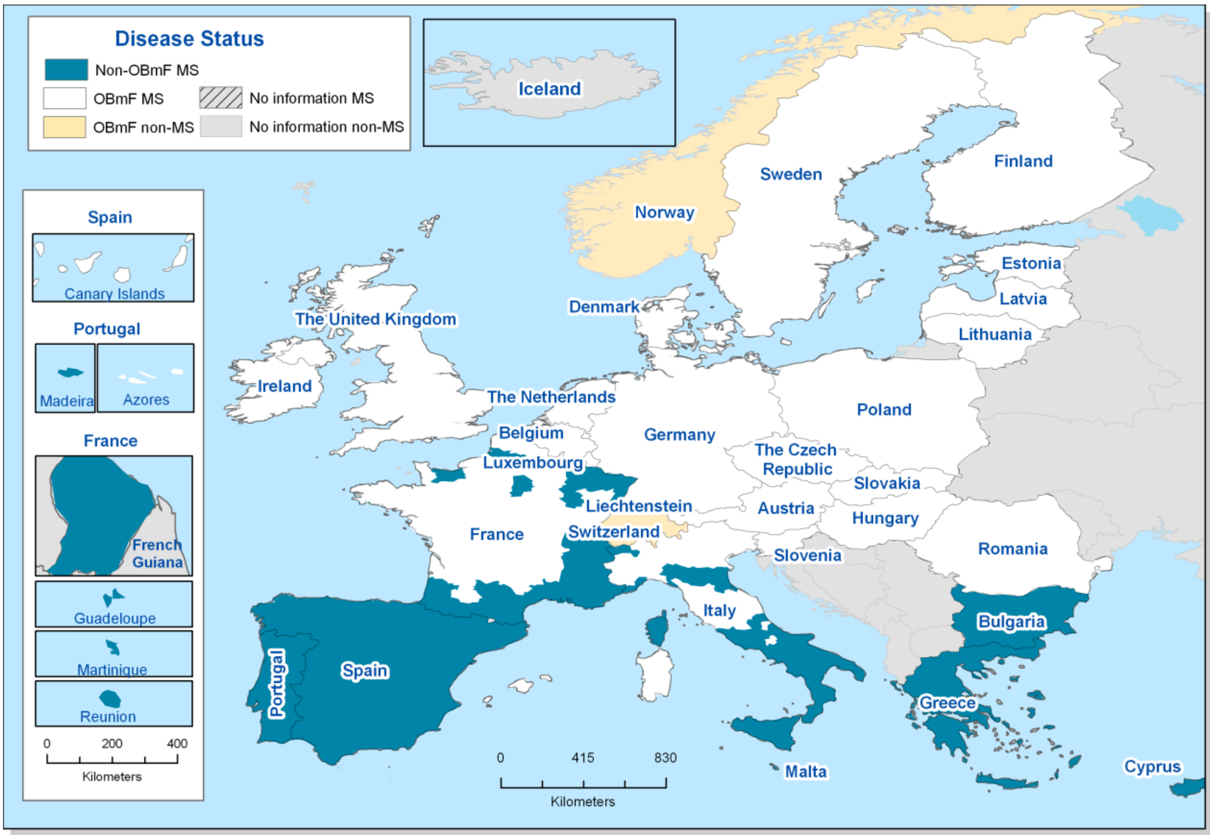

1. The MS group prevalence is estimated using weights. The MS specific weight is the ratio between the number of existing herds and the number of tested herds per MS per year.
2. Vertical bars indicate the 95 % confidence interval.
3. Include data from Cyprus, Italy, Northern Ireland (United Kingdom), Portugal, and Spain.

## Sheep and goats

The status of the countries regarding freedom from ovine and caprine brucellosis caused by *B. melitensis* (Officially *Brucella melitensis* Free, ObmF) and the occurrence of the disease in MSs and non-MSs in 2010 are presented in Figures BR8 and BR9. In 2010, as in 2009, Austria, Belgium, the Czech Republic, Denmark, Finland, Germany, Hungary, Ireland, Luxembourg, the Netherlands, Poland, Romania, Slovakia, Slovenia, Sweden and the United Kingdom, as well as Norway and Switzerland were ObmF in accordance with EU legislation. In addition, Estonia (Decision 2010/695/EC), Latvia (Decision 2010/695/EC) and Lithuania (Decision 2010/391/EC[48]) were granted status as ObmF during 2010. Moreover, in the non-MS Iceland, which has no special agreement concerning animal health (status) with the EU, brucellosis (*B. abortus, B. melitensis, B. suis*) has never been reported. Regions have been granted ObmF status in France (64 departments), Italy (10 regions and six provinces) and Portugal (the Azores Islands). In addition, in Spain, the two provinces of the Canary Islands were already ObmF, and the Balearic Islands were recognised as ObmF during 2010 (Decision 2010/695/EC).

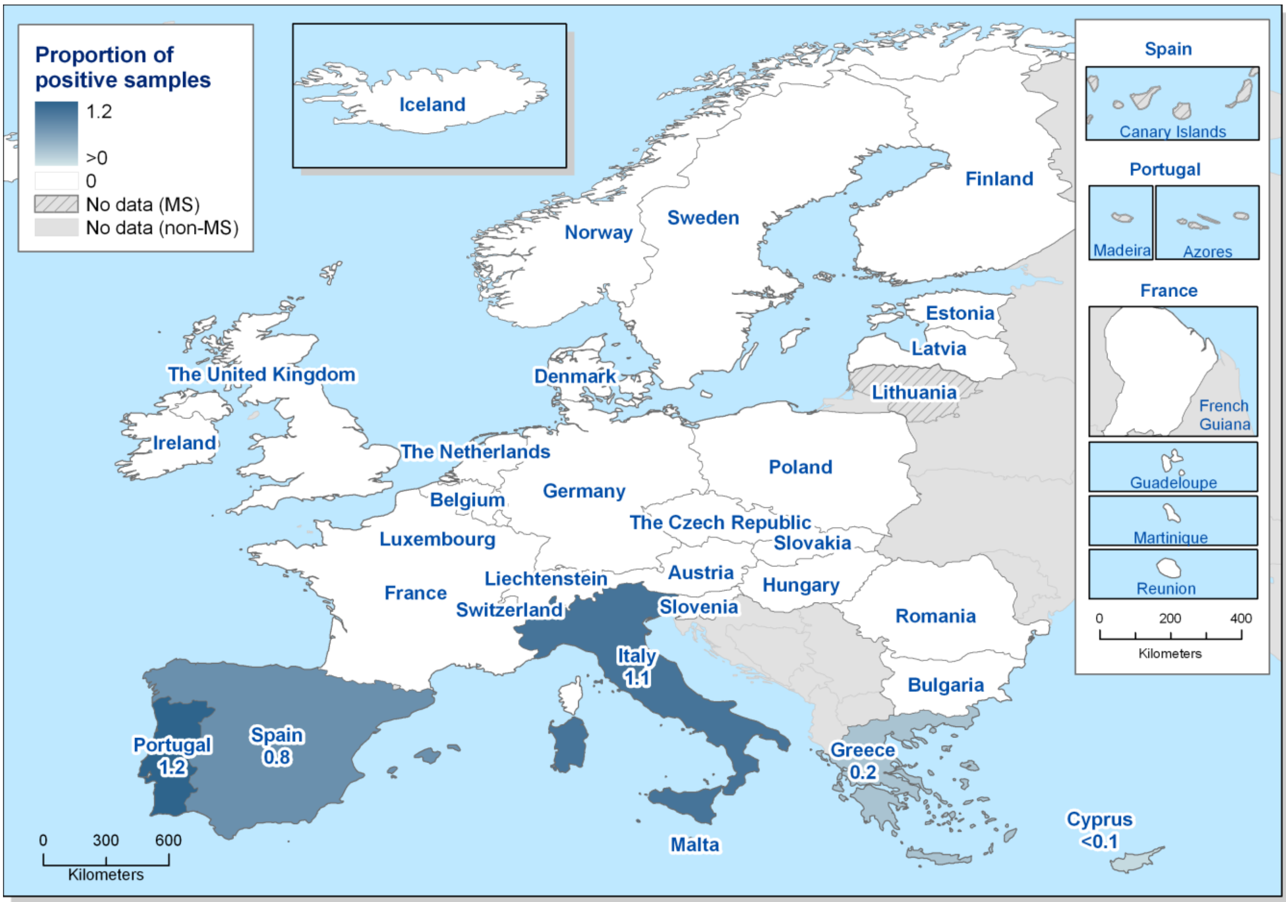
All data submitted by MSs are presented in the level 3 tables of the report.

***Figure BR8. Status of ovine and caprine brucellosis, 2010***



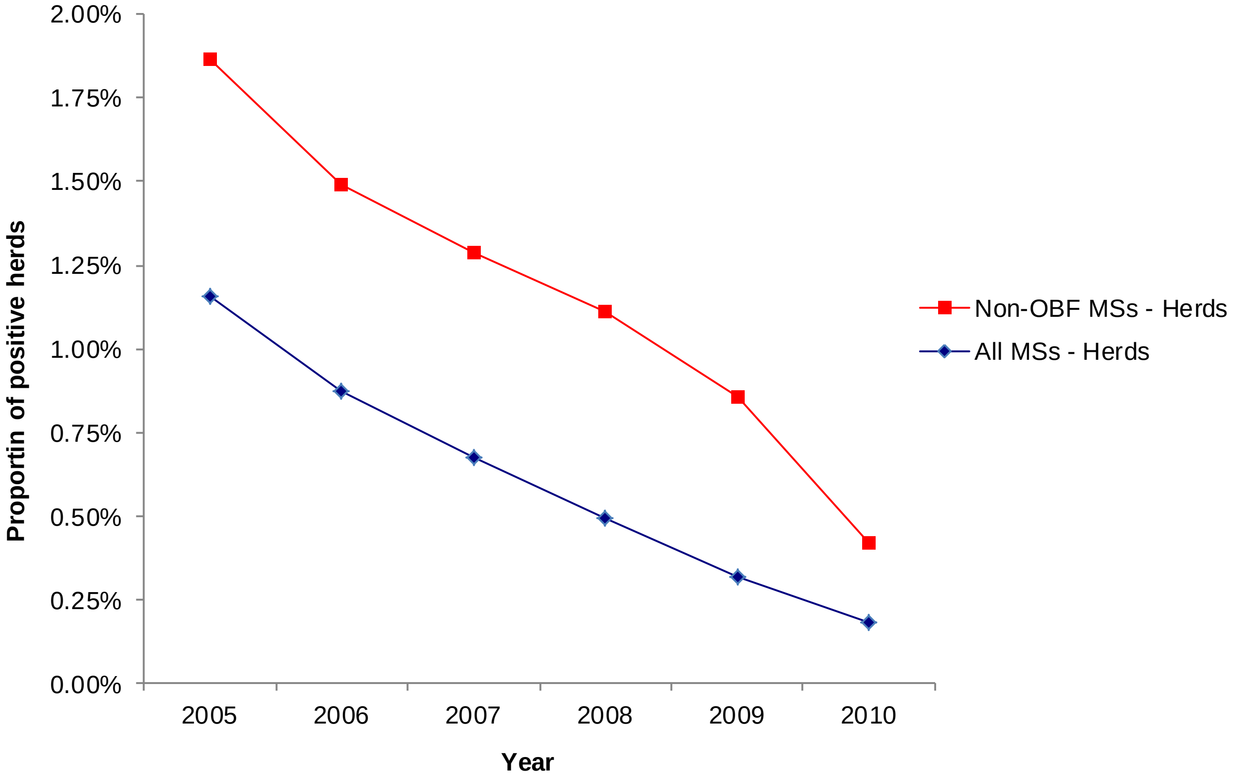

48 Commission Decision 2010/391/EC of 8 July 2010 amending the Annexes to Decision 93/52/EEC as regards the recognition of Lithuania and the region of Molise in Italy as officially free of brucellosis *(B. melitensis*) and amending the Annexes to Decision 2003/467/EC as regards the declaration of certain administrative regions of Italy as officially free of bovine tuberculosis, bovine brucellosis and enzootic-bovine-leukosis. OJ L 180, 15.7.2010, p. 21–25.

***Figure BR9. Proportion of existing sheep and goat herds infected with or positive for* Brucella*, country-based data, 2010***




During the years 2005-2010, the proportion of existing infected/positive sheep and goat herds infected with *B. melitensis* in the EU was at a very low level and decreased from 1.16 % in 2005 to 0.18 % in 2010. A comparable decreasing trend was observed for the proportion of existing infected/positive herds in the non-ObmF MSs, from 1.87 % in 2005 to 0.42 % in 2010 (Figure BR10).

***Figure BR10. Proportion of existing sheep and goat herds infected with or positive for* Brucella*, 2005-2010***




1. Missing data from Bulgaria (2005-2007), Germany (2005-2007), Hungary (2005), Lithuania (2005, 2007, 2010), Luxembourg (2005-2006, 2008-2009), Malta (2005-2006) and Romania (2005-2006, 2008). Romania reported data at animal level in 2008.

### ObmF Member States, non-Member States and regions

No positive herds were detected in the 19 ObmF MSs, or in Norway and Switzerland. Italy reported two infected herds from non-ObmF regions with ObmF provinces. However, these findings do not jeopardise the ObmF status of these provinces.

### Non-ObmF Member States

In 2010, the eight non-ObmF MSs reported a total of 711,564 sheep and goat herds, of which 0.42 % were found to be infected with or positive for *B. melitensis*. This was a substantial decrease compared with 2009 (0.86 %) and continues the steady decrease in the occurrence of *B. melitensis* observed in this group of MSs since 2005 (Figure BR10).

The four non-ObmF MSs without EU co-financed eradication programmes (Bulgaria, France, Greece and Malta) reported a total population of 409,227 existing ovine and caprine herds in 2010; Greece was the only one out of these four MSs that reported infected herds in 2010, with a total of 51 of their herds having been found to be infected.

For the implementation of the brucellosis control and eradication programme for sheep and goats, Greece is divided into two zones in which different policies and measures are applied. The eradication policy covers the islands, where the prevalence of the disease is low among sheep and goat flocks, and is based on test and slaughter of positive reactors. A control strategy is used on the mainland (as well as on some of the islands, including Lesvos and Leros) where the prevalence is higher, which involves mass vaccination with REV-1 vaccine of young and adult female small ruminants, as well as free range (semi-wild) bovines that are sharing common pastures with small ruminants in order to reduce the spread of *Brucella* infection in the field. During 2010, 682,700 sheep and goats from 26,440 flocks were vaccinated, as well as 9,239 cattle from 788 bovine herds.

Among the four non-ObmF MSs with EU co-financed eradication programmes in 2010 (Cyprus, Italy, Portugal and Spain), the overall percentage of both existing positive herds and tested positive herds decreased compared with 2009 and 2008 (Table BR4). Also, in the individual MSs in this group, both indicators decreased in all MSs relative to the levels in 2009. In 2010, existing positive herds were rare in Cyprus, at a very low level in Spain, and at low levels in Italy and Portugal. The proportion of herds testing positive was higher in Italy, whereas in Cyprus, Portugal and Spain the levels of this indicator were more comparable with the proportion existing positive herds. In Cyprus, 2,049 out of the 3,267 sheep and goat flocks are deemed ObmF.

***Table BR4.* Brucella *in sheep and goat herds in co-financed non-ObmF Member States[1], 2008-2010***

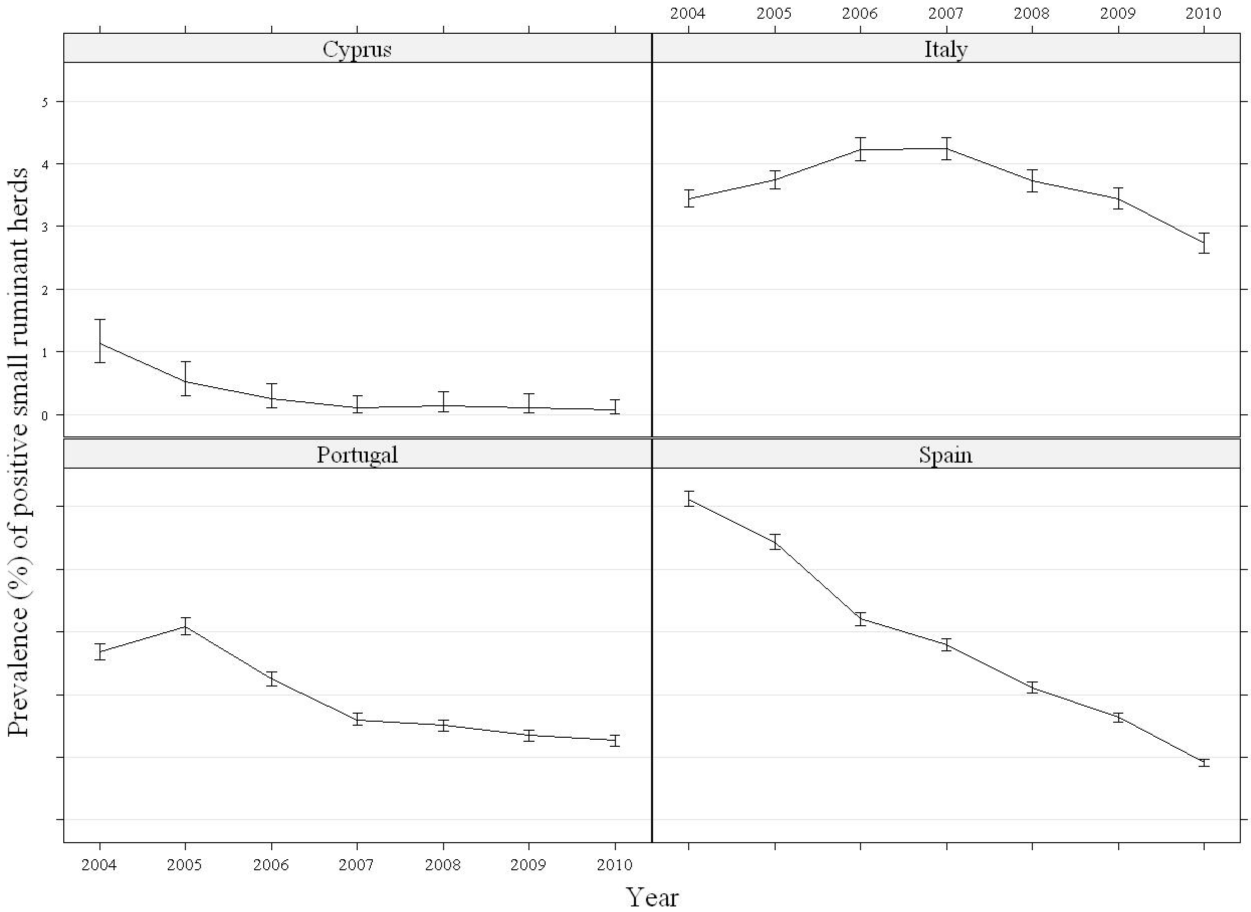
| Non-officially free MSs | 2010 | | | | | 2009 | | 2008 | |
|---|---|---|---|---|---|---|---|---|---|
| | No of existing herds | No of tested herds | No of positive herds | % existing herds positive | % tested herds positive | % existing herds positive | % tested herds positive | % existing herds positive | % tested herds positive |
| Cyprus | 3,327 | 3,007 | 2 | 0.06 | 0.07 | 0.09 | 0.11 | 0.11 | 0.14 |
| Greece | - | - | - | - | - | 0.10 | 3.36 | - | - |
| Italy [2] | 109,682 | 42,723 | 1,168 | 1.06 | 2.73 | 1.56 | 3.44 | 1.51 | 3.73 |
| Portugal [3] | 69,906 | 66,345 | 841 | 1.20 | 1.27 | 1.27 | 1.35 | 1.40 | 1.51 |
| Spain [4] | 119,422 | 106,181 | 942 | 0.79 | 0.89 | 1.47 | 1.64 | 1.94 | 2.11 |
| **Total (4 MSs in 2010)** | **302,337** | **218,256** | **2,953** | **0.98** | **1.35** | **1.33** | **1.90** | **1.64** | **2.23** |

1. Only tested and positive herds from regions that have co-financed eradication programmes are included. The number of existing herds includes all herds in the MS.
2. In Italy, 10 regions and six other provinces are officially free of *B. melitensis*. In the provinces that are ObmF, or do not have a co-financed eradication programme, two of the 60,406 existing herds were found to be infected.
3. In Portugal, the Azores are ObmF and Madeira is not co-financed. In the Azores, none of the 901 existing herds were found to be infected. No data were available for Madeira.
4. In Spain, the two provinces in the Canary Islands (Santa Cruz de Tenerife and Las Palmas) and the Balearic Islands are ObmF. In 2010, none of the 8,510 existing herds in these areas tested positive (no information provided regarding whether they were infected).

Since 2004, the prevalence of sheep and goat herds positive for *B. melitensis* has decreased in Cyprus, and more markedly in Spain. Following an increase between 2004 and 2005, a decrease was also observed in the proportion of positive tested herds in Portugal between 2005 and 2010. In Italy, an increase was observed from 2004 to 2006, which was followed by a continuous decrease up to, and including, 2010 (Figure BR11). This increase in positive tested herds was due to progress made in the eradication programme whereby the declared ObmF provinces and regions are no longer counted in co-financed programmes. Therefore, Italian data reflect the results of regions having the highest prevalence instead of the situation in the whole country.

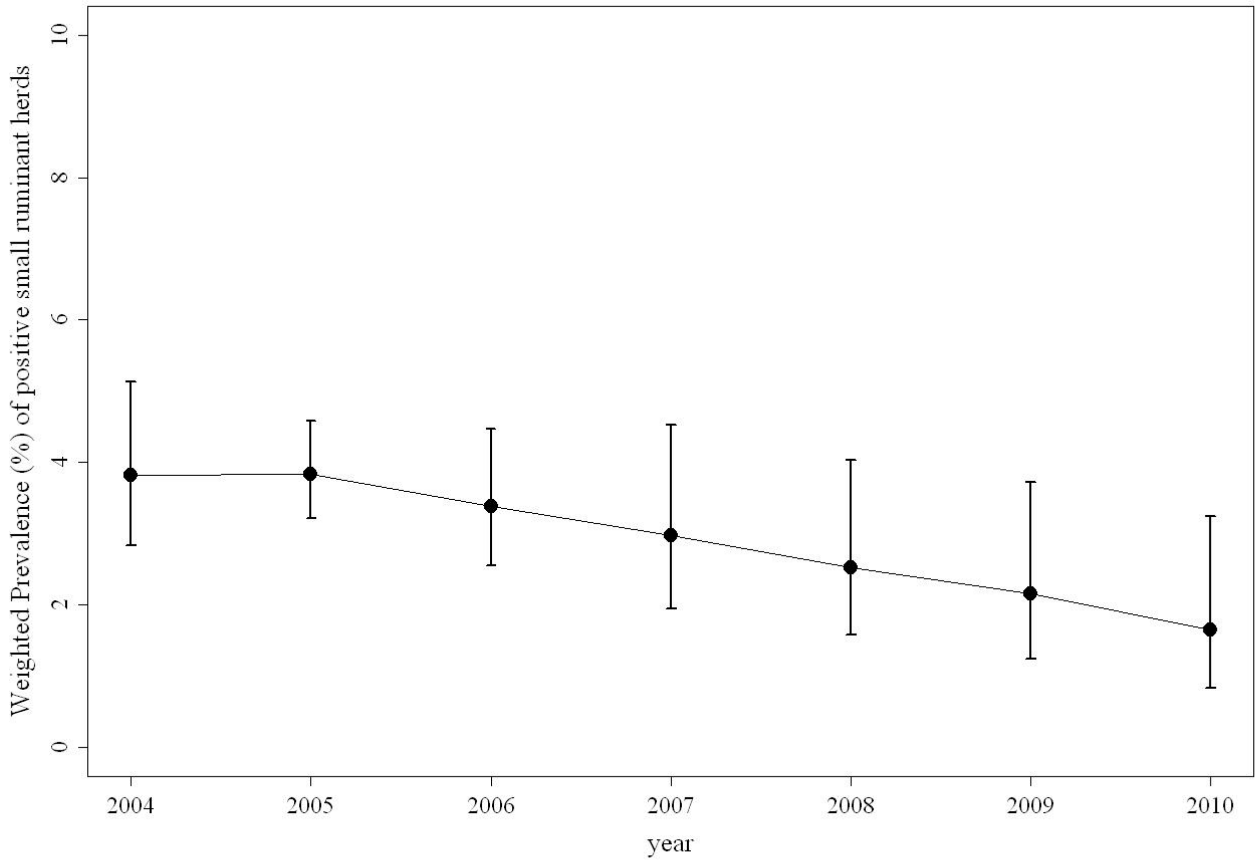
The MS-group weighted prevalence of *B. melitensis* significantly decreased from 2005 to 2010 (Figure BR12), as also confirmed by logistic regression analysis ($p=0.01$). If considering the period from 2004 to 2010, the decreasing trend was still borderline significant ($p=0.05$). See Chapter 6, Materials and methods, section 6.2, for a description of the statistical methodology.

***Figure BR11. Prevalence and 95 % confidence interval[1] of* B. melitensis *test-positive sheep and goat herds, at Member State level, in four non-ObmF co-financed Member States, 2004-2010***




1. Vertical bars indicate the exact binomial 95 % confidence interval.

***Figure BR12. Weighted prevalence[1] and 95 % confidence interval[2] of* B. melitensis *test-positive sheep and goat herds, overall for four co-financed non-ObmF Member States[3], 2004-2010***




1. The MS group prevalence is estimated using weights. The MS-specific weight is the ratio between the number of existing herds and the number of tested herds per MS per year.
2. Vertical bars indicate the 95 % confidence interval.
3. Includes data from Cyprus, Italy, Portugal, and Spain.

## Other animals

In 2010, 21 MSs and two non-MSs provided data on the occurrence of *Brucella* spp. in animals other than cattle, goats and sheep (Table BR5). The data originated from a wide range of sources including clinical investigations, surveillance, monitoring, surveys and control and eradication programmes. In addition, results from other specific local studies are reported for smaller numbers of animals.

The most intensively sampled animal species in 2010 was pigs: 18 MSs and two non-MSs Norway and Switzerland submitted data concerning *Brucella* in this species. A total of 514,177 pigs were tested throughout the EU with a total proportion positive to *Brucella* of 0.11 %. Only three of the MSs reported positive findings. France reported 12 outbreaks identified by clinical investigations and which occurred in farms that were not raised under controlled housing conditions. Eleven outbreaks were confirmed by isolation of *B. suis* biovar 2, whereas the twelfth outbreak was investigated by serology only. Out of 513 animals tested in these 12 farms, 164 were seropositive (32 %). Latvia reported a proportion of seropositives of 1.8 % in 22,429 animals tested. In addition, 21 herds of pigs were tested by Italy, of which two tested positive; one was positive for *Brucella* spp. and the second one positive for *B. suis*.

The second highest number of samples originated from Italian water buffalo: 297,971 animals and 2,018 herds were tested with a low occurrence of 2.1 % and 7.2 %, respectively. All positive animals and herds were reported as positive for *Brucella* spp.

Wild boar were also relatively intensively sampled in 2010, with five MSs (Germany, Italy, Latvia, Portugal and Spain) testing a total of 9,020 animals. A large proportion of the sampling was undertaken by Germany and Spain (68 % and 23 % respectively). Most countries reported a low proportion of positive samples, covered by non-clinical investigation sampling. France reported 12 positive samples. But since these were 12 strains confirmed by the French national reference laboratory (NRL), these results are not representative of the national situation. The results of any other analyses performed in France on wild boar samples in 2010, for which no confirmation was needed by the NRL, are not known. Germany was responsible for the vast majority (93 %) of positive findings from wild boar and reported most of its data as *Brucella* spp.; other countries mainly reported *B. suis,* and Spain also reported that it had isolated *B. abortus* (seven cases), apart from *B. suis* (10 cases), from 17 positive cases (out of a total of 2089) hunted wild boars. However, the percentages are unlikely to be fully comparable as some countries used bacteriological testing and others used serological methods.

Six MSs (Italy, Lithuania, the Netherlands, Portugal, Slovakia and Spain) reported data for deer in 2010. A total of 2,928 animals were tested, 89 % of which were from Spain. Spain was the only country to report any positive deer, with three animals reported as positive for *Brucella* spp.

Five MSs (the Czech Republic, Denmark, France, Italy, and Slovakia) tested hares. Eleven hares were identified as positive for *B. suis* by the Czech Republic. France reported six hares positive to *B. suis*. But since these were six samples with strains confirmed by the French NRL, these results are not representative of the national situation.

Four MSs (Ireland, Latvia, Poland and Slovakia) and one non-MS (Switzerland) reported data for either horses or domestic solipeds in 2010. In total, 126 animals were tested in these countries and none of them were found to be positive for *Brucella*. In addition, a total of 56 alpacas were tested by two MSs (Belgium and Italy) and two non-MSs, and 18 llamas were tested by two other MSs (the Netherlands and Romania); none of these animals was positive for *Brucella*.

Four MSs (Estonia, Italy, Romania and Slovakia) plus two non-MSs (Norway and Switzerland) submitted data concerning *Brucella* in dogs. A total of 206 animals were tested in these countries; 42 % of the animals were from Romania and 27 % were from Italy. Eight dogs were found to be (sero)positive to *Brucella* spp.:six in Italy and two in Romania. Slovakia tested three cats in 2010, and none of these was found to be infected with *Brucella*.

Six MSs (Estonia, Latvia, Poland, Portugal, Romania, and Slovakia) tested zoo animals for *Brucella* in 2010. A total of 180 animals were tested, 59 % of which were from Latvia. None of these animals tested positive for *Brucella*.

A range of other animal species were tested in 2010 with no positive results, including camels, Cantabrian chamois, capricorns, dolphins, dromedaries, land game mammals, marine mammals, mouflon, rabbits and unspecified wild animals.

***Table BR5.* Brucella *in species other than cattle, sheep and goats***

| Country | Species | Sampling context | Sampling unit | Number tested | Number positive | % pos |
|---|---|---|---|---|---|---|
| Belgium (OBF/ObmF) | Alpacas | - | Animal | 32 | 0 | 0 |
| | Pigs | - | Animal | 179 | 0 | 0 |
| Bulgaria | Pigs | - | Animal | 96,123 | 0 | 0 |
| Czech Republic (OBF/ObmF) | Hares | - | Animal | 88 | 5 | 5.7 |
| Denmark (OBF/ObmF) | Hares | Clinical investigations | Animal | 1 | 0 | 0 |
| | Pigs | Clinical investigations | Animal | 105 | 0 | 0 |
| | | Control and eradication programmes | Animal | 14,743 | 0 | 0 |
| Estonia (OBF/ObmF) | Dogs | - | Animal | 9 | 0 | 0 |
| | Pigs | Control and eradication programmes | Animal | 855 | 0 | 0 |
| | | - | Animal | 4,819 | 0 | 0 |
| | Zoo animals | - | Animal | 26 | 0 | 0 |
| Finland (OBF/ObmF) | Pigs | - | Animal | 2,816 | 0 | 0 |
| France (OBF)[1] | Hares | Surveillance | Animal | unknown | 6 | - |
| | Pigs | Clinical investigations | Animal | 513 | 164 | 32 |
| | Wild boars | Surveillance | Animal | unknown | 12 | - |
| Germany (OBF/ObmF) | Pigs | - | Animal | 22,563 | 0 | 0 |
| | Wild boars | - | Animal | 6,129 | 910 | 14.8 |
| Ireland (OBF/ObmF) | Pigs | Clinical investigations | Animal | 1 | 0 | 0 |
| | Solipeds, domestic | Clinical investigations | Animal | 4 | 0 | 0 |
| Italy | Alpacas | Control and eradication programmes | Animal | 8 | 0 | 0 |
| | Cantabrian chamois | National survey | Animal | 42 | 0 | 0 |
| | Deer | Clinical investigations | Animal | 13 | 0 | 0 |
| | | National survey | Animal | 127 | 0 | 0 |
| | Dogs | Clinical investigations | Animal | 28 | 0 | 0 |
| | | Control and eradication programmes | Animal | 15 | 0 | 0 |
| | | National survey | Animal | 12 | 6 | 50.0 |
| | Hares | National survey | Animal | 10 | 0 | 0 |
| | Mouflons | Clinical investigations | Animal | 12 | 0 | 0 |
| | Pigs | Clinical investigations | Herd | 17 | 1 | 5.9 |
| | | Control and eradication programmes | Animal | 19 | 0 | 0 |
| | | | Herd | 4 | 1 | 25.0 |
| | | National survey | Animal | 23 | 0 | 0 |
| | Water buffalos[2] | Clinical investigations | Animal | 24 | 0 | 0 |
| | | Control and eradication programmes | Animal | 297,971 | 6,328 | 2.1 |
| | | | Herd | 2,018 | 145 | 7.2 |
| | | National survey | Animal | 88 | 0 | 0 |
| | Wild animals | Control and eradication programmes | Animal | 39 | 0 | 0 |
| | | National survey | Animal | 15 | 0 | 0 |
| | Wild boars | Clinical investigations | Animal | 20 | 0 | 0 |
| | | Control and eradication programmes | Animal | 380 | 15 | 3.9 |
| | | National survey | Animal | 168 | 4 | 2.4 |
| Latvia (ObmF) | Pigs | - | Animal | 22,429 | 412 | 1.8 |
| | Solipeds, domestic | - | Animal | 1 | 0 | 0 |
| | Wild boars | Monitoring | Animal | 137 | 12 | 8.8 |
| | Zoo animals | - | Animal | 106 | 0 | 0 |
| Lithuania (ObmF) | Deer | - | Animal | 22 | 0 | 0 |
| | Pigs | - | Animal | 316,564 | 0 | 0 |
| Luxembourg (OBF/ObmF) | Pigs | - | Animal | 125 | 0 | 0 |

Table continued overleaf.

***Table BR5 (continued).* Brucella *in species other than cattle, sheep and goats***

| Country | Species | Sampling context | Sampling unit | Number tested | Number positive | % pos |
|---|---|---|---|---|---|---|
| Netherlands (OBF/ObmF) | Deer | Control and eradication programmes | Animal | 32 | 0 | 0 |
| | Llamas | Control and eradication programmes | Animal | 16 | 0 | 0 |
| | Pigs | Control and eradication programmes | Animal | 6,310 | 0 | 0 |
| Poland (OBF/ObmF) | Camels | Control and eradication programmes | Animal | 1 | 0 | 0 |
| | Horses | Survey | Animal | 6 | 0 | 0 |
| | Pigs | Survey | Animal | 5 | 0 | 0 |
| | | - | Animal | 7,288 | 0 | 0 |
| | Zoo animals | Control and eradication programmes | Animal | 28 | 0 | 0 |
| Portugal | Deer | - | Animal | 63 | 0 | 0 |
| | Pigs | - | Animal | 7 | 0 | 0 |
| | Wild boars | - | Animal | 85 | 5 | 5.9 |
| | Zoo animals | - | Animal | 5 | 0 | 0 |
| Romania (ObmF) | Camels | Clinical investigations | Animal | 11 | 0 | 0 |
| | Dogs | Clinical investigations | Animal | 86 | 2 | 2.3 |
| | Dolphin | Clinical investigations | Animal | 1 | 0 | 0 |
| | Llamas | Clinical investigations | Animal | 2 | 0 | 0 |
| | Pigs | - | Animal | 12,513 | 0 | 0 |
| | Rabbits | Clinical investigations | Animal | 55 | 0 | 0 |
| | Zoo animals | Clinical investigations | Animal | 3 | 0 | 0 |
| Slovakia (OBF/ObmF) | Capricorns | Monitoring | Animal | 7 | 0 | 0 |
| | Cats | Monitoring | Animal | 3 | 0 | 0 |
| | Deer | Monitoring | Animal | 68 | 0 | 0 |
| | Dogs | Monitoring | Animal | 28 | 0 | 0 |
| | Hares | Monitoring | Animal | 61 | 0 | 0 |
| | Horses | Monitoring | Animal | 107 | 0 | 0 |
| | Land game mammals | Monitoring | Animal | 10 | 0 | 0 |
| | Mouflons | Monitoring | Animal | 18 | 0 | 0 |
| | Other animals | Monitoring | Animal | 29 | 0 | 0 |
| | Pigs | Monitoring | Animal | 2,708 | 0 | 0 |
| | Zoo animals | Monitoring | Animal | 12 | 0 | 0 |
| Spain | Cantabrian chamois | - | Animal | 150 | 0 | 0 |
| | Deer | - | Animal | 2,603 | 3 | 0.1 |
| | Dromedaries | Monitoring | Animal | 403 | 0 | 0 |
| | Wild boars | - | Animal | 2,089 | 17 | 0.8 |
| Sweden (OBF/ObmF) | Pigs | - | Animal | 2,262 | 0 | 0 |
| United Kingdom (OBF[3]/ObmF) | Marine mammals | - | Animal | 30 | 0 | 0 |
| **Total (21 MSs)** | | | | **826,548** | **8,048** | **1.0** |
| Norway (OBF/ObmF) | Alpacas | - | Animal | 14 | 0 | 0 |
| | Dogs | - | Animal | 27 | 0 | 0 |
| | Pigs | - | Animal | 1,168 | 0 | 0 |
| Switzerland (OBF/ObmF) | Alpacas | Clinical investigations | Animal | 2 | 0 | 0 |
| | Buffalos | Clinical investigations | Animal | 1 | 0 | 0 |
| | Dogs | Clinical investigations | Animal | 1 | 0 | 0 |
| | Other animals | Clinical investigations | Animal | 3 | 0 | 0 |
| | Pigs | Clinical investigations | Animal | 18 | 0 | 0 |
| | Solipeds, domestic | Clinical investigations | Animal | 8 | 0 | 0 |
| | Wild animals | Clinical investigations | Animal | 6 | 0 | 0 |

Note: Data presented include sample size <25.
1. These were all suspect samplings. Analyses were done by the French NRL. The proportion of positive samples is not a prevalence as no data were available regarding the total number of analyses performed throughout France and the total number of negative ones.
2. Although buffalo are bovine animals, data reported in this table were not included by Italy in the section on cattle.
3. In the United Kingdom, Great Britain is OBF.

### 3.7.4 Discussion

Brucellosis is a rare infection in humans in the EU and has followed a significant five-year decreasing trend since 2006. In 2010, there were 356 confirmed human cases; 74 % of those cases were reported by three southern MSs that have not yet eradicated brucellosis in ruminants. This decline in brucellosis cases in humans is thought to be due to a decrease in the number of brucellosis-infected cattle, sheep and goat herds in the EU.

In contrast to previous years, there were no *Brucella* findings in raw milk, cheese or dairy products in 2010. However, fewer MSs reported on *Brucella* in foodstuffs and the number of reported samples tested was lower than in previous years. The fact that a strong evidence food-borne outbreak (involving three hospitalised cases) in a non-OBF/non-ObmF MS caused by cheese was reported in 2010 indicates that the health risk related to these foodstuffs is still relevant, particularly in the MSs that are not free of animal brucellosis.

Concomitantly with the significant decreasing EU-trend in human brucellosis cases, the prevalence of both bovine and small ruminant brucellosis has continued to decrease within the EU, although the decline in the latter has been notably more substantial. Both bovine and small ruminant brucellosis-infected herds seem to be geographically concentrated in southern European MSs. In 2010, brucellosis has become a rare event at the EU level in cattle herds (0.06 %) while the prevalence in sheep and goat herds is at very low level (0.18 %). Also in non-OBF MSs and in non-ObmF MSs a decreasing trend has been observed in brucellosis since 2005. The decrease in *Brucella* prevalence in sheep and goat herds in co-financed non-ObmF MSs was statistically significant for the years 2005-2010. Much of the overall decrease at EU-level as well as within co-financed MSs appears to have been driven by Italy and Spain.

The lack of a more important decrease in the prevalence of bovine brucellosis, as opposed to small ruminant brucellosis, might reflect diminishing returns from disease surveillance and mitigation measures when prevalence is very low (<0.1 %), whereas the prevalence of *Brucella* in sheep and goat herds is at a somewhat higher, but still very low level. At such a low prevalence it may become increasingly difficult to detect and remove infected animals before they have the opportunity to transmit the infection.

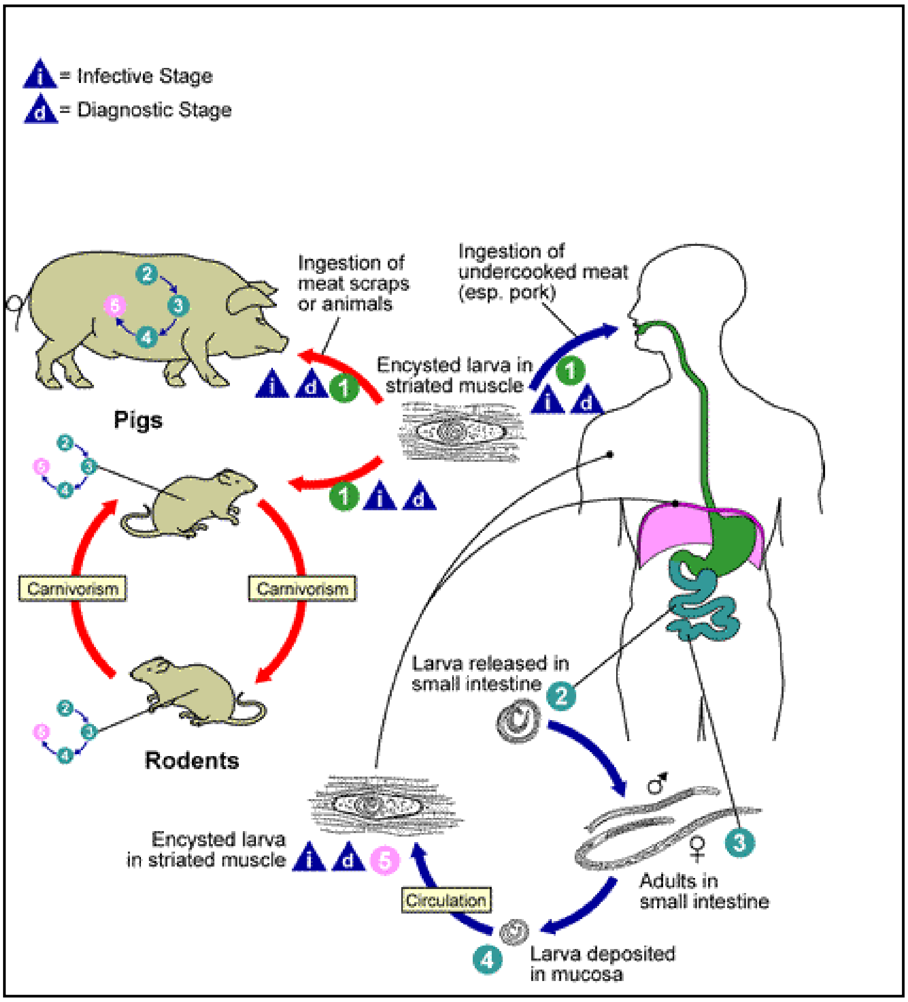
*B. suis*-positive samples were reported from pigs (three MSs), wild boar (six MSs) and hares (two MSs). Also it was notable that one non-OBF MS reported cases of *B. abortus* in wild boar.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.8 *Trichinella*

Trichinellosis is a zoonotic disease caused by parasitic nematodes of the genus *Trichinella*. The parasite has a wide range of host species, mostly mammals. *Trichinella* spp. undergo all stages of the life cycle, from larva to adult, in the body of a single host (Figure TR1).

***Figure TR1. Life cycle of* Trichinella**




Source: www.dpd.cdc.gov/dpdx

In Europe, trichinellosis has been described as an emerging and/or re-emerging disease during the past decades. Worldwide, eight species and three genotypes have been described: *T. spiralis, T. nativa, T. britovi, T. murelli, T. nelsoni, T. pseudospiralis, T. papuae and T. zimbabwensis, Trichinella* T6, *Trichinella* T8 and *Trichinella* T9. The majority of human infections in Europe are caused by *T. spiralis, T. britovi* and *T. nativa*, while a few cases caused by *T. pseudospiralis* and *T. murelli* have also been described.

Humans typically acquire the infection by eating raw or inadequately cooked meat contaminated with infectious larvae. The most common sources of human infection are pig meat, wild boar meat and other game meat. Horse, dog and many other animal meats have also transmitted the infection. Horse meat was identified as the source of infection in a number of human outbreaks recorded in the EU from the mid-1970s until 2005, including some of the largest outbreaks recorded in decades. Freezing of the meat minimizes the infectivity of the parasite, even though some *Trichinella* species/genotypes (*T. nativa, T. britovi* and *Trichinella* genotype T6) have demonstrated resistance to freezing in game meats.

The clinical signs of acute trichinellosis in humans are characterised by two phases. The first phase of trichinellosis symptoms may include nausea, diarrhoea, vomiting, fatigue, fever and abdominal discomfort. However, this phase is often asymptomatic. Thereafter, a second phase of symptoms including muscle pains, headaches, fever, swelling of the eyes, aching joints, chills, cough, itchy skin and diarrhoea or constipation may follow. In more severe cases, difficulties with coordinating movements as well as heart and breathing problems may occur. A small proportion of people die from trichinellosis infection. Systematic clinical signs usually appear about 8-15 days after consumption of contaminated meat.

An overview of the data reported in 2010 is presented in the following tables and figures.

***Table TR1. Overview of countries reporting data on* Trichinella *spp., 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 25 | **All MSs** except DK and IT<br>**Non-MSs:** CH, IS |
| Animal | 27 | **All MSs**<br>**Non-MSs**: CH, NO |

### 3.8.1 Trichinellosis in humans

The number of reported trichinellosis cases in humans is presented in Table TR2. In 2010, there were 394 reported cases of trichinellosis of which 56.6 % (223 cases) were reported as confirmed. This difference in case classification reporting may be because in an outbreak only one or two clinical cases out of the total number are laboratory confirmed and the rest are considered epidemiologically linked to the confirmed case or cases. In 2010, the case fatality ratio for human trichinellosis was zero.

In 2010, confirmed cases of trichinellosis decreased remarkably by 70.2 % compared with 2009 (Table TR2). The greatest decreases were reported in Bulgaria and Romania, where the number of confirmed cases decreased by 96.6 % and 69.1 %, respectively. Despite the sharp decrease in the number of confirmed cases in Romania, this country still reported the most cases in the EU in 2010. The largest increase was observed in Lithuania where the number of reported confirmed cases (77 cases) increased by 285 % compared with 2009 (20 cases). Lithuania and Romania accounted for 71.3 % of all confirmed reported cases in 2010. The large number of cases in Lithuania and Romania can partly be explained by the reported food-borne outbreaks in Romania (three outbreaks with a total of 145 cases), and Lithuania (six outbreaks with a total of 77 cases).

In 2010, *T. spiralis* was the most common species reported, accounting for 38 out of 65 (58.5 %) confirmed cases in which the species was reported as other than unknown or missing. In 27 of the confirmed cases, species other than *T. spiralis* were detected. In 2010, no cases due to *T. nativa* or *T. pseudospiralis* were reported. Overall, information was provided on the species for 29.1 % of the confirmed cases.

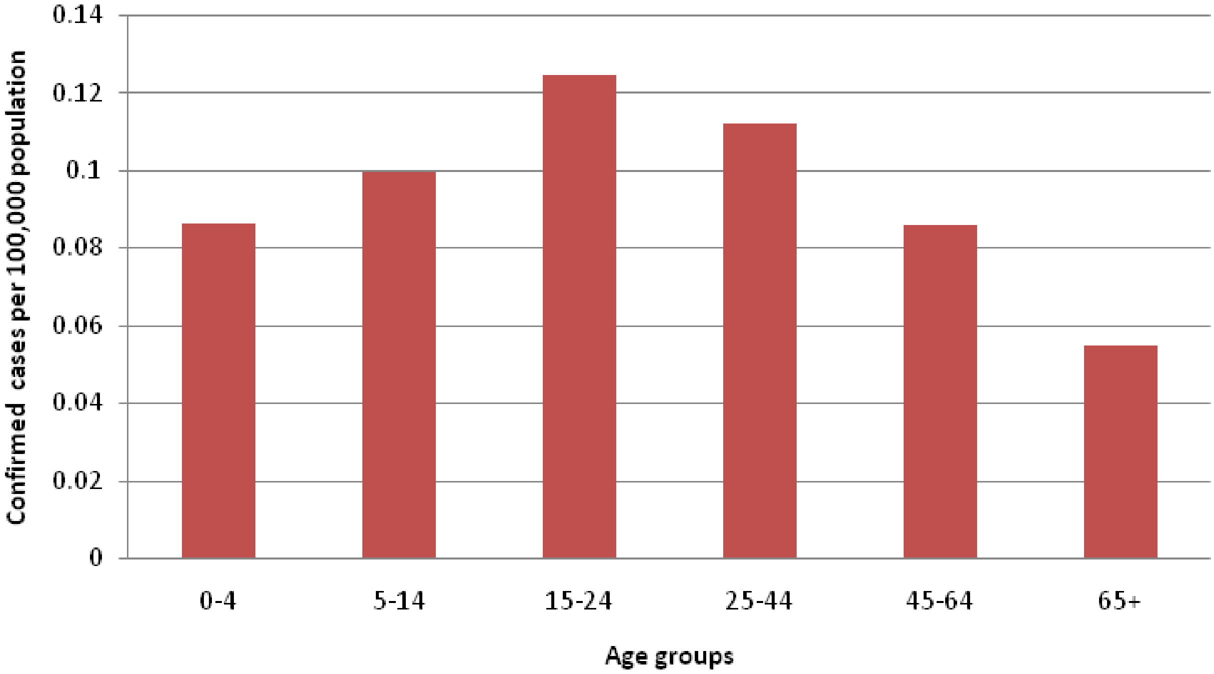
The highest incidence of reported cases occurred in the age group 15-24 years old followed by 25-44 years old (0.12 and 0.11 per 100,000 population, respectively) (Figure TR2). There were nine confirmed cases with an overall incidence of 0.09 per 100,000 in children aged 0-4 years old reported from Lithuania (four), Poland (one) and Romania (four). Of cases infected through food, consumption of pork was the main suspected vehicle in 90.1 % of confirmed trichinellosis cases in which the source was reported (N=304). Other meat and other wild/game meat accounted for the remainder.

*Table TR2. Reported cases of trichinellosis in humans 2006-2010, and notification rate for confirmed cases, 2010*

| Country | 2010 | | | | 2009 | 2008 | 2007 | 2006 |
|---|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases (Imported) | Confirmed cases/ 100,000 | Total confirmed cases (Imported) | | | |
| Austria | C | 5 | 5 (2) | 0.06 | 0 | 0 | 0 | 0 |
| Belgium | A | 3 | 3 | 0.03 | 0 | 5 | 3 | - |
| Bulgaria | A | 16 | 14 | 0.19 | 407 | 67 | 62 | 180 |
| Cyprus | U | 0 | 0 | 0 | 0 | 0 | 0 | - |
| Czech Republic | U | 0 | 0 | 0 | 0 | 0 | 0 | - |
| Denmark | -[2] | - | - | - | - | - | - | - |
| Estonia | U | 0 | 0 | 0 | 0 | 0 | 0 | - |
| Finland | U | 0 | 0 | 0 | 0 | 0 | 0 | - |
| France | U | 0 | 0 | 0 | 9 (9) | 3 | 1 (1) | 10 |
| Germany | C | 3 | 3 (1) | <0.01 | 1 | 1 (1) | 10 (7) | 22 (1) |
| Greece | C | 4 | 4 | 0.04 | - | 0 | 0 | - |
| Hungary | U | 0 | 0 | 0 | 9 (1) | 5 (3) | 2 (2) | - |
| Ireland | U | 0 | 0 | 0 | 0 | 0 | 2 (2) | 0 |
| Italy | - | - | - | - | 1 | 0 | 1 | - |
| Latvia | C | 9 | 9 | 0.40 | 9 | 4 | 4 | 11 |
| Lithuania | A | 77 | 77 | 2.31 | 20 | 31 | 8 | 20 |
| Luxembourg | U | 0 | 0 | 0 | 0 | 0 | - | - |
| Malta | U | 0 | 0 | 0 | 0 | 0 | 0 | - |
| Netherlands | U | 0 | 0 | 0 | 1 | 1 (1) | 0 | - |
| Poland | C | 51 | 14 | 0.04 | 18 | 4 | 217 | 89 |
| Portugal | C | 0 | 0 | 0 | 0 | 0 | 0 | - |
| Romania | C | 214 | 82 | 0.38 | 265 | 503 | 432 | 350 |
| Slovakia | C | 2 | 2 | 0.04 | 0 | 18 | 8 | 5 |
| Slovenia | U | 0 | 0 | 0 | 1 (1) | 1 (1) | 0 | 1 |
| Spain | C | 10 | 10 | 0.02 | 7 | 27 | 29 | 18 |
| Sweden | U | 0 | 0 | 0 | 0 | 0 | 1 | - |
| United Kingdom | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **EU Total** | | **394** | **223 (3)** | **0.05** | **748 (11)** | **670 (6)** | **780 (12)** | **706 (1)** |
| Iceland | -[2] | - | - | - | - | - | - | - |
| Norway | U | 0 | 0 | 0 | 0 | 0 | 0 | - |
| Switzerland[3] | C | 1 | 1 (1) | 0.01 | 4 | - | - | - |

1. A: aggregated data report; C: case-based report; –: no report; 0: no cases reported.
2. No surveillance system exists.
3. Switzerland provided data directly to EFSA.

***Figure TR2. Age-specific distribution of reported confirmed cases of human trichinellosis per 100,000 population for reporting Member States, 2010***




Source: Austria, Germany, Greece, Latvia, Lithuania, Poland, Romania, Slovakia and Spain (N=206).

### 3.8.2 *Trichinella* in animals

All MSs and the two non-MSs submitted data on *Trichinella* in animals for 2010 and these data are presented in Figures TR3-TR5 and Tables TR3-TR6. The results are given for the most important animal species that serve as sources of human trichinellosis cases in MSs. According to Commission Regulation (EC) No 2075/2005[49], carcasses of domestic swine, horses, wild boar and other farmed or wild animal species susceptible to *Trichinella* infestation are systematically sampled at slaughter as part of meat inspection and tested for *Trichinella*. Thus, most of the reported data are derived from meat inspections. Another source of data is the monitoring of *Trichinella* in wildlife animal species that are not intended for human consumption.

In 2010, all MSs and two non-MSs provided information regarding *Trichinella* in farm animals (pigs, farmed wild boar and solipeds). Ten MSs isolated *Trichinella* from farm animals. Romania reported 62.1 % of all these positive findings, while Spain, Greece, Lithuania and Poland accounted for 11.0 %, 8.8 %, 7.0 % and 5.3 % of the findings, respectively. No country reported positive samples in all three of the farm animal species. The prevalence of *Trichinella* in farm animals in 2010 was highest in farmed wild boar (0.07 %), followed by solipeds (0.001 %) and then pigs (0.00009 %).

In 2010, all MSs and the two non-MSs provided data concerning *Trichinella* in pigs (breeding and fattening pigs). Eight MSs reported positive findings, giving an overall EU prevalence of 0.00009 % (Table TR3). *Trichinella* has been rare in slaughtered pigs for many years and has decreased since 2009 and 2008 when the prevalence was 0.0002 % and 0.0005 %, respectively. Romania was responsible for the vast majority of positive findings in 2010, accounting for 70.4 % of all the *Trichinella* reports, compared with 68.6 % in 2009. Romania also had the highest prevalence in pigs of all the reporting countries, but this has been declining in recent years, with a prevalence of just 0.004 % in 2010, compared with 0.009 % in 2009. All of the 140 Trichinella-positive pigs from Romania were backyard pigs not raised under a controlled housing system. Bulgaria, Finland and France also reported their *Trichinella* findings from pigs not raised under controlled housing conditions. None of the MSs reported *Trichinella*-positive pigs from controlled housing conditions. Finland, France and Germany each reported just one *Trichinella*-positive pig in 2010, compared with none in 2009 (Table TR3). In all the other countries that had positive findings, the prevalence reported in 2010 was lower than that in 2009, with the single exception of Lithuania, where the prevalence increased from 0.001 % to 0.002 %. More than two-thirds of the positive results from pigs in 2010 were reported as *Trichinella* spp. In addition, there were 57 reports of *T. spiralis* and six reports of *T. britovi.*

In 2010, all MSs except Cyprus, Greece and Poland reported data on solipeds. Most of these data were from horses or unspecified solipeds, although Italy also provided data regarding donkeys. In total, 159,213 solipeds were tested, and only Bulgaria and Romania reported one Trichinella-positive horse each.

Eight MSs submitted information regarding farmed wild boar in 2010. A total of 26 animals were reported to be positive, giving an overall prevalence of 0.07 % in the EU (Table TR4). This is considerably higher than the prevalence in pigs (0.00009 %) in this reporting year (Table TR3). Greece was responsible for 76.9 % of the reports but Finland had the highest overall prevalence with 1.2 % of animals testing positive. The four positive results from Finland in 2010 were *T. pseudospiralis,* while the results from Austria and Greece were reported as *Trichinella* spp. In contrast to pigs, the prevalence of *Trichinella* in farmed wild boar (Table TR4) increased between 2008 and 2010 from 0.003 % to 0.07 %. This is largely attributable to Finland and Greece, neither of which reported positive findings in 2008.

In total, 21 MSs and one non-MS reported data on hunted wild boar in 2010 (Table TR5). The total prevalence was 0.14 %, which is slightly less than the 0.17 % reported in 2009, but identical to the prevalence in 2008. Seven countries reported no *Trichinella* detected in hunted wild boar in 2010. Poland, Spain and Lithuania were responsible for 57.2 %, 16.2 % and 9.3 % of all positive reports respectively. The highest prevalence was reported from Finland (11.11 %); however, only nine animals were tested. All other MSs reported a prevalence less than 1 %. The overall *Trichinella* prevalence in hunted wild boar in 2010 was higher than in pigs or farmed wild boar (Tables TR3-TR5). As in pigs, the majority (86 %) of results were reported as *Trichinella* spp*.* but there were also 77 reports of *T. spiralis*, 56 reports of *T. britovi* and three reports each of *T. nativa* and *T. pseudospiralis*.

49 Commission Regulation (EC) No 2075/2005 of 5 December 2005 laying down specific rules on official controls for *Trichinella* in meat. OJ L 338, 22.12.2005, p. 60-82.

Data on *Trichinella* in wildlife species other than wild boar are presented in Table TR6. All countries except for Bulgaria, Malta, Portugal and Switzerland reported investigations of these wildlife species in 2010 and 16 MSs reported positive findings. The majority of these positive results were from foxes, bears and raccoon dogs, although there were also reports of *Trichinella* in badgers, birds (goshawks and eagles), lynx, martens, otters, seals, wolverines and wolves. Finland was responsible for 55.6 % of the reports of *Trichinella* in other wildlife in 2010, while Italy accounted for 11.1 %.

In 2010, 17 MSs and one non-MS reported data on *Trichinella* in foxes. Of these, 10 MSs had positive results which gave a total prevalence of *Trichinella* in foxes of 1.1 %. Lithuania reported a very high prevalence (66.7 %), although only nine samples were tested. In addition, Finland had a high prevalence (30.1 %) and Latvia had a moderate prevalence (17.1 %). The majority of positive foxes were reported as *Trichinella* spp., but there were also findings of *T. britovi, T. nativa, T. pseudospiralis* and *T. spiralis*.

Six MSs reported data on *Trichinella* in bears in 2010, with a total prevalence within these countries of 4.8 %. Most of the positive bears were from Estonia, Finland and Romania, where the prevalence ranged between 8.3 % and 11.9 %. Slovakia and Slovenia each reported a single *Trichinella*-positive bear, and Sweden reported no positive findings. *T. nativa* was most commonly reported but there were also a comparable number of reports of *T. britovi* and *Trichinella* spp.

Four MSs tested raccoon dogs for *Trichinella* in 2010, and the total prevalence within these MSs was 27.9 %. Latvia had a high prevalence (50.0 %) although it tested only 12 animals, while in Finland 31.1 % of raccoon dogs tested positive. Denmark and Sweden reported no *Trichinella*-positive raccoon dogs in 2010. All of the positive results in Latvia and Finland were reported as *Trichinella* spp.

Four MSs reported data on wolves in 2010. In total, 133 wolves were tested, and 22.6 % were found to be positive for *Trichinella*. Estonia reported the testing of only a single wolf, which tested positive for *T. britovi*. The prevalence of *Trichinella* in wolves in Finland, Italy and Sweden ranged between 13.3 % and 29.4 %. Sweden reported findings of *T. britovi* and *T. nativa,* while all the positive findings from Finland and Italy were reported as *Trichinella* spp.

***Figure TR3. Findings of* Trichinella *in pigs, 2010***

### *Table TR3. Findings of* Trichinella *in pigs, 2009-2010*

| Country | Species | 2010 N | 2010 Pos | 2010 % Pos | 2010 Production system of positive pigs | 2009 N | 2009 Pos | 2009 % Pos |
|---|---|---|---|---|---|---|---|---|
| Austria | | 5,577,579 | 0 | 0 | | 5,537,389 | 0 | 0 |
| Belgium | | 11,922,765 | 0 | 0 | | 11,677,883 | 0 | 0 |
| Bulgaria | *T. spiralis* | 336,662 | 3 | 0.00089 | Not controlled housing conditions | 384,296 | 9 | 0.0023 |
| | *T.* spp. | | | | | | 42 | 0.0109 |
| Cyprus | | 720,829 | 0 | 0 | | 717,383 | 0 | 0 |
| Czech Republic | | 3,187,411 | 0 | 0 | | 3,289,761 | 0 | 0 |
| Denmark | | 22,239,258 | 0 | 0 | | 23,230,324 | 0 | 0 |
| Estonia | | 420,496 | 0 | 0 | | 405,456 | 0 | 0 |
| Finland | *T. spiralis* | 2,251,788 | 1 | 0.00004 | Not controlled housing conditions | 2,331,712 | 0 | 0 |
| France [1,2] | *T. britovi* | 670,532 | 1 | 0.00015 | Not controlled housing conditions | 602,165 | 0 | 0 |
| Germany [3] | *T.* spp. | 58,422,565 | 1 | <0.00001 | Unspecified | 56,415,489 | 0 | 0 |
| Greece | | 1,290,958 | 0 | 0 | | 823,534 | 0 | 0 |
| Hungary [4] | | 4,678,081 | 0 | 0 | | 4,445,592 | 0 | 0 |
| Ireland [5] | | 58,014 | 0 | 0 | | 2,403,896 | 0 | 0 |
| Italy | | 9,533,165 | 0 | 0 | | 9,241,075 | 0 | 0 |
| Latvia | | 246,236 | 0 | 0 | | 323,588 | 0 | 0 |
| Lithuania | *T. spiralis* | 723,819 | 8 | 0.00221 | Unspecified | 549,146 | 7 | 0.0013 |
| | *T.* spp. | | 8 | | | | | |
| Luxembourg | | 1,833 | 0 | 0 | | 1,955 | 0 | 0 |
| Malta | | 71,230 | 0 | 0 | | 100 | 0 | 0 |
| Netherlands | | 14,016,937 | 0 | 0 | | 12,186,453 | 0 | 0 |
| Poland | *T.* spp. | 19,730,521 | 12 | 0.00006 | Unspecified | 17,799,002 | 13 | 0.00007 |
| Portugal | | 4,669,044 | 0 | 0 | | 786,839 | 0 | 0 |
| Romania | *T. spiralis* | 3,259,215 | 45 | 0.00430 | Not controlled housing conditions | 3,400,571 | 71 | 0.0021 |
| | *T. britovi* | | 5 | | | | 2 | 0.00006 |
| | *T.* spp. | | 90 | | | | 222 | 0.0065 |
| Slovakia [6] | | 797,830 | 0 | 0 | | 153,585 | 0 | 0 |
| Slovenia | | 291,254 | 0 | 0 | | 295,960 | 0 | 0 |
| Spain | *T.* spp. | 41,278,349 | 25 | 0.00006 | Unspecified | 39,990,011 | 64 | 0.0002 |
| Sweden | | 3,021,322 | 0 | 0 | | 2,969,690 | 0 | 0 |
| United Kingdom | | 1,960,612 | 0 | 0 | | 1,936,234 | 0 | 0 |
| **EU Total** | | **211,378,305** | **199** | **0.00009** | | **201,899,089** | **430** | **0.0002** |
| Norway | | 1,565,700 | 0 | 0 | | 1,522,300 | 0 | 0 |
| Switzerland | | 2,660,000 | 0 | 0 | | 2,420,000 | 0 | 0 |

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

1. In France, all the animals raised in free-range farming conditions and all the breeding animals are tested.
2. In France, in 2009, reported data represent only samples tested at the French NRL. All positive samples have to be sent to the NRL.
3. The data from Germany include pigs from domestic production as well as imported pigs.
4. In Hungary in 2009, an additional 159 fattening pigs not raised under controlled housing conditions in integrated production systems were tested for *Trichinella* in an outbreak investigation. In total, 24 pigs tested positive (*T. spiralis*: 4, *Trichinella* spp.: 20).
5. In Ireland, a further 2,634,465 samples were examined using a serological method and all tested negative.
6. In Slovakia, a further 195 home slaughters at farm were tested as 'selective sampling' and all tested negative.

### *Table TR4. Findings of* Trichinella *in farmed wild boar, 2010*

| Country | Species | 2010 | | |
|---|---|---|---|---|
| | | N | Pos | % Pos |
| Austria | *T.* spp. | 25,480 | 2 | 0.01 |
| Bulgaria | | 82 | 0 | 0 |
| Denmark | | 1,007 | 0 | 0 |
| Finland | *T. pseudospiralis* | 332 | 4 | 1.20 |
| France | | 3,899 | 0 | 0 |
| Greece | *T.* spp. | 4,439 | 20 | 0.45 |
| Italy [1] | | 680 | 0 | 0 |
| United Kingdom | | 952 | 0 | 0 |
| **Total (8 MSs in 2010)** | | **36,871** | **26** | **0.07** |

Note: Data presented include sample sizes <25. The following data have been reported without information regarding farmed/hunted status: in the Netherlands, 2,505 wild boar were tested, all of which tested negative; in Portugal, 634 wild boar were tested, all of which tested negative.

1. In Italy, 26 flocks of farmed wild boar were also tested and two of these were positive for *Trichinella* spp. A further 26,616 wild boar were also tested with no information on farmed/hunted status; all of them tested negative.

### *Figure TR4. Findings of* Trichinella *in hunted wild boar, 2010*


Note: The sample size for Greece and Finland was nine. These were the only MSs with sample size below 25.

### *Table TR5. Findings of* Trichinella *in hunted wild boar, 2010*

| Country | Species | 2010 N | 2010 Pos | 2010 % Pos |
|---|---|---|---|---|
| Belgium | | 11,730 | 0 | 0 |
| Bulgaria | *T. spiralis* | 6,978 | 17 | 0.24 |
| Czech Republic | *T.* spp. | 124,320 | 1 | <0.01 |
| Estonia [1] | *T. britovi* | 3,616 | 26 | 0.83 |
| | *T. nativa* | | 2 | |
| | *T.* spp. | | 3 | |
| Finland | *T. nativa* | 9 | 1 | 11.11 |
| France | | 33,552 | 0 | 0 |
| Germany | *T. spiralis* | 199,003 | 9 | <0.01 |
| | *T.* spp. | | 1 | |
| Greece | | 9 | 0 | 0 |
| Hungary | *T. britovi* | 50,884 | 6 | 0.02 |
| | *T. pseudospiralis* | | 1 | |
| | *T.* spp. | | 2 | |
| Italy [2] | *T.* spp. | 15,364 | 1 | <0.01 |
| Latvia | *T.* spp. | 2,434 | 19 | 0.78 |
| Lithuania | *T.* spp. | 22,653 | 92 | 0.41 |
| Luxembourg | | 1,110 | 0 | 0 |
| Poland | *T.* spp. | 87,614 | 565 | 0.64 |
| Portugal [3] | | 904 | 0 | 0 |
| Romania | *T. spiralis* | 7,960 | 20 | 0.84 |
| | *T. britovi* | | 12 | |
| | *T.* spp. | | 35 | |
| Slovakia | *T.* spp. | 26,895 | 11 | 0.04 |
| Slovenia | *T.* spp. | 818 | 1 | 0.12 |
| Spain | *T. spiralis* | 78,571 | 30 | 0.20 |
| | *T. britovi* | | 11 | |
| | *T.* spp. | | 119 | |
| Sweden | *T. spiralis* | 50,014 | 1 | <0.01 |
| | *T. britovi* | | 1 | |
| | *T. pseudospiralis* | | 2 | |
| United Kingdom | | 202 | 0 | 0 |
| **EU Total** | | **724,640** | **988** | **0.14** |
| Switzerland | | 2,448 | 0 | 0 |

Note: Data presented include sample sizes <25. In the Netherlands, 2,505 wild boar were tested without information regarding farmed/hunted status, all of which tested negative, and an additional 441 hunted wild boar were examined using serological methods, all of which tested negative.

1. In Estonia, both *T. nativa* and *T. britovi* were found in one wild boar sample.
2. In Italy, a further 26,616 wild boar were tested with no information on farmed/hunted status. All of these tested negative.
3. In Portugal, an additional 634 wild boar were tested with no information about the farmed/hunted status. All of them tested negative.

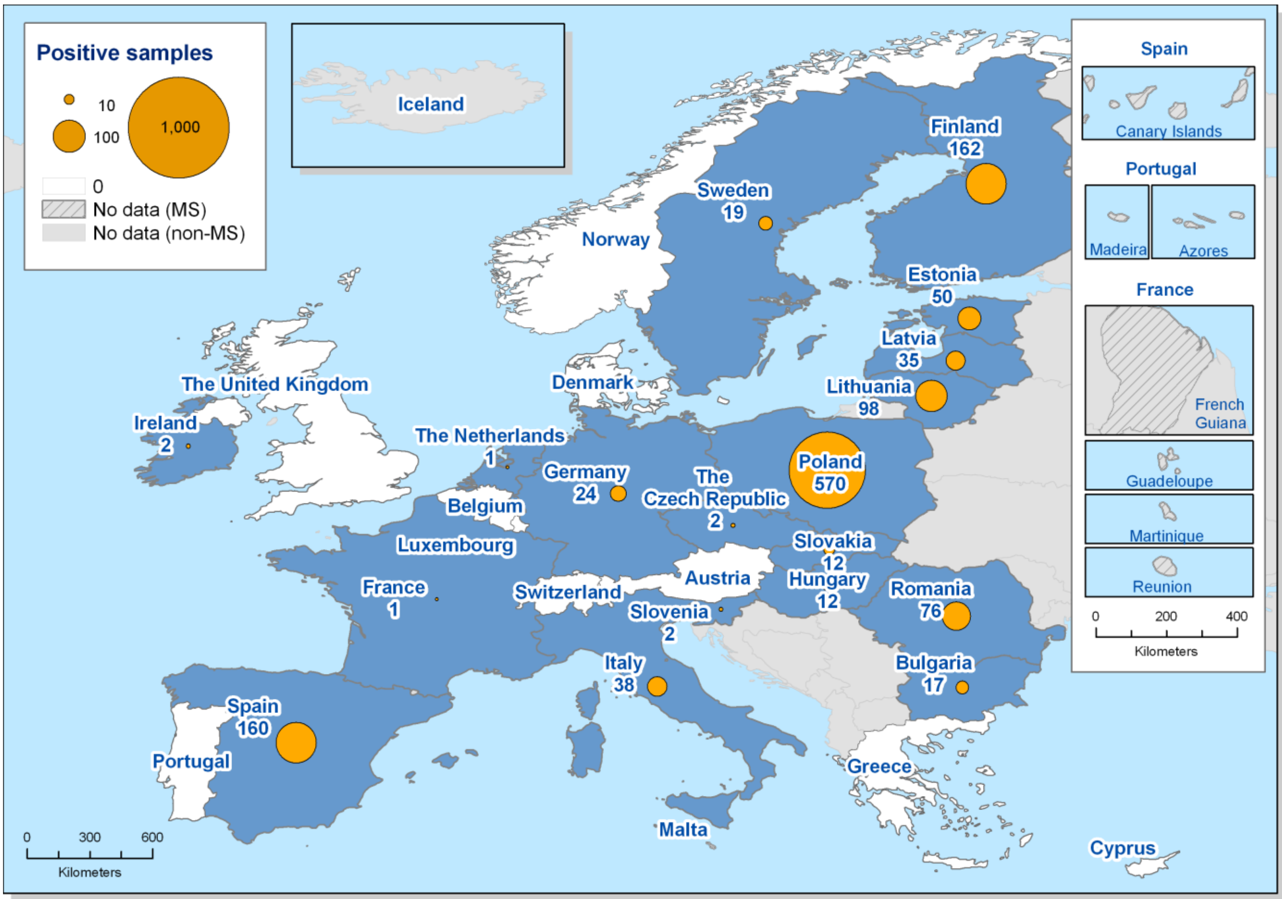
*Table TR6. Findings of* Trichinella *in wildlife other than wild boar, 2010*

| Country | Foxes | | | Bears | | | Raccoon dogs | | | Other wildlife[1] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Pos | % Pos | N | Pos | % Pos | N | Pos | % Pos | N | Pos | % Pos |
| Austria | - | - | - | - | - | - | - | - | - | 17 | 0 | 0 |
| Belgium | 362 | 0 | 0 | - | - | - | - | - | - | - | - | - |
| Cyprus | 1 | 0 | 0 | - | - | - | - | - | - | 17 | 0 | 0 |
| Czech Republic | - | - | - | - | - | - | - | - | - | 38 | 1 | 2.6 |
| Denmark | 270 | 0 | 0 | - | - | - | 12 | 0 | 0 | 69 | 0 | 0 |
| Estonia | - | - | - | 65 | 7 | 10.8 | - | - | - | 19 | 13 | 68.4 |
| Finland | 146 | 44 | 30.1 | 84 | 10 | 11.9 | 167 | 52 | 31.1 | 266 | 55 | 20.7 |
| France [2] | 920 | 1 | 0.1 | - | - | - | - | - | - | - | - | - |
| Germany | 4,440 | 14 | 0.3 | - | - | - | - | - | - | - | - | - |
| Greece | - | - | - | - | - | - | - | - | - | 2 | 0 | 0 |
| Hungary | 80 | 3 | 3.8 | - | - | - | - | - | - | 1 | 0 | 0 |
| Ireland | 423 | 2 | 0.5 | - | - | - | - | - | - | - | - | - |
| Italy | 1,717 | 26 | 1.5 | - | - | - | - | - | - | 2,014 | 11 | 0.5 |
| Latvia | 35 | 6 | 17.1 | - | - | - | 12 | 6 | 50.0 | 4 | 4 | 100 |
| Lithuania | 9 | 6 | 66.7 | - | - | - | - | - | - | 5 | 0 | 0 |
| Luxembourg | 16 | 0 | 0 | - | - | - | - | - | - | - | - | - |
| Netherlands | 91 | 1 | 1.1 | - | - | - | - | - | - | - | - | - |
| Poland | 100 | 5 | 5.0 | - | - | - | - | - | - | - | - | - |
| Romania | - | - | - | 109 | 9 | 8.3 | - | - | - | - | - | - |
| Slovakia | - | - | - | 37 | 1 | 2.7 | - | - | - | 1 | 0 | 0 |
| Slovenia | - | - | - | 44 | 1 | 2.3 | - | - | - | - | - | - |
| Spain | 1 | 0 | 0 | - | - | - | - | - | - | 18 | 0 | 0 |
| Sweden | 310 | 0 | 0 | 250 | 0 | 0 | 17 | 0 | 0 | 256 | 15 | 5.9 |
| United Kingdom | 648 | 0 | 0 | - | - | - | - | - | - | 33 | 0 | 0 |
| **EU Total** | **9,569** | **108** | **1.1** | **589** | **28** | **4.8** | **208** | **58** | **27.9** | **2,760** | **99** | **3.6** |
| Norway | 2 | 0 | 0 | - | - | - | - | - | - | - | - | - |

Note: Data presented include sample sizes <25.

1. 'Other wildlife' includes badgers, birds (including falcons, goshawks and eagles), coypu, deer, lynx, martens, minks, mouflon, otters, rats, seals, stoats, wolverines, wolves, and unspecified wild animals.
2. The results for foxes are from a survey conducted between January and August 2010.

***Figure TR5. Findings of* Trichinella *in wildlife, 2010***




Note: Data from the following species are included: badgers, bears, birds (including falcons, goshawks and eagles), coypu, deer, foxes, lynx, martens, minks, mouflons, otters, rats, raccoon dogs, seals, stoats, wild boar non-farmed, wolverines, wolves, and unspecified wild animals.

### 3.8.3 Discussion

Cases of confirmed human trichinellosis decreased markedly, by 70.2 %, in 2010 (223) compared with 2009 (748). The greatest decreases compared with 2009 were reported in Bulgaria and Romania, although the latter still reported the highest number of cases in the EU. Fourteen MSs reported no cases of human trichinellosis, and seven MSs reported 10 or fewer cases. The majority of the confirmed cases (84 %) occurred mainly in four MSs: Bulgaria, Lithuania, Poland and Romania. These MSs also reported food-borne outbreaks due to *Trichinella* and positive *Trichinella* findings from pigs and wild boars. Pork and wild boar meat (and products thereof) are considered to be the two main sources of human *Trichinella* infections in the EU. Most of the human cases were reported in the age group 25-44 years and the highest incidence was in 15 to 24 year-olds.

*Trichinella* is very rarely detected from pigs in the EU, and all the positive findings reported by MSs in 2010 were from pigs from non-controlled or unspecified housing conditions. In 2010, eight MSs reported positive findings for *Trichinella* in pigs, giving an overall EU prevalence of 0.00009 %. *Trichinella* has been rare in slaughtered pigs for many years and has decreased since 2008. Romania was responsible for the majority of *Trichinella* findings in pigs in 2010, but the positive findings have been deceasing in recent years in that country, which was also reflected in the numbers of positive pigs at EU level.

*Trichinella* is often reported from wildlife species by some Eastern and Northern MSs in which the parasite is circulating in wild animal populations. The overall *Trichinella* prevalence in hunted wild boar in 2010 was higher than in pigs or in farmed wild boar. Food-borne outbreaks linked to wild boar meat were reported in 2010 by two MSs. The prevalence in wildlife other than wild boar was noticeably high during 2010 in some Northern European MSs. Unlike pigs, there is no sign of a decreasing trend in *Trichinella* in wildlife; thus, it is vital to continue educating hunters on the risks of eating undercooked bear, badger, lynx, wild boar or other carnivore or omnivore game meat.

Recently, EFSA's Panels on Biological Hazards (BIOHAZ), on Contaminants in the Food Chain (CONTAM) and on Animal Health and Welfare (AHAW) delivered a Scientific Opinion on the public health hazards (biological and chemical) to be covered by inspection of meat from swine[50]. *Trichinella* spp. were considered to be of medium relevance at present in the EU and one of the four most relevant biological hazards in the context of meat inspection of swine.

50 EFSA Panels on Biological Hazards (BIOHAZ), on Contaminants in the Food Chain (CONTAM), and on Animal Health and Welfare (AHAW), 2011. Scientific Opinion on the public health hazards to be covered by inspection of meat (swine). EFSA Journal;9(10):2351, 198 pp.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.9 *Echinococcus*

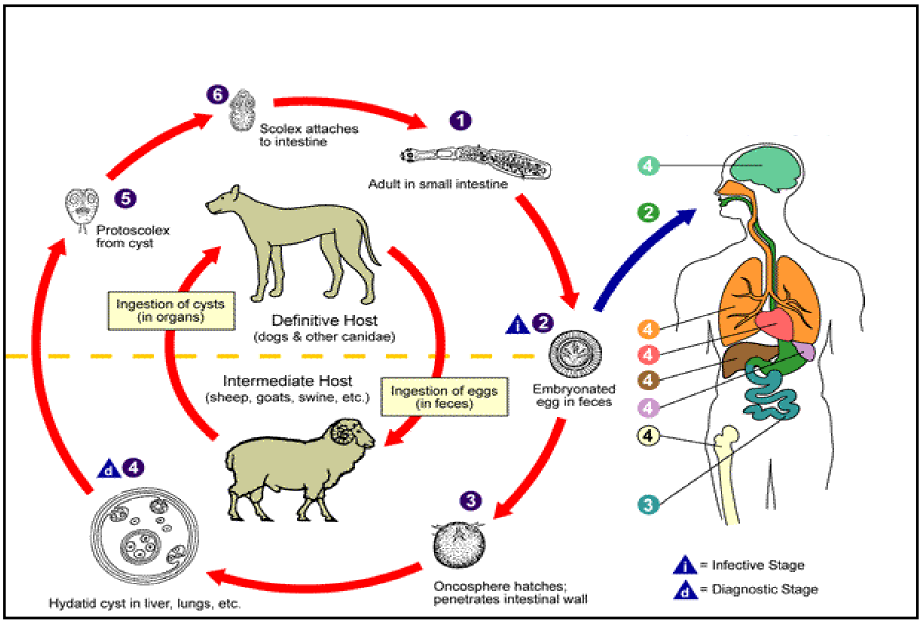
Human echinococcosis is caused by the larval stages of the small tapeworms of the genus *Echinococcus*. In Europe this disease is caused by two of the six recognised species, namely *E. granulosus* and *E. multilocularis*. The disease caused by the two species is also known as 'cystic hydatid disease' and 'alveolar hydatid disease', respectively.

### *E. granulosus*

The adult stage of the tapeworm *E. granulosus* lives in the small intestines of dogs and, rarely, of other canids, e.g. wolves and jackals, which are the definitive hosts. The adult parasite releases eggs that are passed in the faeces. Sheep, goats, cattle and reindeer are the intermediate hosts in which ingested eggs hatch and release the larval stage (oncosphere) of the parasite. The larvae may enter the bloodstream and migrate into various organs, especially the liver and lungs, where they develop into hydatid cysts. The definitive hosts become infected by ingestion of the cyst-containing organs of the infected intermediate hosts.

Humans are a dead-end host and may become infected through accidental ingestion of the eggs, shed in the faeces of infected dogs or other canids. In humans, the eggs also hatch in the digestive tract, releasing oncospheres, which may enter the bloodstream and migrate to the liver, lungs and other tissues to develop into hydatid cysts. These cysts may develop unnoticed over many years, and may ultimately rupture (Figure EH1). Clinical symptoms and signs of the disease (cystic echinococcosis) depend on the location of the cysts and are often similar to those induced by slow-growing tumours.

***Figure EH1. Life cycle* of E. granulosus**

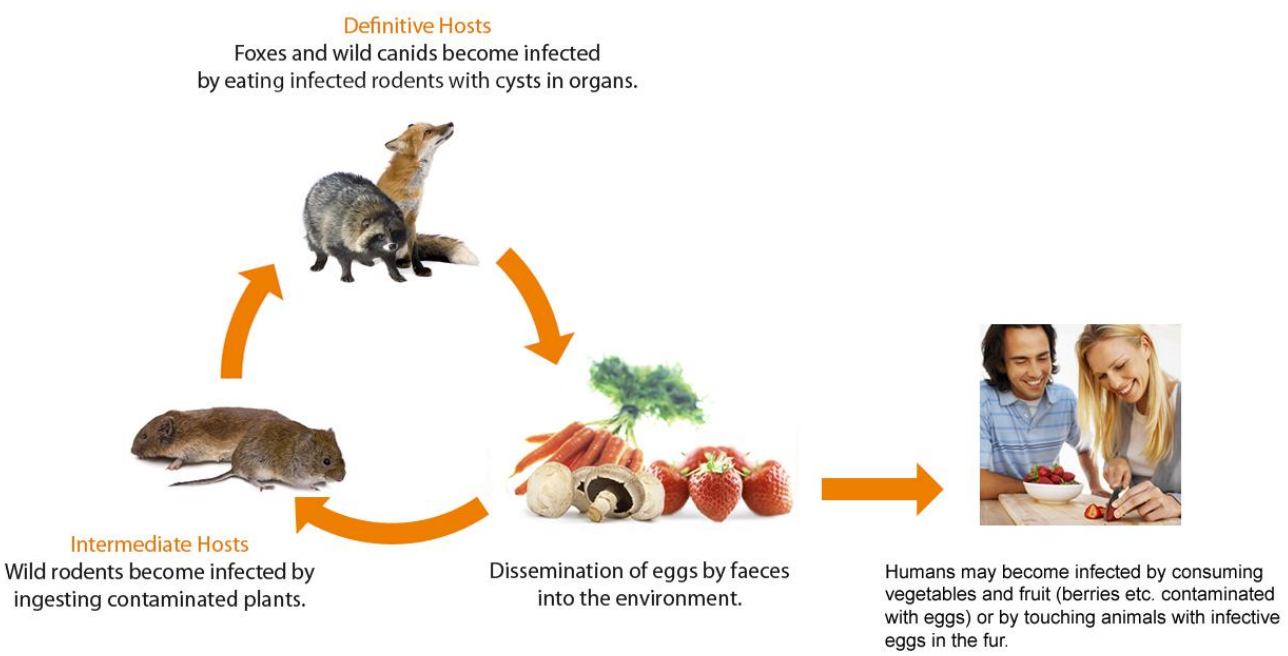



Source: www.dpd.cdc.gov/dpdx

### *E. multilocularis*

*E. multilocularis* has a similar life cycle as *E. granulosus* (Figure EH2). The definitive hosts are foxes, raccoon dogs and, to a lesser extent, dogs, cats, coyotes and wolves. Small rodents and voles are the intermediate hosts. The larval form of the parasite remains indefinitely in the proliferative stage in the liver, thus invading the surrounding tissues. In accidental cases, humans may also acquire *E. multilocularis* infection by ingesting eggs shed by the definitive host for example by consuming contaminated vegetables or berries or by touching animals with infective eggs in their fur. *E. multilocularis* is the causative agent of the highly pathogenic alveolar echinococcosis in man. Although a rare human disease, alveolar echinococcosis is a chronic disease with infiltrative growth of considerable public health importance as it is fatal in a large number of untreated patients.

***Figure EH2. Life cycle of* E. multilocularis**




An overview of the data reported in 2010 is presented in the following tables and figures. Additional information on data provided by MSs on *Echinococcus* spp. in 2010 is presented in the level 3 tables.

***Table EH1. Overview of countries reporting data on* Echinococcus *spp., 2010***

| Data | Total number of MS reporting | Countries |
|---|---|---|
| Human | 25 | **All MSs** except DK and IT<br>**Non-MSs:** LI, NO |
| Animal | 26 | **All MSs** except MT<br>**Non-MSs:** CH, NO |

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

## 3.9.1 Echinococcosis in humans

The numbers of reported human cases of echinococcosis (including both cystic and alveolar echinococcosis) are presented in Table EH2. In 2010, a total of 750 confirmed cases of echinococcosis were reported in the EU, a 4.9 % decrease compared with 2009 (789 cases). Bulgaria, Germany, Romania and Spain accounted for 72.7 % of the confirmed cases reported in the EU in 2010. The highest notification rate was reported by Bulgaria and Spain with, respectively, 3.85 and 0.71 reported confirmed cases per 100,000 population. It is often difficult to ascertain the geographical location where an infection was acquired as it can take many years for the disease to manifest.

The highest notification rate was observed in 45 to 64 year olds (0.23 per 100,000 population), followed by those over 25-44 years old (0.18 per 100,000 population) (Figure EH3). Three cases in children under 4 years old were reported from Bulgaria (two) and Romania (one) in 2010.

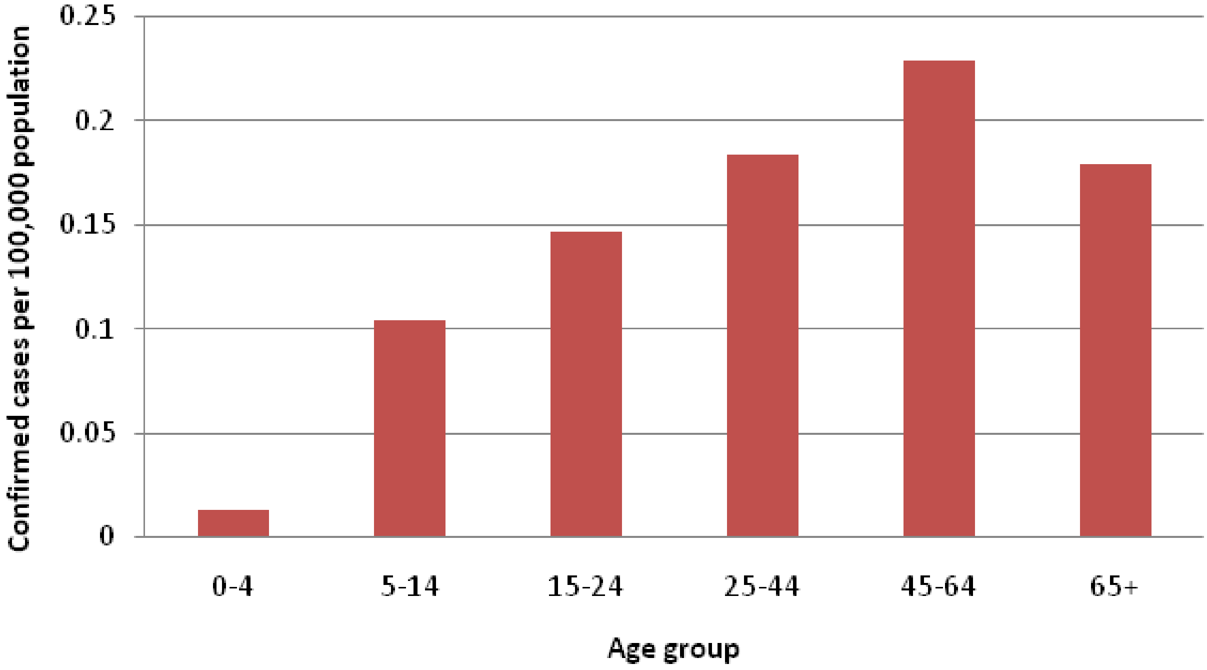
Of the confirmed cases for which information was provided on *Echinococcus* spp. in 2010 (719), *E. granulosus* accounted for 497 (69.1 %) while *E. multilocularis* accounted for 67 (9.3 %) and the *Echinococcus* spp. was unknown in 155 cases (21.6 %) (Table EH3). The severe alveolar form of echinococcosis (*E. multilocularis*) increased by 25.0 % in Germany, from 24 cases in 2009 to 30 cases reported in 2010. Two deaths were reported due to echinococcosis: one a 28-year-old man from Germany due to *E. granulosus* and one a 68-year-old man from Poland due to *E. multilocularis* (overall case fatality rate 0.9 %) in 2010.

***Table EH2. Reported cases of echinococcosis in humans, 2006-2010, and notification rates in 2010***

| Country | 2010 | | | | 2009 | 2008 | 2007 | 2006 |
|---|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed Cases | Confirmed cases/ 100,000 | Confirmed cases | | | |
| Austria | C | 21 | 21 | 0.25 | 20 | 6 | 16 | 16 |
| Belgium | A | 14 | 14 | 0.13 | 14 | 0 | 1 | 6 |
| Bulgaria | A | 291 | 291 | 3.85 | 323 | 386 | 461 | 485 |
| Cyprus | C | 0 | 0 | 0 | 1 | 1 | 4 | 6 |
| Czech Republic | C | 5 | 5 | 0.05 | 1 | 2 | 3 | 2 |
| Denmark | -[2] | - | - | - | - | - | - | - |
| Estonia | U | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| Finland | C | 1 | 1 | 0.02 | 1 | 1 | 1 | 0 |
| France | C | 14 | 14 | 0.02 | 27 | 14 | 25 | 16 |
| Germany | C | 117 | 117 | 0.14 | 106 | 102 | 89 | 124 |
| Greece | C | 11 | 11 | 0.10 | 22 | 28 | 10 | 6 |
| Hungary | C | 9 | 9 | 0.09 | 8 | 7 | 8 | 7 |
| Ireland | C | 1 | 1 | 0.02 | 1 | 2 | 0 | 0 |
| Italy | -[2] | - | - | - | - | - | - | - |
| Latvia | C | 14 | 14 | 0.62 | 15 | 21 | 12 | 22 |
| Lithuania | C | 23 | 23 | 0.69 | 36 | 32 | 12 | 15 |
| Luxembourg | U | 1 | 1 | 0.20 | 0 | 0 | 0 | 0 |
| Malta | U | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Netherlands | U | - | - | - | 25 | 25 | 11 | 31 |
| Poland | C | 34 | 34 | 0.09 | 25 | 28 | 40 | 65 |
| Portugal | C | 3 | 3 | 0.03 | 4 | 4 | 10 | 9 |
| Romania | C | 128 | 55 | 0.26 | 42 | 0 | 99 | - |
| Slovakia | C | 9 | 9 | 0.17 | 4 | 5 | 4 | 6 |
| Slovenia | C | 8 | 8 | 0.39 | 9 | 7 | 1 | 3 |
| Spain | C | 82 | 82 | 0.71 | 86 | 109 | 131 | 123 |
| Sweden | C | 30 | 30 | 0.32 | 12 | 13 | 24 | 7 |
| United Kingdom | C | 7 | 7 | 0.01 | 7 | 9 | 7 | 14 |
| **EU Totals** | | **823** | **750** | **0.16** | **789** | **803** | **971** | **963** |
| Iceland | - | - | - | - | - | - | - | - |
| Liechtenstein | - | - | - | - | - | 0 | 0 | - |
| Norway | C | 1 | 1 | 0.02 | 0 | 2 | 0 | 0 |

1. A: aggregated data report; C: case-based report; U: unspecified; –: no report.
2. No surveillance system exists.

*Figure EH3. Age-specific notification rates of echinococcosis in humans, 2010*




Source: Austria, Bulgaria, Czech Republic, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Lithuania, Luxembourg, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom (N=703).

*Table EH3. Species distribution of reported confirmed echinococcosis cases in humans, 2010*

| Country | *E. granulosus* | *E. multilocularis* | *E.* spp unknown | Total |
|---|---|---|---|---|
| Austria | 18 | 3 | 0 | 21 |
| Belgium | 0 | 14 | 0 | 14 |
| Bulgaria | 291 | 0 | 0 | 291 |
| Finland | 1 | 0 | 0 | 1 |
| France | 0 | 14 | 0 | 14 |
| Germany | 70 | 30 | 17 | 117 |
| Hungary | 0 | 0 | 9 | 9 |
| Ireland | 0 | 0 | 1 | 1 |
| Latvia | 9 | 1 | 4 | 14 |
| Lithuania | 5 | 2 | 2 | 9 |
| Poland | 8 | 3 | 23 | 34 |
| Portugal | 3 | 0 | 0 | 3 |
| Romania | 0 | 0 | 55 | 55 |
| Slovakia | 8 | 0 | 1 | 9 |
| Slovenia | 0 | 0 | 8 | 8 |
| Spain | 82 | 0 | 0 | 82 |
| Sweden | 1 | 0 | 29 | 30 |
| United Kingdom | 1 | 0 | 6 | 7 |
| **EU Total (%)** | **497 (69.1 %)** | **67 (9.3 %)** | **155 (21.6 %)** | **719 (100 %)** |

### 3.9.2 *Echinococcus* in animals

In 2010, 19 MSs and one non-MS reported data on *Echinococcus* in farm animals, mainly from meat inspection at slaughterhouses. All these countries (except Portugal) reported large numbers of animals inspected (Table EH4 and Figure EH4). Most MSs reported no or very few findings of *Echinococcus*, with the total EU prevalence ranging from 0.2 % in pigs to 1.3 % in sheep. As in 2009, Bulgaria and Romania reported some of the highest prevalences, whereas the Nordic countries, Belgium, Cyprus and Estonia did not report any positive findings (Figure EH4). Overall, the prevalence of *Echinococcus* was higher in sheep (1.3 %) than in cattle (0.6 %), but this did vary from country to country. In Bulgaria, Greece, Italy and the United Kingdom more sheep than cattle were positive for *Echinococcus*, whereas in Latvia and Romania the reverse was seen. Romania reported 20.7 % of sampled cattle, 4.0 % of sheep and 3.0 % of goats positive for the parasite. Portugal also reported that 50.0 % of the sheep tested were positive, although only 26 samples were tested, which was much fewer than most MSs reported. Bulgaria also reported relatively common detections of positive samples from cattle and sheep, 4.3 % and 6.4 % positive, respectively, and Italy reported 3.9 % of sheep tested to be positive for *Echinococcus* spp. Two MSs reported data from farmed wild boar; Italy tested 35 animals at slaughter and Greece tested 4,159 animals. Neither country reported any positive samples.

A number of MSs reported data from farm animals at *Echinococcus* species level. In Bulgaria, Hungary, Italy, Portugal, Slovenia and the United Kingdom the reported findings were for *E. granulosus*. Regional data for *Echinococcus* in farm animals were reported by France, Italy and Romania (Figure EH4). All regional data from Romania were reported as *Echinococcus* spp., while France and Italy did report isolates as *E. granulosus* and *E. multilocularis.* However, the French data were from suspect samplings with 100 % *E. granulosus*-positive sheep in Alpes-de-Haute-Provence, 66.1 % *E. granulosus*-positive pigs in Upper Corsica and 84.2 % *E. granulosus*-positive pigs in South Corsica, out of, respectively, 27,224 and 38 tested slaughtered animals with lesions (cysts).

During 2008-2010, 16 MSs and two non-MSs reported data on *Echinococcus* in foxes and seven MSs and one non-MS reported positive findings (Table EH5). The overall number of samples being tested each year has remained consistent, with the Czech Republic, France and Germany reporting more than 85 % of all data from foxes and 97 % of the positive samples during the three years. Seven MSs and one non-MS have reported data on *E. multilocularis* in foxes for a minimum of four years, from 2005 to 2010 (Figure EH6). In this period, the Nordic countries (Finland and Sweden) reported no or very few positive findings in foxes. After an observed increase in prevalence in foxes in the Czech Republic during 2005-2009, a decrease was observed in 2010. Findings from France, Germany, Luxembourg, the Netherlands and Switzerland have continued to fluctuate, with increases in prevalence reported by France and Luxembourg in 2010. In 2007 and 2008, Switzerland reported relatively high prevalence in foxes (26.2 % and 19.3 %, respectively) as part of a study focusing on these animals; however, in 2009 and 2010 no data reporting prevalence in foxes specifically were provided.

For the most recent reporting period, a total of 13 MSs reported data on *E. multilocularis* in foxes in 2010 (Table EH5). The Czech Republic, Ireland and France reported data from the monitoring of hunted foxes, whereas Sweden reported data from surveillance in hunted foxes. In 2010, six MSs reported positive findings of *E. multilocularis* in foxes*.* The Czech Republic, France, Germany, Luxembourg, Poland and Sweden reported positive rates of *E. multilocularis* in samples from foxes of, respectively, 23.3 %, 19.5 %, 15.6 %, 30.8 %, 12.8 % and 0.3 % (Table EH5). The distribution of *E. multilocularis* in foxes in 2008-2010 is presented in Figure EH5. Regional data for *E. multilocularis* in foxes were reported by the Czech Republic, France, the Netherlands and Sweden. The Czech Republic reported moderate to high prevalences in all but one region where only three samples were tested.

| |
|---|
| Before 2010, *E. multilocularis* had never been reported in Sweden. In 2010 the first case was reported in a fox shot in December of that year. Extended investigations will be implemented to clarify the prevalence and spread of this parasite as well as the intermediate hosts involved in its life cycle. The most likely source of the infection is dogs entering the country without complying with the compulsory requirements of deworming. This is in line with results of the Swedish risk assessment conducted in 2006. |

In Switzerland, the Federal Veterinary Office is funding a project entitled 'Control of alveolar echinococcosis and management of foxes in urban areas'. New methods in the management of urban foxes are to be tried out along with active communication to encourage dealing with foxes in a way that is appropriate to wild animals.
The Institute of Parasitology of the University of Zurich is currently running a study to control the disease in foxes in the urban area of Zurich. Fox baits are distributed once a month by hand on extended parts of the surroundings of the city. The baits contain the anthelminthic praziquantel to deworm the foxes. The method has been proved to be effective; thus, areas where bait was distributed showed a significant decrease in contamination with *E. multilocularis* eggs. The practicability of the method on a larger scale is under investigation.

**Alveolar echinococcosis in foxes and domestic animals: towards new epidemiologic trends?**
*E. multilocularis* is a cestode responsible for a rare zoonosis, alveolar echinococcosis. The lifecycle of the parasite is based on the predator/prey relationship between definitive hosts (mainly foxes) and intermediate hosts (rodents in Europe) and on the survival of the free stage of the parasite (the oncosphere) in the environment.
A geographical extension of the distribution range of the parasite has been reported in Europe, simultaneously with the increase in fox populations. Moreover, the prevalence of *E. multilocularis* in foxes has also increased in historically endemic areas. In France, studies show an extension of the parasite range to the west of the country with positive cases in the Manche and Calvados districts.
The recent presence of foxes in urban areas makes the appearance of *E. multilocularis* in towns possible. Nevertheless, the prevalence of *E. multilocularis* observed in cities is very low compared to that in rural areas.
Domestic animals (dogs, cats) can also contribute to the lifecycle as definitive hosts and be a potential source of infection due to their close proximity to humans. Regular deworming with praziquantel must be recommended in endemic areas.
The extension of the endemic areas of *E. multilocularis* in Europe and in France and the increase in the prevalence of foxes in the historically endemic areas make an increase in human cases possible. More information can be found at www.anses.fr/bulletin-epidemiologique/Documents/BEP-mg-BE38.pdf

Five MSs and one non-MS reported positive findings for *Echinococcus* spp. in wildlife other than foxes during 2008-2010 (Table EH6). The highest numbers of positive samples were reported by Italy, for wild boar, by Spain, for deer and wild boar, and by Switzerland, for mice. *E. multilocularis* was reported in mice from Switzerland and *E. granulosus* was reported in wolves, reindeer and other ruminants by Finland, in other ruminants by France, and in wild boar and unspecified wildlife by Italy. Furthermore, *Echinococcus* spp. were reported in deer by Spain, in wild boar by Italy and Spain and in unspecified wildlife by Italy.

Some countries provided information on their *Echinococcus* findings in pet animal species. Three MSs reported positive findings of *Echinococcus* spp. in dogs from 2008 to 2010 (Table EH7). France, Germany and Romania reported positive findings of *E. multilocularis* and *Echinococcus* spp. in dogs, all with a low or very low occurrence. Bulgaria, Cyprus, Italy, Norway and Slovakia reported no positive samples from dogs. Germany and Slovakia were the only countries to report data from cats from 2008 to 2010 and all samples were negative (Table EH7).

For additional information on *Echinococcus* in animals, see the level 3 tables.

***Table EH4.* Echinococcus *in farm animals, inspected at slaughter, 2010***

| Country | Species | Cattle | | Goats | | Pigs | | Sheep | | Solipeds | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | N | % pos | N | % pos | N | % pos | N | % pos | N | % pos |
| Austria[1] | *Echinococcus* spp. | 624,859 | <0.1 | 45,159 | 0 | 5,632,643 | 0 | 265,568 | 0.2 | - | - |
| Belgium | *Echinococcus* spp. | 837,290 | 0 | - | - | - | - | - | - | - | - |
| Bulgaria | *E. granulosus* | 41,345 | 4.3 | 43,789 | 0.9 | 532,156 | <0.1 | 599,098 | 6.4 | - | - |
| Cyprus[3] | *Echinococcus* spp. | - | - | - | - | 720,829 | 0 | - | - | - | - |
| Denmark | *Echinococcus* spp. | 496,494 | 0 | - | - | 19,793,743 | 0 | - | - | - | - |
| Estonia | *Echinococcus* spp. | 41,194 | 0 | - | - | 420,496 | 0 | 8,506 | 0 | - | - |
| Finland | *Echinococcus* spp. | 264,233 | 0 | - | - | - | - | 35,464 | 0 | - | - |
| Greece | *Echinococcus* spp. | 137,052 | 1.3 | 737,614 | 1.2 | 1,290,875 | <0.1 | 1,807,624 | 1.8 | - | - |
| Hungary | *E. granulosus* | 16,000 | <0.1 | - | - | 120,000 | <0.1 | 1,500 | 0.2 | - | - |
| Italy[2,4] | *Echinococcus* spp. | 1,780,575 | 0.2 | 48,626 | 0.7 | 8,465,266 | <0.1 | 1,180,166 | 3.9 | 22,085 | 2.3 |
| | *E. granulosus* | | 0.2 | | <0.1 | | <0.1 | | 0.3 | | - |
| Latvia | *Echinococcus* spp. | 90,760 | <0.1 | 27 | 0 | 246,236 | 0 | 8,528 | 0 | 445 | 0 |
| Lithuania | *Echinococcus* spp. | 178,754 | <0.1 | - | - | 721,169 | <0.1 | - | - | - | - |
| Poland | *Echinococcus* spp. | - | - | - | - | 19,730,521 | 0.8 | - | - | - | - |
| Portugal | *E. granulosus* | - | - | - | - | - | - | 26 | 50.0 | - | - |
| Romania | *Echinococcus* spp. | 139,757 | 20.7 | 1,524 | 3.0 | 2,972,880 | 0.2 | 431,070 | 4.0 | 27,527 | 0.1 |
| Slovenia[2,5] | *Echinococcus* spp. | 124,923 | 0 | - | - | 291,511 | 0 | - | - | 1,772 | - |
| | *E. granulosus* | | <0.1 | - | - | | <0.1 | - | - | | - |
| Spain[6] | *Echinococcus* spp. | 2,228,478 | 0.4 | - | - | 41,250,878 | <0.1 | - | - | 33,069 | <0.1 |
| Sweden | *Echinococcus* spp. | 452,174 | 0 | 473 | 0 | 2,946,346 | 0 | 254,629 | 0 | 3,941 | 0 |
| United Kingdom[2] | *E. granulosus* | 1,042,785 | 0.1 | - | - | - | - | 10,453,233 | 0.5 | - | - |
| **EU Total (19 MSs)** | | **8,496,673** | **0.6** | **877,212** | **1.1** | **105,135,549** | **0.2** | **15,045,412** | **1.3** | **88,839** | **0.7** |
| Norway | *Echinococcus* spp. | 306,900 | 0 | 24,300 | 0 | 1,565,700 | 0 | 1,228,100 | 0 | - | - |

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

1. In Austria the positive samples in cattle and sheep were not characterised at genus level. It is not known whether the agent was *Echinococcus* or another parasite.
2. Some samples were tested for multiple *Echinococcus* spp. The total number of samples is stated only once in Table EH4.
3. In Cyprus an additional 170 sheep and goats were tested: none were positive.
4. In Italy, an additional 4,144 sheep and goats were tested and 14 were positive (12 with *E. granulosus* and 2 with *Echinococcus* spp.).
5. In Slovenia, an additional 10,239 sheep and goats were tested and none were positive.
6. In Spain, an additional 12,580,427 sheep and goats were tested and 71,866 were positive (*Echinococcus* spp.).

***Figure EH4. Findings of* Echinococcus *in farm animals, 2010***


Note: Data from cattle, goats, pigs, sheep and solipeds are included. Samples sizes of less than 25 are not included. Data do not include clinical investigations or suspect sampling. Portugal reported data for 26 samples, of which 50 % were positive.

### *Table EH5.* E. multilocularis *in foxes, 2008-2010*

| Country | 2010 | | | 2009 | | | 2008 | | |
|---|---|---|---|---|---|---|---|---|---|
| | N | Pos | % pos | N | Pos | % pos | N | Pos | % pos |
| Belgium | - | - | - | - | - | - | 117 | 0 | 0 |
| Cyprus | 1 | 0 | 0 | - | - | - | - | - | - |
| Czech Republic[1,6] | 1,594 | 371 | 23.3 | 1,554 | 522 | 33.6 | 1,333 | 426 | 32.0 |
| Finland | 144 | 0 | 0 | 189 | 0 | 0 | 411 | 0 | 0 |
| France[2,6] | 354 | 69 | 19.5 | 925 | 104 | 11.2 | 1,344 | 258 | 19.2 |
| Germany[3] | 5,823 | 906 | 15.6 | 5,463 | 916 | 16.8 | 5,927 | 1,217 | 20.5 |
| Hungary | - | - | - | 840 | 90 | 10.7 | - | - | - |
| Ireland[4,5] | 493 | 0 | 0 | - | - | - | - | - | - |
| Italy | - | - | - | - | - | - | 2 | 0 | 0 |
| Latvia | 35 | 0 | 0 | - | - | - | - | - | - |
| Luxembourg | 26 | 8 | 30.8 | 23 | 4 | 17.4 | 20 | 2 | 10.0 |
| Netherlands | 94 | 0 | 0 | 41 | 0 | 0 | - | - | - |
| Poland | 250 | 32 | 12.8 | 250 | 10 | 4.0 | - | - | - |
| Slovakia | 3 | 0 | 0 | 1 | 0 | 0 | - | - | - |
| Sweden[6] | 310 | 1 | 0.3 | 305 | 0 | 0 | 244 | 0 | 0 |
| United Kingdom[7] | 1 | 0 | 0 | - | - | - | - | - | - |
| **Total (13 MSs in 2010)** | **9,128** | **1,387** | **15.2** | **9,591** | **1,646** | **17.2** | **9,398** | **1,903** | **20.2** |
| Norway | - | - | - | 396 | 0 | 0 | 427 | 0 | 0 |
| Switzerland | - | - | - | - | - | - | 1,044 | 202 | 19.3 |

Note: Includes data based on sample size <25.

1. In the Czech Republic 2008, all the 426 positive samples were reported as *Echinococcus* spp.
2. In France, the result for foxes cannot be interpreted as national prevalence as the results are based on surveys carried out in a selection of French departments, mainly in the east of France.
3. In Germany 2009, 153 of the 916 positive samples were reported as *Echinococcus* spp.; in 2008, 122 of the 1,217 positive samples were reported as *Echinococcus* spp.; the remainder were *E. multilocularis*.
4. In Ireland 2010, foxes captured and tested between October 2009 and November 2010.
5. Reported data are from the monitoring of hunted foxes.
6. Reported data are from surveillance programmes.
7. Data are part of a survey carried out in England for *E. multilocularis.* In total, 384 foxes were tested between 2005 and 2010, all with negative results.

***Figure EH5. Findings of* E. multilocularis *in foxes, 2010***

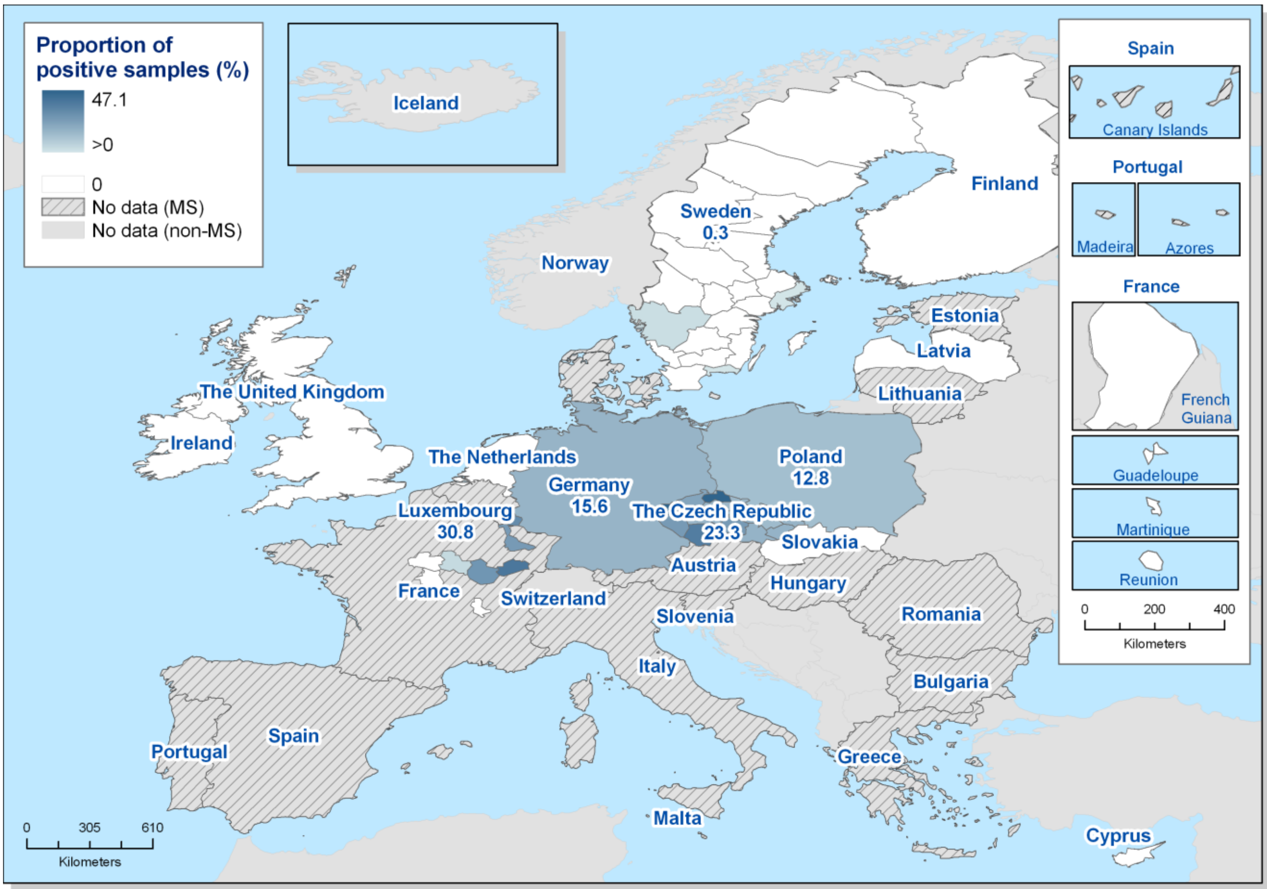
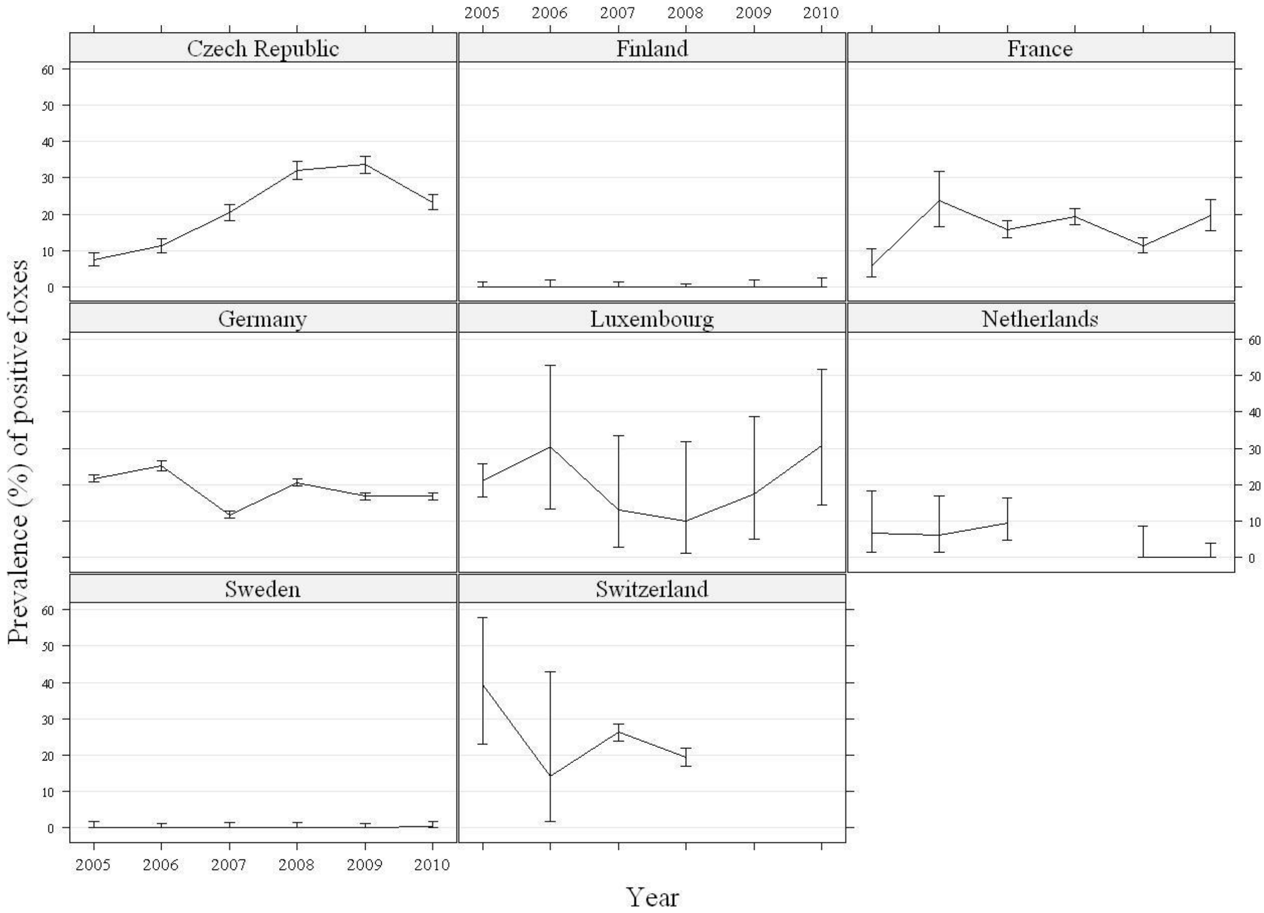


***Figure EH6. Findings of* E. multilocularis *in foxes in Member States providing data for at least four years, 2005-2010*[1]**




1. No data were reported from the Netherlands in 2008, therefore no line was drawn from 2007 to 2009 in the trend figure for this MS. The vertical bars indicate the exact binomial 95 % confidence interval.

*Table EH6.* **Echinococcus** *in wildlife other than fox, 2008-2010 pooled data (2010 data in brackets)*

| Country | Deer | | Reindeers | | Other ruminants[1] | | Wild boars | | Other/unspecified wildlife[2] | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Pos[3] | N | Pos[4] | N | Pos[4] | N | Pos[5] | N | Pos[6] |
| Bulgaria | - | - | 510 (265) | 0 (0) | - | - | - | - | - | - |
| Estonia | - | - | 5,306 (1,914) | 0 (0) | - | - | - | - | - | - |
| Finland | - | - | 239,390 (84,893) | 6 (3) | 609 (-) | 8 (-) | - | - | 9,323 (2,805) | 9 (3) |
| France | - | - | - | - | 1 (-) | 1 (-) | 1 (-) | 0 (-) | - | - |
| Germany | - | - | - | - | - | - | - | - | 557 (-) | 8 (-) |
| Greece | - | - | - | - | - | - | 309 (9) | 0 (0) | - | - |
| Italy | 2,899 (982) | 0 (0) | - | - | - | - | 40,977 (18,647) | 120 (67) | 13,065 (-) | 93 (-) |
| Romania | - | - | - | - | - | - | - | - | 9,480 (9,480) | 0 (0) |
| Slovakia | - | - | - | - | - | - | - | - | 11 (11) | 0 (0) |
| Slovenia | 124 (-) | 0 (-) | 3 (3) | 0 (0) | 2 (-) | 0 (-) | 10 (-) | 0 (-) | 4 (-) | 0 (-) |
| Spain | 313,497 (100,127) | 463 (314) | - | - | - | - | 201,773 (39,545) | 356 (154) | 1,634 (1,634) | 0 (0) |
| Sweden | 4,589 (4,589) | 0 (0) | 107,077 (52,645) | 0 (0) | - | - | - | - | 6 (6) | 0 (0) |
| **Total (12 MSs)** | **321,109 (105,698)** | **463 (314)** | **352,286 (139,720)** | **6 (3)** | **612 (0)** | **9 (0)** | **243,070 (58,201)** | **476 (221)** | **34,080 (13,936)** | **110 (3)** |
| Norway | - | - | - | - | - | - | - | - | 1 (1) | 0 (0) |
| Switzerland | - | - | - | - | - | - | - | - | 393 (-) | 66 (-) |

Note: Includes data based on sample size <25.

1. Data include alpine chamois and moose.
2. Data include bears, hares, lynx, mouflons, mice, muskrats, raccoon dogs, voles, wolves and other unspecified wild animals.
3. In deer, all positive samples were reported as *Echinococcus* spp.
4. In reindeer and 'other ruminants', all positive samples were *E. granulosus* in 2008-2009. In 2010, 3 positive samples from reindeer were *E. granulosus* while all other positive samples were reported as *Echinococcus* spp.
5. In wild boar in 2008 and 2009, 47 of the positive samples from Italy were reported as *E. granulosus;* the remaining samples from both Italy and Spain were reported as *Echinococcus* spp. In 2010, 36 of the positive samples from Italy were reported as *E. granulosus;* the remaining samples from both Italy and Spain were reported as *Echinococcus* spp.
6. In other/unspecified wildlife, 6 positive samples from wolves from Finland were *E. granulosus*, 25 and 68 positive samples from unspecified wildlife from Italy were reported as *E. granulosus* and *Echinococcus* spp., respectively, and 66 positive samples from mice from Switzerland were *E. multilocularis*.

***Table EH7.*** **Echinococcus** ***in pets, 2008-2010 pooled data (2010 data in brackets)***

| Country | Species | Cats | | Dogs | |
|---|---|---|---|---|---|
| | | N | Pos | N | Pos |
| Bulgaria | | - | - | 481 (112) | 0 (0) |
| Cyprus | | - | - | 8 (8) | 0 (0) |
| France | *E. multilocularis* | - | - | 1,175 (378) | 1 (0) |
| Germany | *E. multilocularis* | 187 (42) | 0 (0) | 676 (143) | 3 (0) |
| Italy | | - | - | 5 (-) | 0 (-) |
| Romania | *Echinococcus* spp. | - | - | 809 (809) | 2 (2) |
| Slovakia | | 1,029 (178) | 0 (0) | 4,237 (1,228) | 0 (0) |
| **Total (7 MSs)** | | **1,216 (220)** | **0 (0)** | **7,391 (2,678)** | **6 (2)** |
| Norway | | - | - | 1 (-) | 0 (-) |

Note: Includes data based on sample size <25.

Note: Clinical investigations are not included.

### 3.9.3 Discussion

In humans, 750 confirmed echinococcosis cases were reported by 24 MSs in 2010, which represents a decrease of 4.9 % from 2009. In addition, one confirmed case was reported by a non-MS. In 2010, speciation of the parasite improved remarkably, from 45.3 % in 2009 to 78.4 % in 2010. Among the cases for which definitive speciation information was reported (564) the majority of cases were *E. granulosus* (88.1 %) and the relative proportion of *E. multilocularis* cases fell from 23.2 % in 2009 to 11.9 % in 2010 providing a more accurate estimate of the proportional occurrence of this species. The highest relative increase was noted in Sweden where 30 cases were reported in 2010 compared with 12 cases in 2009 (increase of 150 %). Moderate increases were reported in Poland (36 %, from 25 cases in 2009 to 34 cases in 2010) and Romania (31.0 %, from 42 cases in 2009 to 55 cases in 2010). The highest population-based risk was noted in Bulgaria, where the notification rate was 3.85 per 100 000 population, which is 24 times higher than the rate at the EU level (0.16 per 100 000 population).

Surveillance of *E. multilocularis* in foxes is important in order to access the migration pattern of this parasite in Europe, particularly as there is evidence that the distribution of *E. multilocularis* is spreading in northern Europe[51,52,53]. Several MSs have had monitoring/surveillance programmes running for some years, and based on data reported the parasite has been commonly found in foxes in many central European countries. In general, countries with no positive findings continue to be free from *E. multilocularis,* although Sweden reported one positive case for the first time.

In wildlife species other than foxes, MSs frequently reporting *E. multilocularis* in foxes also report findings in other wildlife. However, the majority of samples were negative for *Echinococcus* in wildlife other than foxes.

In 2010, as in the previous years, most MSs reported no findings or very low levels of *Echinococcus* in farm animals and pets. Of the six MSs that reported data on *E. granulosus* in farm animals, four reported very few or no findings. However, in Bulgaria and Portugal, the parasite was more frequently recorded in farm animal species.

The quality of the data reported on *Echinococcus* in animals has improved in recent years, with more information being provided about the sampling context and more data reported at species level. The data on parasite speciation are very important for risk management efforts as *E. granulosus* and *E. multilocularis* have different epidemiology and pose different health risks to humans.

Regional data on *Echinococcus* in farm animals, and *E. multilocularis* in foxes were reported by four and three MSs, respectively. This is a very welcome development because more regional data will enable us to determine the patterns of spread of the parasite geographically.

51 Takumi K, et al, 2008. Evidence for an increasing presence of *Echinococcus multilocularis* in foxes in the Netherlands. International Journal for Parasitology. 38, 571-578.

52 Berke O, et al, 2008. Emergence of *Echinococcus multilocularis* among red foxes in northern Germany 1991-2005. Veterinary Parasitology 155, 319-322.

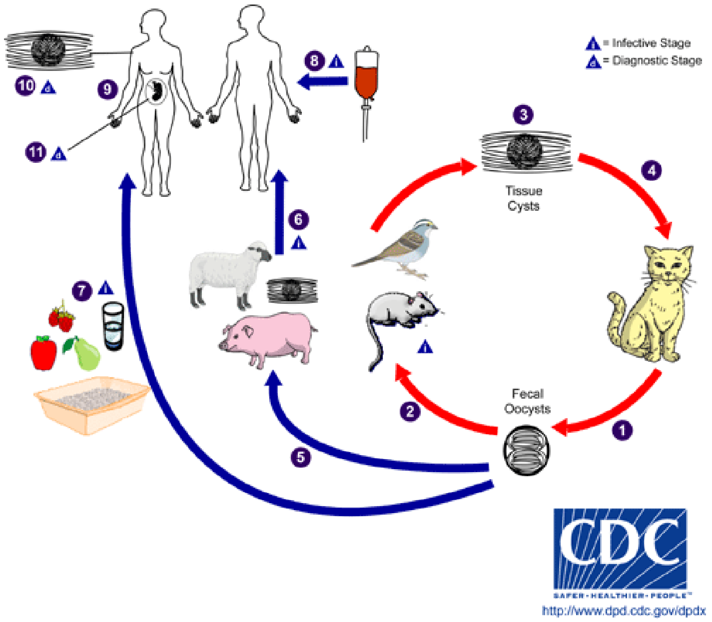
53 Vervaeke M, et al, 2006. Spatial spreading of *Echinococcus multilocularis* in red foxes across nation borders in Western Europe. Preventive Veterinary Medicine 76, 137-150.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.10 *Toxoplasma*

*Toxoplasma* infection is common in animals and humans. The causative agent is an obligate intracellular protozoan parasite, *Toxoplasma gondii*. Nearly all warm-blooded animals can act as intermediate hosts, and seemingly all animals may be carriers of tissue cysts of this parasite (Figure TO1). However, the parasite only matures in domestic and wild cats, which are the definitive hosts.

***Figure TO1. Life cycle of* Toxoplasma gondii**




Source: [www.dpd.cdc.gov/dpdx/HTML/Toxoplasmosis.htm](www.dpd.cdc.gov/dpdx/HTML/Toxoplasmosis.htm)

The infection may be acquired by humans through the consumption of undercooked meat containing intermediate cysts or food/water contaminated with oocysts from cat faeces or from handling contaminated soil or cat litter trays. Most human infections are asymptomatic or cause mild flu-like symptoms resulting in long-lasting immunity. Lymphadenitis accompanied by fever and headache is the most frequent clinical sign of infection in humans. About 50 %-80 % of the European population are estimated to be infected. Occasionally the parasite may cause a serious fetal infection resulting in abortion or congenital lesions in the child's brains, eyes or other organs, particularly if the mother acquires her first infection during the first trimester of pregnancy.

In animals, *Toxoplasma* is an important cause of abortion in sheep and goats, but may be controlled by proper management practices and vaccination.

***Table TO1. Overview of countries reporting data on* Toxoplasma*, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 19 | **MSs:** AT, BG, CY, CZ, EE, FI, HU, IE, LV, LT, LU, MT, PL, RO, SK, SI, ES, SE, UK<br>**Non-MSs:** IS, LI, NO |
| Animal | 19 | **MSs:** AT, BE, BG, CY, DE, EE, ES, FI, GR, HU, IE, IT, LV, NL, PL, PT, RO, SK, UK<br>**Non-MSs:** CH, NO |

### 3.10.1 Congenital toxoplasmosis in humans

For the first time, only cases reported in infants (<12 months) according to the EU case definition (Decision 2008/426/EC[54]) are presented in this chapter. In total, 21 confirmed human cases of congenital toxoplasmosis were reported from 18 EU MSs in 2010 (Table TO2). The overall notification rate was 0.56 per 100,000 population. No deaths in infants due to toxoplasmosis were reported in 2010; however, for most cases this information was not reported (19 out of 21 cases with unknown data on the outcome of the disease).

***Table TO2. Reported cases of congenital toxoplasmosis in humans (<12 months of age)[1] and notification rates for 2010, TESSy data for 2007-2010***

| Country | 2010 | | | | 2009 | 2008 | 2007 |
|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases | Confirmed cases/ 100,000 | Confirmed cases | | |
| Austria | C | 1 | 1 | 1.32 | 1 | 0 | 1 |
| Belgium | - | - | - | - | - | - | - |
| Bulgaria | A[2] | - | - | - | - | - | - |
| Cyprus | U | 0 | 0 | 0 | - | - | - |
| Czech Republic | C | 2 | 2 | 1.69 | 2 | 2 | 1 |
| Denmark | - | - | - | - | - | - | - |
| Estonia | C | 0 | 0 | 0 | - | - | - |
| Finland | U | 0 | 0 | 0 | - | - | 1 |
| France | - | - | - | - | 266 | - | - |
| Germany | - | - | - | - | - | - | - |
| Greece | - | - | - | - | - | - | - |
| Hungary | C | 1 | 1 | 1.05 | 3 | 1 | - |
| Ireland | C | 1 | 1 | 1.36 | - | 2 | 2 |
| Italy | - | - | - | - | - | - | - |
| Latvia | U | 0 | 0 | 0 | - | - | - |
| Lithuania | C | 0 | 0 | 0 | - | - | - |
| Luxembourg | C | 0 | 0 | 0 | - | - | - |
| Malta | U | 0 | 0 | 0 | - | - | - |
| Netherlands | - | - | - | - | - | - | - |
| Poland | C | 7 | 7 | 1.68 | 3 | - | - |
| Portugal | - | - | - | - | - | - | - |
| Romania | C | 0 | 0 | 0 | 2 | - | - |
| Slovakia | C | 0 | 0 | 0 | - | - | 2 |
| Slovenia | C | 0 | 0 | 0 | 1 | - | 2 |
| Spain[3] | C | 0 | 0 | 0 | 1 | 1 | - |
| Sweden | C | 0 | 0 | 0 | - | - | - |
| United Kingdom | C | 9 | 9 | 1.15 | 10 | 5 | 3 |
| **EU Total** | | **21** | **21** | **0.56** | **289** | **11** | **16** |
| Iceland | - | - | - | - | - | - | - |
| Liechtenstein | - | - | - | - | - | - | - |
| Norway | - | - | - | - | - | - | - |

A: aggregated data report; C: case-based report; U: unspecified; –: no report.
1. According to Decision 2008/426/EC.
2. Aggregated data not included as cases reported under the 0-4 year age group; population data not included in the EU rate.
3. Surveillance system covers 25 % of the total population.

54 Commission Decision 2008/426/EC of 28 April 2008 amending Decision 2002/253/EC laying down case definitions for reporting communicable diseases to the Community network under Decision No 2119/98/EC of the European Parliament and of the Council. OJ L 159, 18.6.2008, p. 46–90.

### 3.10.2 *Toxoplasma* in animals

In total, 19 MSs and two non-MSs reported information on the occurrence of *Toxoplasma* in animals in 2010. Overall, the number of sheep, goats and cats reported as tested among MSs for *Toxoplasma* increased during the last three years, whereas the number of cattle, pigs and dogs tested decreased in 2010 compared with the number tested in 2009 (Table TO3). Detection of the parasite or exposure to it, as indicated by a positive serological test, was reported in cattle, pigs, sheep, goats, cats and dogs as presented in Table TO3. Positive findings were also reported in birds, deer, foxes, hares, kangaroos, monkeys, mouflon, pigeons and wild boar.

During the years 2008-2010, the highest proportion of samples positive for *Toxoplasma* or antibodies to *Toxoplasma* across all reporting MSs was reported from sheep and goats. This proportion was at reporting MSs level of 23.9 % in 2008, 24.4 % in 2009 and 18.2 % in 2010. In particular, Romania reported a large number of sheep and goats tested in 2010 (5,210 tested animals with 14.4 % positive). In 2010, the proportion of positive samples in all sheep and goats ranged from 0.7 % to 96.3 % among MSs (Table TO3). However, as exemplified by the latter proportion of positive samples (96.3 %) from Belgium which originated from aborted sheep and goats, these data might have been heavily influenced as a result of sampling based on clinical disease or suspicion of an infection, even though the reason for sampling is not always reported by MSs. In 2010, Austria, Cyprus, Greece, Ireland, Italy, the Netherlands, Norway, Switzerland and the United Kingdom all reported data originating from clinical sampling of sheep and goats.

In 2010, 1.2 % of tested cattle and 2.2 % of tested pigs were positive for *Toxoplasma* or antibodies to *Toxoplasma* in the reporting MS group. Belgium found 21 out of 22 cattle samples positive in diagnostic investigations, whereas the Netherlands (N=2,769) and Austria (N=11) did not find any positive samples from clinical investigations of cattle and Ireland detected 4.8 % positive samples out of 104 clinical samples. In pigs, only the United Kingdom reported positive samples (26.8 %) in 2010.

In 2010, data on *Toxoplasma* in cats were reported from 14 MSs as well as from Norway and Switzerland. Overall 12.9 % of tested animals were positive across reporting MSs. This was similar to the proportion of positive animals reported in previous years. In dogs, data on *Toxoplasma* were reported by 10 MSs as well as by Norway and Switzerland, and in total at EU level 13.4 % of animals were positive. Austria, Italy, the Netherlands, Norway and Switzerland all reported data based on clinical sampling of cats and dogs.

In 2010 there was an improvement in reporting on the sampling details, with more information submitted than in recent years. However, no formal analyses of trends at EU level over the years can be carried out as data between the years are not comparable owing to variations in the MSs reporting data from year to year. At a national level, since 2008, the Netherlands has continued to show a decrease in *Toxoplasma* in sheep and goats and failed to find any positive cattle.

*Table TO3. Findings of T. gondii[1] in animals, 2008-2010*

| Country | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sampling context | N | Pos | % Pos | Sampling context | N | Pos | % Pos | Sampling context | N | Pos | % Pos |
| **Cattle** | | | | | | | | | | | | |
| Austria | Clinical investigations | 11 | 0 | 0 | - | 23 | 0 | 0 | Clinical investigations | 13 | 0 | 0 |
| Belgium | Diagnostic | 22 | 21 | 95.5 | - | - | - | - | - | - | - | - |
| Finland | - | 422 | 0 | 0 | - | 463 | 0 | 0 | Clinical investigations | 85 | 0 | 0 |
| France | - | - | - | - | Monitoring | 2,349 | 304 | 12.9 | - | - | - | - |
| Germany | - | 256 | 0 | 0 | - | 296 | 0 | 0 | Surveillance | 199 | 1 | 0.5 |
| Hungary | - | - | - | - | - | 1 | 1 | 100 | - | - | - | - |
| Ireland | Clinical investigations | 104 | 5 | 4.8 | - | 24 | 1 | 4.2 | - | 37 | 1 | 2.7 |
| Italy [2] | Mixed | 106 | 17 | 16.0 | - | 163 | 31 | 19.0 | Mixed | 81 | 17 | 21.0 |
| Latvia | - | 7 | 0 | 0 | - | - | - | - | - | - | - | - |
| Netherlands | Clinical investigations | 2,769 | 0 | 0 | Clinical investigations | 2,648 | 0 | 0 | Clinical investigations | 3,469 | 0 | 0 |
| Poland | - | - | - | - | - | 400 | 0 | 0 | Survey | 299 | 26 | 8.7 |
| Portugal | - | 21 | 0 | 0 | - | 22 | 0 | 0 | - | 8 | 3 | 37.5 |
| Slovakia | Monitoring | 3 | 0 | 0 | Clinical investigations | 22 | 0 | 0 | - | 48 | 5 | 10.4 |
| Spain | - | 11 | 0 | 0 | Clinical investigations | 13 | 1 | 7.7 | - | - | - | - |
| **Total (11 MSs in 2010)** | | **3,732** | **43** | **1.2** | | **6,424** | **338** | **5.3** | | **4,239** | **53** | **1.3** |
| Switzerland | Clinical investigations | 1 | 0 | 0 | Clinical investigations | 4 | 0 | 0 | Clinical investigations | 1 | 0 | 0 |
| **Pigs** | | | | | | | | | | | | |
| Austria | - | - | - | - | - | 5 | 1 | 20.0 | Clinical investigations | 25 | 1 | 4.0 |
| Finland | - | 511 | 0 | 0 | - | 1,144 | 0 | 0 | Clinical investigations | 393 | 0 | 0 |
| Germany | - | 450 | 0 | 0 | - | 705 | 0 | 0 | Surveillance | 479 | 0 | 0 |
| Ireland | - | - | - | - | - | 9 | 0 | 0 | - | 8 | 1 | 12.5 |
| Italy | Control and eradication programmes | 103 | 0 | 0 | - | - | - | - | Survey | 14 | 0 | 0 |
| Latvia | - | - | - | - | - | 5 | 0 | 0 | - | - | - | - |
| Poland | - | - | - | - | - | 550 | 8 | 1.5 | Survey | 326 | 59 | 18.1 |
| Portugal | - | 1 | 0 | 0 | - | - | - | - | - | - | - | - |
| Romania | - | 6 | 0 | 0 | - | - | - | - | - | - | - | - |
| United Kingdom[3] | Surveillance | 97 | 26 | 26.8 | Surveillance | 10 | 1 | 10.0 | - | - | - | - |
| **Total (6 MSs in 2010)** | | **1,168** | **26** | **2.2** | | **2,428** | **10** | **0.4** | | **1,245** | **61** | **4.9** |
| Norway | Clinical investigations | 3 | 0 | 0 | - | - | - | - | - | - | - | - |
| Switzerland | Clinical investigations | 1 | 0 | 0 | - | - | - | - | Clinical investigations | 1 | 0 | 0 |

Table continued overleaf.

### *Table TO3 (continued). Findings of T. gondii[1] in animals, 2008-2010*

| Country | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sampling context | N | Pos | % Pos | Sampling context | N | Pos | % Pos | Sampling context | N | Pos | % Pos |
| **Sheep and goats** | | | | | | | | | | | | |
| Austria | Clinical investigations | 68 | 22 | 32.4 | - | 118 | 53 | 44.9 | Clinical investigations | 39 | 12 | 30.8 |
| Belgium | Abortion protocol | 82 | 79 | 96.3 | - | - | - | - | - | - | - | - |
| Cyprus | Clinical investigations | 304 | 34 | 11.2 | - | - | - | - | - | - | - | - |
| Finland | - | 88 | 3 | 3.4 | - | 92 | 0 | 0 | Clinical investigations | 23 | 0 | 0 |
| Germany | - | 349 | 34 | 9.7 | - | 338 | 23 | 6.8 | Surveillance | 207 | 8 | 3.9 |
| Greece[4] | - | - | - | - | - | 257 | 105 | 40.9 | Clinical investigations | 544 | 308 | 56.6 |
| Hungary | - | 3 | 0 | 0 | - | - | - | - | - | 5 | 0 | 0 |
| Ireland | Clinical investigations | 757 | 145 | 19.2 | - | 712 | 63 | 8.8 | - | 531 | 82 | 15.4 |
| Italy[5] | Mixed | 285 | 134 | 47.0 | - | 654 | 304 | 46.5 | Mixed | 229 | 117 | 51.1 |
| Latvia | - | 29 | 16 | 55.2 | - | 11 | 4 | 36.4 | - | - | - | - |
| Lithuania | - | - | - | - | - | - | - | - | Surveillance | 6 | 0 | 0 |
| Netherlands | Clinical investigations | 609 | 4 | 0.7 | Clinical investigations | 987 | 75 | 7.6 | Clinical investigations | 2,174 | 336 | 15.5 |
| Poland | - | - | - | - | - | - | - | - | Survey | 166 | 60 | 36.1 |
| Portugal | - | 25 | 2 | 8.0 | - | 21 | 7 | 33.3 | - | 53 | 23 | 43.4 |
| Romania | - | 5,210 | 748 | 14.4 | - | 9 | 3 | 33.3 | - | - | - | - |
| Slovakia | Monitoring | 6 | 1 | 16.7 | Clinical investigations | 17 | 10 | 58.8 | - | 18 | 8 | 44.4 |
| Spain | - | - | - | - | Clinical investigations | 260 | 61 | 23.5 | Clinical investigations | 19 | 4 | 21.1 |
| United Kingdom[6] | Surveillance | 781 | 340 | 43.5 | Surveillance | 741 | 323 | 43.6 | - | - | - | - |
| **Total (14 MSs in 2010)** | | **8,596** | **1,562** | **18.2** | | **4,217** | **1,031** | **24.4** | | **4,014** | **958** | **23.9** |
| Norway | Clinical investigations | 50 | 24 | 48.0 | - | 31 | 9 | 29.0 | Mixed | 2,314 | 442 | 19.1 |
| Switzerland | Clinical investigations | 9 | 1 | 11.1 | Clinical investigations | 15 | 2 | 13.3 | Clinical investigations | 11 | 1 | 9.1 |

Table continued overleaf.

***Table TO3 (continued). Findings of* T. gondii[1] *in animals, 2008-2010***

| Country | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sampling context | N | Pos | % Pos | Sampling context | N | Pos | % Pos | Sampling context | N | Pos | % Pos |
| **Cats** | | | | | | | | | | | | |
| Austria | Clinical investigations | 1 | 0 | 0 | - | 4 | 1 | 25.0 | - | - | - | - |
| Belgium | Diagnostic | 166 | 53 | 31.9 | - | - | - | - | - | - | - | - |
| Bulgaria | - | 20 | 0 | 0 | - | 11 | 0 | 0 | - | - | - | - |
| Estonia | - | 7 | 0 | 0 | - | 8 | 0 | 0 | - | 6 | 0 | 0 |
| Finland | - | 318 | 1 | 0.3 | - | 312 | 0 | 0 | Clinical investigations | 282 | 8 | 2.8 |
| Germany | - | 794 | 2 | 0.3 | - | 898 | 6 | 0.7 | Surveillance | 599 | 9 | 1.5 |
| Hungary | - | 1 | 1 | 100 | - | - | - | - | - | 3 | 0 | 0 |
| Ireland | - | - | - | - | - | - | - | - | - | 4 | 0 | 0 |
| Italy | Mixed | 51 | 7 | 13.7 | - | 287 | 106 | 36.9 | Mixed | 93 | 14 | 15.1 |
| Latvia | - | 60 | 7 | 11.7 | - | 68 | 12 | 17.6 | - | 121 | 17 | 14.0 |
| Netherlands | Clinical investigations | 459 | 93 | 20.3 | - | - | - | - | - | - | - | - |
| Poland | - | 1 | 0 | 0 | - | - | - | - | Mixed | 111 | 45 | 40.5 |
| Portugal | - | 172 | 78 | 45.3 | - | 219 | 60 | 27.4 | Clinical investigations | 16 | 3 | 18.8 |
| Romania | - | 30 | 4 | 13.3 | - | 28 | 6 | 21.4 | - | - | - | - |
| Slovakia | Monitoring | 128 | 39 | 30.5 | Clinical investigations | 139 | 27 | 19.4 | - | 172 | 34 | 19.8 |
| **Total (14 MSs in 2010)** | | **2,208** | **285** | **12.9** | | **1,974** | **218** | **11.0** | | **1,407** | **130** | **9.2** |
| Norway | Clinical investigations | 3 | 1 | 33.3 | - | - | - | - | - | - | - | - |
| Switzerland | Clinical investigations | 447 | 1 | 0.2 | Clinical investigations | 477 | 6 | 1.3 | Clinical investigations | 427 | 3 | 0.7 |

Table continued overleaf.

### *Table TO3 (continued). Findings of* T. gondii[1] *in animals, 2008-2010*

| Country | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sampling context | N | Pos | % Pos | Sampling context | N | Pos | % Pos | Sampling context | N | Pos | % Pos |
| **Dogs** | | | | | | | | | | | | |
| Austria | Clinical investigations | 2 | 0 | 0 | - | 1 | 0 | 0 | - | - | - | - |
| Belgium | Diagnostic | 186 | 81 | 43.5 | - | - | - | - | - | - | - | - |
| Estonia | - | 1 | 0 | 0 | - | - | - | - | - | - | - | - |
| Finland | - | 636 | 0 | 0 | - | 726 | 0 | 0 | Clinical investigations | 496 | 1 | 0.2 |
| Germany | - | 259 | 0 | 0 | - | 279 | 0 | 0 | Surveillance | 258 | 0 | 0 |
| Hungary | - | - | - | - | - | - | - | - | - | 5 | 0 | 0 |
| Ireland | - | - | - | - | - | 2 | 0 | 0 | - | 5 | 0 | 0 |
| Italy | Mixed | 231 | 85 | 36.8 | - | 549 | 234 | 42.6 | Mixed | 199 | 71 | 35.7 |
| Latvia | - | 34 | 6 | 17.6 | - | 48 | 4 | 8.3 | - | 54 | 19 | 35.2 |
| Netherlands | - | 44 | 15 | 34.1 | - | - | - | - | - | - | - | - |
| Poland | - | - | - | - | - | - | - | - | Clinical investigations | 1 | 0 | 0 |
| Portugal | - | - | - | - | - | 1 | 0 | 0 | - | - | - | - |
| Romania | - | 14 | 4 | 28.6 | - | 13 | 10 | 76.9 | - | - | - | - |
| Slovakia | Monitoring | 78 | 8 | 10.3 | Clinical investigations | 95 | 18 | 18.9 | - | 123 | 48 | 39.0 |
| **Total (10 MSs in 2010)** | | **1,485** | **199** | **13.4** | | **1,714** | **266** | **15.5** | | **1,141** | **139** | **12.2** |
| Norway | Clinical investigations | 1 | 0 | 0 | - | - | - | - | - | - | - | - |
| Switzerland | Clinical investigations | 2 | 0 | 0 | Clinical investigations | 3 | 1 | 33.3 | Clinical investigations | 1 | 0 | 0 |

Note: Includes data for which the sample size is <25. Data from 2008 have been amended to separate different sampling units.
Note: In 2010, serological data were reported in each animal category by the following MSs:
Cattle: Austria, Ireland, Latvia, Netherlands and Slovakia.
Pigs: Romania and United Kingdom.
Sheep and goats: Austria, Cyprus, Greece, Ireland, Latvia, Netherlands, Romania, Slovakia and United Kingdom.
Cats: Austria, Latvia, Netherlands and Romania.
Dogs: Latvia, Netherlands and Romania.

1. Positive samples are *T. gondii*, except positive samples from Germany (2010, 2009, 2008) and Switzerland (2009, 2008), which are *Toxoplasma* spp. In Germany (2010) and Italy (2008, 2010) positive samples are reported as a mix of *Toxoplasma* spp. and *T. gondii*.
2. In 2010 Italy tested additional 30 cattle herds from different sampling contexts. No positive samples were detected. In 2008 Italy tested additional 207 cattle herds/holdings from different sampling contexts, 66 of which were positive.
3. In 2010, one positive sample from pigs was reported in the United Kingdom, but the number of tested samples was not reported.
4. In 2010, Greece tested 17 flocks of sheep and goats from abortion investigations, 14 of which were positive.
5. In 2010, Italy tested additional 370 herds of sheep and goats from different sampling contexts, 180 of which were positive. In 2008 Italy tested additional 783 herds/holdings of sheep and goats from different sampling contexts, 325 of which were positive.
6. In the United Kingdom, in 2010 the figure reported for sheep and goats is the number of sheep sampled only. 266 additional positive samples were reported from sheep and one from goats from clinical investigations, but the number tested was not reported. In 2010 the United Kingdom tested an additional 3,539 flocks of sheep in a national survey, 2,619 of which were positive. In 2009, one positive sample from goats and 247 positive samples from sheep from clinical investigations were reported, but the number of tested samples was not reported. In 2008, 201 positive samples from sheep and goats were reported but the number tested was not reported.

### 3.10.3 Discussion

The surveillance of human toxoplasmosis varies significantly among countries, most likely a result of the majority of cases being asymptomatic. A comparison of the data is therefore difficult to make. In order to harmonise EU reporting and focus on the severe cases, the new EU case definition requires reporting only of congenital cases that could have a fatal outcome. Most MSs, however, still have to implement this new case definition. In total, 21 confirmed human cases of congenital toxoplasmosis were reported from 18 EU MSs in 2010.

As observed already in 2009, increasing numbers of MSs provided data on *Toxoplasma* in animals. Most reporting MSs detected positive findings from animals. As in 2009, the highest proportion of positive or seropositive samples was found from sheep and goats in 2010. Clinical signs of disease caused by *Toxoplasma* (such as abortion) are particularly obvious in these two animal species, so they are more likely to be tested due to clinical suspicion than other species. This could account for the high levels of positive samples detected from sheep and goats compared with other animal species, in which the more subtle signs of infection (particularly in the acute phase of the disease) may be missed.

*Toxoplasma* was also reported by MSs from cattle, pigs, dogs, cats, birds, deer, foxes, hares, kangaroos, monkeys, mouflon, pigeons and wild boar.

In a scientific opinion[55] of the panel on Biological Hazards on the surveillance and monitoring of *Toxoplasma* in humans, food and animals from 2007 it was concluded that no representative data from humans, food or animals are available. However, it was suggested that harmonised analytical methods for detecting the parasite should be developed before comparable monitoring was introduced in the EU.

Following a request from the EC, the Panels on Biological Hazards (BIOHAZ), on Contaminants in the Food Chain (CONTAM) and on Animal Health and Welfare (AHAW) were asked to deliver a series of Scientific Opinions on the public health hazards (biological and chemical, respectively) to be covered by inspection of meat for several animal species; the first Opinion dealt with swine[56]. *Toxoplasma* was deemed to be of medium relevance at present in the EU and one of the most relevant biological hazards in the context of meat inspection of swine, alongside *Salmonella* spp., *Yersinia enterocolitica* and *Trichinella* spp.

55 EFSA (European Food Safety Authority), 2007. Scientific opinion of the panel on Biological Hazards on a request from EFSA on Surveillance and monitoring of *Toxoplasma* in humans, food and animal. The EFSA Journal, 583, 1-64.

56 EFSA (European Food Safety Authority), 2007. Scientific Opinion of the Panel on Biological Hazards (BIOHAZ) on monitoring and identification of human enteropathogenic *Yersinia* spp.The EFSA Journal, 595, 1-30.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.11 Rabies

Rabies is a disease caused by a rhabdovirus of the genus *Lyssavirus*. This virus can infect all warm-blooded animals and is transmitted through contact with saliva from infected animals, typically from foxes and stray dogs, for example via animal bites. The disease causes swelling in the central nervous system of the host and is usually fatal. The majority of rabies cases are caused by the classical rabies virus (genotype 1). In addition, two sub-types of rabies virus, *Lyssavirus* genotypes 5 and 6, also known as European Bat *Lyssavirus* (EBLV-1 and -2, respectively), are detected in bats in Europe. In rare cases, the infection from bats can be transferred to other mammals, including humans.

Symptoms in humans include a sense of apprehension, headache and fever, leading to death. Human cases are extremely rare in industrialised countries. However, those working with bats and other wildlife are encouraged to seek advice on preventive immunisation.

In animals, the pathogenicity and infectivity of the disease vary greatly among different species. Infected animals may exhibit a wide range of symptoms, including drooling, difficulty in swallowing, irritability, strange behaviour, alternating rage and apathy and increasing paralysis of lower jaw and hind parts. Animals may excrete the virus during the incubation period, up to 14 days prior to the onset of clinical symptoms.

Table RA1 presents countries reporting data in 2010

***Table RA1. Overview of countries reporting data on* Lyssavirus*, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 26 | **MSs:** except for DE<br>**Non-MSs:** IS, NO |
| Animal | 23 | **All MSs** except CY, IE, MT, PT<br>**Non-MSs:** CH, NO |

### 3.11.1 Rabies in humans

Generally, very few cases of rabies in humans are reported in the EU, and most MSs have not had any indigenous cases for decades. In 2010, two autochthonous cases of rabies were reported in the EU, from Romania (Table RA2). This was the third consecutive year that Romania had reported cases of human rabies. These two fatal cases occurred in two girls, 11 and 10 years old, from rural areas. The probable transmission mode was contact with sick animals and a rabid cat.

***Table RA2. Human rabies cases, 2005-2010***

| Year | Country | Case |
|---|---|---|
| 2005 | Germany | 4 cases in total: 3 patients became ill after receiving organs from a rabies infected donor. The donor was infected during a trip to India. |
| 2006 | | No cases |
| 2007 | Finland | 1 case from the Philippines who was bitten by a dog in his home country, fell ill with rabies when working on a ship in the Baltic Sea and was hospitalised in Finland and died there. |
| | Germany | 1 case imported from Morocco |
| | Lithuania | 1 case imported from India after contact with dog |
| 2008 | France | 1 case (French Guyana) |
| | Netherlands | 1 case imported from Kenya (fatal) |
| | Romania | 1 case (fatal) |
| | United Kingdom | 1 imported case |
| 2009 | Romania | 1 fatal case, 69 year old female from a rural area bitten by a fox. The patient did not visit a hospital or reported it to the veterinary authorities. |
| 2010 | Romania | 2 fatal cases, 10 and 11 year old girls from rural areas. Possible transmission by cat bite and unknown. |

With reporting of two indigenous cases of rabies in humans, 2010 was the third consecutive year for which Romania reported rabies cases. The first case occurred in a 10-year-old girl from rural Romania. She was admitted to hospital with flaccid paralysis and suspected botulism on 30 March. Death occurred on 4 June, and rabies was diagnosed based on post-mortem histological tests. The epidemiological investigation carried out by the village doctor was not conclusive but suggested possible transmission by contact with sick animals.

The second reported case was in an 11-year-old girl, also from a rural area. She developed a clinical onset of fever and anxiety on 8 August after being bitten by a cat on her thumb six weeks earlier. The symptoms progressed to hydrophobia and delirium, and death occurred on 13 September as a result of multiple organ failure, acute bronchopneumonia and haemolytic dysfunction. The cat was not vaccinated against rabies and died shortly after the incident. The cat was not tested for rabies.

### 3.11.2 Rabies in animals

With the exception of Cyprus, Ireland, Malta, and Portugal, all MSs and two non-MSs (Switzerland and Norway) provided information on rabies cases in animals. Ten MSs reported data on rabies in animals other than bats, and six MSs reported rabies infected bats (Tables RA3 and RA4).

According to Directive 64/432/EEC[57], rabies is a notifiable disease in bovine animals and pigs. The wildlife animal species form the reservoir of rabies in the EU and control measures are specifically targeted to the wildlife population. In 2010, Austria, Bulgaria, Estonia, Finland, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia had eradication programmes approved and co-financed by the European Commission (Decision 2009/883/EC). Within the framework of these programmes, oral vaccinations of wildlife are performed through the distribution of bait. Vaccination of carnivorous pets, such as dogs and cats, is compulsory in 15 MSs. For more detailed information on vaccination programmes, refer to Appendix Table RA1.

The majority of samples from domestic animals and wildlife are taken based on suspicion of rabies infection. However, countries carrying out wildlife oral vaccinations monitor the efficiency of the vaccinations. These monitoring programmes involve the sampling of healthy (rabies unsuspected) foxes and raccoon dogs according to the vaccination area, and these animals are tested for vaccine intake and for specific immunity, as well as for rabies virus. The results of the last test are included in the reporting by MSs. The vaccination programmes can be conducted nation-wide or in at-risk areas only, and they may differ in frequency and be ordinary vaccination campaigns (twice a year) or extraordinary (as many campaigns as required by the epidemiological situation).

In 2010, the total number of reported classical rabies findings in animals increased slightly from 837 in 2009 to 883 cases. Overall, since 2006, the total number of reported classical rabies cases in animals has decreased (Figure RA3).

Although the number of positive cases in Romania decreased, this MS still reported the highest number (448) of rabies cases from animals other than bats. In Bulgaria, the number of cases fell from 59 (2009) to six (2010), whereas Italy saw an increase from 68 (2009) to 209 (2010) mostly attributable to an increase of cases in foxes, cats and ‘other animals’. Poland also reported an increase of cases of rabies in animals other than bats from six cases in 2009 to 145 cases in 2010, due to an increase of reported cases in foxes, and the occurrence of cases in other wildlife and domestic animals (Table RA3 and Table RA4).

In 2010, fewer MSs provided information at virus species level: four out of eight MSs reported only classical rabies cases (rather than unspecified *Lyssavirus*) compared with seven out of nine in 2009 and five out of nine MSs in 2008.

In 2010, two cases of rabies in imported animals were reported. Belgium reported one case of EBLV-1 in a bat originating from the north of Spain. The infected bat, which had died in Spain, was brought to Belgium for diagnosis by a Belgian photographer who had been bitten by the bat. Germany reported, in the context of import control, a case of rabies in a dog imported from Croatia.

#### Domestic animals

In 2010, seven MSs (Hungary, Italy, Latvia, Lithuania, Poland, Romania and Slovenia) reported cases of classical rabies or unspecified *Lyssavirus* in (non-imported) domestic animals (farm animals, cats and dogs; Figure RA4 and Table RA3), compared with six MSs in 2009 when Poland did not report rabies cases in domestic animals. As in 2009, Spain reported rabid dogs occurring in Spanish territories in North Africa.

In the EU, the number of cases reported in farm animals increased slightly in 2010, whereas the overall number of rabid pets decreased slightly (Figure RA3 and Table RA3). However, among pet animals, the number of cases increased in cats and decreased in dogs. The increase in rabid farm animals is mainly explained by the increase in the cases in Romania and Poland. Poland did not report any rabies cases in

57 Council Directive 64/432/EEC of 26 June 1964 on animal health problems affecting intra-Community trade in bovine animals and swine. OJ 121, 29.7.1964, p. 1977-2012.

domestic animals (farm animals, cats and dogs) in 2009, but reported cases in farm animals (seven), cats (eight) and dogs (six) in 2010. As in 2009 when Romania reported 115 cases, most (121) of the rabies cases in domestic animals were observed in Romania in 2010.

The insets in Figure RA4 show the regional distribution of the cases in domestic animals in Italy and Romania, and Figure RA1 and the boxed text for Poland shows the localisation of outbreaks occurring in domestic animals.

Historically, Poland has reported many cases of rabies in animals. As a result of the eradication programme developed and implemented since 1993, the overall number of cases reported decreased substantially from 2,964 cases in 2001 to eight cases in 2009. However, in 2010, the number of classical rabies cases increased to 145 cases (in domestic and wild animals) mostly due to an outbreak of rabies that started in August 2010 in the Malopolska southern region of Poland (Figure RA1). As a result, the number of rabies cases reported by Poland in foxes increased from six in 2009 to 117 in 2010 and in domestic animals from none in 2009 to 22 in 2010 (seven farm animals, eight cats, six dogs and one stray dog). In May 2010 there was flooding in the Malopolska region that might have affected the fox population's (vaccinal) immunity, thus partially explaining the outbreak occurrence. Together with public information and awareness campaigns, the Polish authorities implemented further measures to control the rabies outbreak and mitigate the risk to public health, including an emergency vaccination of domestic animals and an additional vaccination of wild animals to eradicate the disease[58].

***Figure RA1. Classical rabies cases in domestic and wild animals, Poland, 2010[1]***


1. Each dot represents an outbreak of rabies. Therefore, more than one case might have occurred in one dot. Cases occurred in foxes (red dot), raccoon dogs (dark blue dot), badgers (orange dot), martens (light blue dot), roe deer (pink dot), dogs (violet dot), cats (yellow dot), cattle (black dot), horses (dark green dot) and sheep (grey dot).

58 SCFCAH presentation. December 2010: http://ec.europa.eu/food/committees/regulatory/scfcah/animal_health/presentations_en.htm#01122010

### Wildlife

In 2010, eight out of the 23 reporting MSs detected rabies cases in wildlife (Bulgaria, Italy, Latvia, Lithuania, Hungary, Poland, Romania and Slovenia); the MSs with positive animals were the same as in 2009, with the exception of Estonia, which did not report any cases in 2010 (Figure RA5 and Table RA4).

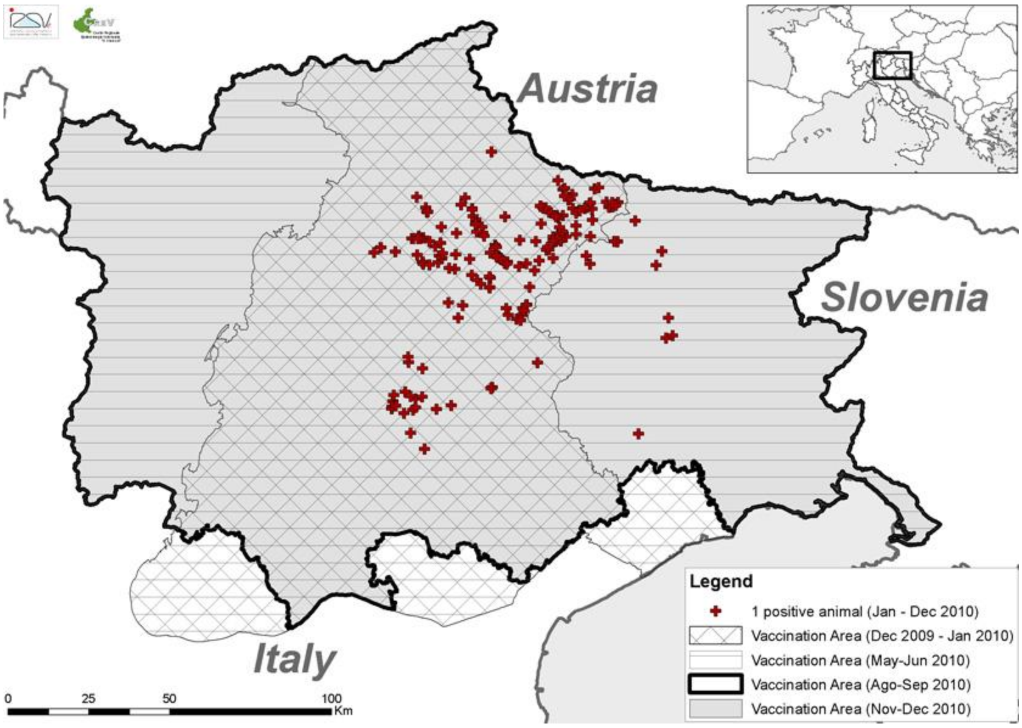
In wildlife, most cases of rabies were attributable to foxes, followed by raccoon dogs and badgers. Twenty-two MSs and two non-MSs reported data on rabies in foxes in 2010 and all eight MSs reporting classical rabies or unspecified *Lyssavirus* also reported positive cases from foxes. This is similar to findings in previous years, with the exception of Estonia, which did not report any rabid foxes in 2010 (Table RA5).

There was a small increase in reported number of rabid foxes (from 597 in 2009 to 643 cases in 2010) and a notable decrease in the number of rabid raccoon dogs (from 52 in 2009 to 15 cases in 2010). Romania accounted for the majority of reported fox cases (303), which was lower than in 2009 (404). The small increase in fox cases at EU-level was due to Italy’s (rabies outbreak in the north-eastern region in 2008; see dedicated box for Italy and Table RA5) and also Poland’s report (several outbreaks in 2010 in southern Poland; see dedicated box). As in previous years, the majority of positive raccoon dog cases were reported by Lithuania (13), but, in contrast to previous years, Latvia reported only one case in 2010 compared with 24 in 2009. Together with the reduction in cases in raccoon dogs Latvia also reported a reduction in the number of rabid foxes (from 24 in 2009 to 11 in 2010) (Table RA4).

Six MSs reported their findings per region, two of them covering rabies surveillance of the entire national area. Figure RA5 insets and Figure RA2 show that most of the cases of rabies in wildlife in Italy are from the north-eastern regions and none are detected in the rest of the country. In Romania the positive cases of rabies in wildlife are found throughout the different regions.

In 2008 rabies reappeared in wildlife in north-eastern Italy, when nine wildlife cases were reported: one badger and eight foxes. The epidemic spread westwards during 2009, with 64 cases reported in wildlife, mainly in foxes (61 cases), and four cases reported in domestic animals. Despite the control measures in place since 2008 and further implementation in 2009 in coordination with the Slovenian and Austrian authorities, the spread continued westwards and peaked in 2010 with 198 cases in wildlife, while wildlife cases in Slovenia decreased. Cases were mainly in foxes (172 cases) as well as in other wildlife animals (26 cases in badgers, deer and marten). Besides wildlife, an increased number of cases in domestic animals was also observed. Most cases were in cats and were diagnosed during the first four months of 2010, followed by a marked decrease starting in May. The decrease was attributable to the preventive measures applied to both wild animals (four emergency oral fox vaccination campaigns, as displayed in Figure RA2) and domestic animals (compulsory vaccination of dogs and domestic animals at pasture or migrating in at-risk areas: bovines, small ruminants and horses). Cases in domestic animals are considered an indicator of the spreading of rabies, but it is significant that rabid cats either had no owners or were attributable to feral colonies.

***Figure RA2. Classical rabies cases and oral vaccination of foxes in Italy, 2010***




Source: Istituto Zooprofilattico Sperimentale delle Venezie, Italian national reference laboratory for rabies: www.izsvenezie.it

The epidemiological situation in Romania requires the application of a uniform vaccination strategy to the entire territory of Romania, by aeroplane distribution of vaccine baits and by manual distribution in remote areas or areas where flying is forbidden. In 2010 the National Authority for Sanitary Veterinary and Food Safety issued a 'Public procurement tender for rabies vaccine baits in the form of vaccine and its distribution-related services'. However, in Romania complete vaccination of foxes by aeroplane distribution has never been done, and the only means of vaccination so far has been by manual distribution of vaccine baits.

## Bats

Compared with 2009, fewer MSs reported findings of EBLV or unspecified *Lyssavirus* in bats (Figure RA6). In 2010, six MSs reported findings of EBLV-positive bats (France, Germany, the Netherlands, Hungary, Poland and Spain), compared with 10 MSs in 2009 and five MSs in 2008. However, one dead bat was imported to Belgium for diagnosis only and was found to be rabid. France, Sweden and the United Kingdom are the only MSs to report data from passive surveillance programmes for EBLV in bats. Finland, which reported EBLV for the first time in bats in 2009, reported none in 2010. In France, six bats from five different departments across the country were infected by EBLV-1. The United Kingdom did not detect any positive bats in 2010.

For additional information on rabies in animals, refer to the level 3 tables.

*Table RA3. Number of tested animals and positive cases of rabies in domestic animals, 2009-2010*

| Country | Classical rabies virus or unspecified *Lyssavirus* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Farm animals[1] | | | | Cats (pets) | | | | Dogs (pets) | | | |
| | 2010 | | 2009 | | 2010 | | 2009 | | 2010 | | 2009 | |
| | N | Pos | N | Pos | N | Pos | N | Pos | N | Pos | N | Pos |
| Austria | 9 | 0 | 15 | 0 | 52 | 0 | 65 | 0 | 57 | 0 | 70 | 0 |
| Belgium | 412 | 0 | 299 | 0 | 13 | 0 | 13 | 0 | 5 | 0 | 12 | 0 |
| Bulgaria | 4 | 0 | 43 | 4 | - | - | 6 | 2 | - | - | 23 | 3 |
| Czech Republic | 6 | 0 | 5 | 0 | 200 | 0 | 198 | 0 | 152 | 0 | 149 | 0 |
| Denmark | 2 | 0 | - | - | 1 | 0 | - | - | - | - | 2 | 0 |
| Estonia | 19 | 0 | 14 | 0 | 48 | 0 | 39 | 0 | - | - | 24 | 0 |
| Finland | 4 | 0 | 4 | 0 | 15 | 0 | 12 | 0 | 26 | 0 | 16 | 0 |
| France | 16 | 0 | 21 | 0 | 536 | 0 | 668 | 0 | 773 | 0 | - | - |
| Germany | - | - | - | - | - | - | - | - | - | - | - | - |
| Greece | - | - | - | - | 1 | 0 | - | - | 11 | 0 | 5 | 0 |
| Hungary | 50 | 0 | 53 | 0 | 302 | 0 | 337 | 0 | 254 | 1 | 252 | 0 |
| Italy | 69 | 2 | 11 | 1 | 690 | 9 | 198 | 0 | 530 | 0 | 431 | 3 |
| Latvia | 11 | 0 | 20 | 0 | 38 | 0 | 56 | 1 | 38 | 1 | 56 | 5 |
| Lithuania | 24 | 0 | 48 | 8 | 104 | 1 | 103 | 1 | 141 | 1 | 137 | 5 |
| Luxembourg | 5 | 0 | 1 | 0 | 1 | 0 | - | - | - | - | - | - |
| Netherlands | - | - | - | - | 8 | 0 | 6 | 0 | 7 | 0 | 5 | 0 |
| Poland | 56 | 7 | 58 | 0 | 973 | 8 | 856 | 0 | 518 | 6 | 620 | 0 |
| Portugal | - | - | - | - | - | - | 2 | 0 | - | - | 14 | 0 |
| Romania | 262 | 65 | 475 | 48 | 64 | 24 | 36 | 29 | 187 | 32 | 474 | 38 |
| Slovakia | 4 | 0 | 9 | 0 | 139 | 0 | 150 | 0 | 185 | 0 | 241 | 0 |
| Slovenia | 45 | 1 | 112 | 1 | 68 | 0 | 68 | 0 | 46 | 0 | 55 | 0 |
| Spain | - | - | - | - | 16 | 0 | 26 | 0 | 36 | 0 | 42 | 0 |
| Sweden | - | - | - | - | 1 | 0 | 3 | 0 | 5 | 0 | 3 | 0 |
| United Kingdom | - | - | - | - | 16 | 0 | 9 | 0 | 18 | 0 | 14 | 0 |
| **EU Total** | **998** | **75** | **1,188** | **62** | **3,286** | **42** | **2,851** | **33** | **2,989** | **41** | **2,645** | **54** |
| Norway | - | - | - | - | - | - | - | - | 2 | 0 | 3 | 0 |
| Switzerland | 2 | 0 | 4 | 0 | 8 | 0 | 10 | 0 | 15 | 0 | 16 | 0 |

Note: in 2010, one case from a dog in Germany was an imported animal from Croatia, and Spain reported two cases from dogs in animals from Melilla (Spanish city in North Africa). In 2009, Spain reported three dogs from the Spanish cities of North Africa to be positive for rabies (classical rabies virus). These cases are not reported in table RA3.

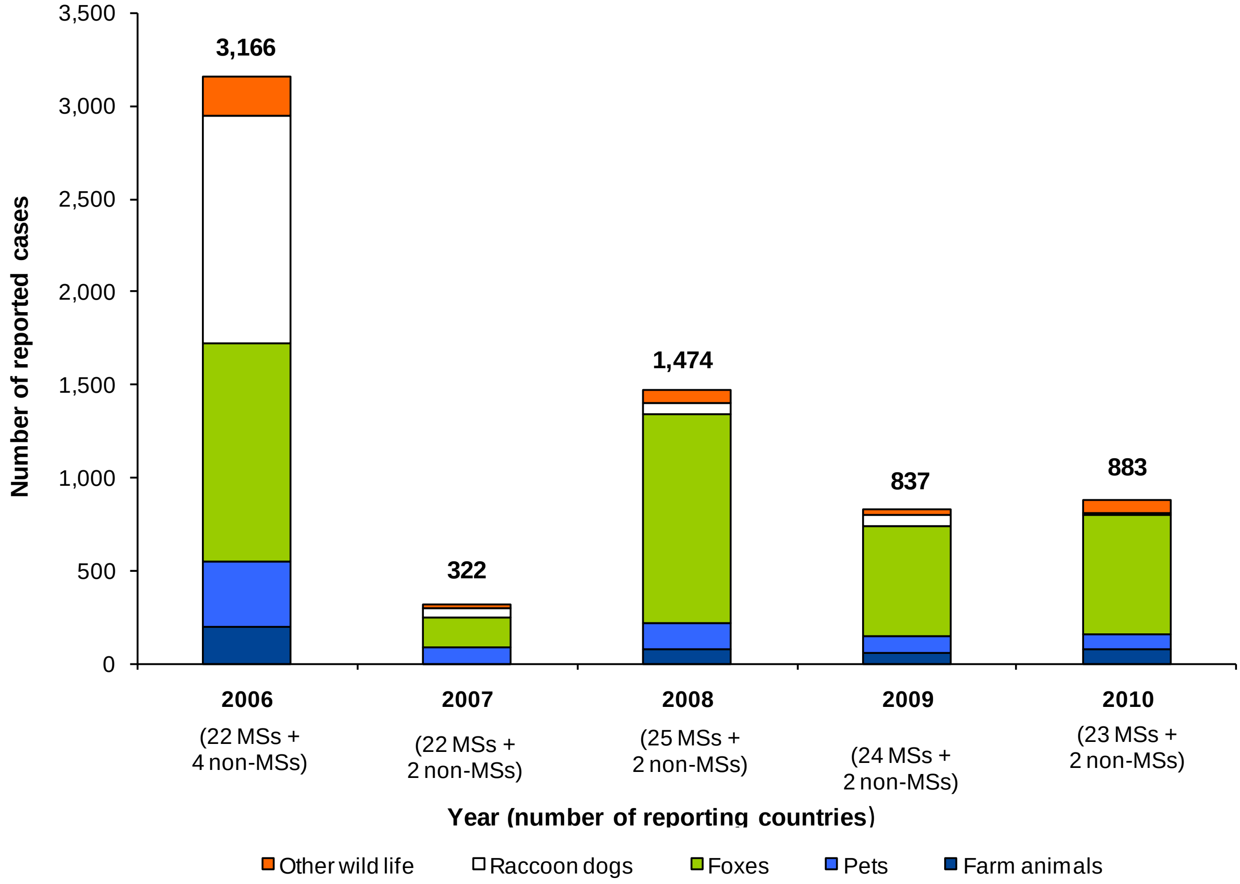
1. Data include cattle, sheep, goats, solipeds, unspecified poultry and pigs.

***Table RA4. Number of tested animals and positive cases of rabies in wildlife, 2009-2010***

| Country | Classical rabies virus or unspecified *Lyssavirus* | | | | | | | | | | | | European Bat *Lyssavirus* or unspecified *Lyssavirus* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Foxes | | | | Raccoon dogs | | | | Other[2] | | | | Bats[3] | | | |
| | 2010 | | 2009 | | 2010 | | 2009 | | 2010 | | 2009 | | 2010 | | 2009 | |
| | N | Pos | N | Pos | N | Pos | N | Pos | N | Pos | N | Pos | N | Pos | N | Pos |
| Austria | 2,358 | 0 | 7,515 | 0 | - | - | - | - | 57 | 0 | 801 | 0 | 80 | 0 | 360 | 0 |
| Belgium | 114 | 0 | 183 | 0 | - | - | - | - | 1 | 0 | 46 | 0 | 58 | 0 | 29 | 0 |
| Bulgaria | 259 | 2 | 397 | 47 | - | - | - | - | 26 | 4 | 37 | 3 | - | - | 1 | 0 |
| Czech Republic | 5,424 | 0 | 7,844 | 0 | 2 | 0 | 1 | 0 | 133 | 0 | 97 | 0 | 12 | 0 | 12 | 0 |
| Denmark | 1 | 0 | - | - | - | - | - | - | - | - | - | - | 10 | 0 | 9 | 1 |
| Estonia | 61 | 0 | 72 | 3 | 84 | 0 | 64 | 0 | 25 | 0 | 16 | 0 | 1 | 0 | 1 | 0 |
| Finland | 148 | 0 | 198 | 0 | 164 | 0 | 181 | 0 | 125 | 0 | 116 | 0 | 8 | 0 | 24 | 1 |
| France[1] | 46 | 0 | 63 | 0 | - | - | - | - | 48 | 0 | 779 | 0 | 174 | 6 | 323 | 11 |
| Germany | 13,012 | 0 | 15,636 | 0 | - | - | - | - | 1,812 | 0 | - | - | 5 | 5 | 5 | 5 |
| Greece | - | - | - | - | - | - | - | - | 10 | 0 | 8 | 0 | - | - | 3 | 0 |
| Hungary | 5,187 | 9 | 7,019 | 2 | - | - | 9 | 0 | 94 | 0 | 136 | 0 | 13 | 1 | 10 | 1 |
| Italy | 6,139 | 172 | 2,921 | 61 | - | - | - | - | 2,083 | 26 | 1,051 | 3 | 6 | 0 | 7 | 0 |
| Latvia[1] | 236 | 11 | 304 | 24 | 93 | 1 | 138 | 24 | 88 | 3 | 144 | 15 | - | - | - | - |
| Lithuania | 447 | 14 | 348 | 17 | 315 | 13 | 315 | 28 | 125 | 4 | 140 | 2 | - | - | - | - |
| Luxembourg | 26 | 0 | 23 | 0 | - | - | - | - | - | - | 1 | 0 | - | - | - | - |
| Netherlands | 6 | 0 | 2 | 0 | - | - | - | - | - | - | 1 | 0 | 129 | 10 | 165 | 11 |
| Poland | 24,158 | 117 | 23,153 | 6 | 90 | 1 | 75 | 0 | 841 | 6 | 589 | 0 | 61 | 6 | 109 | 2 |
| Portugal | - | - | - | - | | | - | - | | | - | - | - | - | - | - |
| Romania | 983 | 303 | 1,173 | 404 | - | - | - | - | 61 | 24 | 17 | 16 | 1 | 0 | 1 | 1 |
| Slovakia | 2,922 | 0 | 3,203 | 0 | - | - | - | - | 48 | 0 | 99 | 0 | 4 | 0 | 2 | 0 |
| Slovenia | 2,276 | 15 | 2,482 | 33 | - | - | - | - | 154 | 0 | 92 | 0 | 1 | 0 | - | - |
| Spain | 25 | 0 | 2 | 0 | - | - | - | - | 2 | 0 | 38 | 0 | 38 | 2 | 31 | 1 |
| Sweden[1] | 1 | 0 | - | - | - | - | - | - | 3 | 0 | - | - | 128 | 0 | 164 | 0 |
| United Kingdom[1] | 2 | 0 | 2 | 0 | - | - | - | - | 0 | 0 | 2 | 0 | 609 | 0 | 1,095 | 1 |
| **EU Total** | **63,831** | **643** | **72,540** | **597** | **748** | **15** | **783** | **52** | **5,736** | **67** | **4,210** | **39** | **1,338** | **30** | **2,351** | **35** |
| Norway | 8 | 0 | 64 | 0 | - | - | - | - | 1 | 0 | 3 | 0 | - | - | 1 | 0 |
| Switzerland | 37 | 0 | 31 | 0 | - | - | - | - | 10 | 0 | 8 | 0 | 15 | 0 | 41 | 0 |

1. Latvia, France, Sweden (since 1998) and the United Kingdom (since 1987) have a passive surveillance programme for EBLV in bats. In Latvia, cases of rabies in bats were not registered.
2. Data include alpine chamois, badgers, beavers, chinchillas, chipmunks, deer, dormice, ferrets, hares, hedgehogs, jackals, lynx, martens, mice, mink, monkeys, moose, moles, mouflon, muskrats, unspecified mustelids, otter, other pets, bears, polar bear, polecats, rabbit, rats, raccoons, squirrels, stray cats, stray dogs, weasels, wild boar, wild cats (*Felis silvestris*), voles, wolverines and wolves.
3. In 2010, in Germany (4), Hungary (1) and Spain (2) positive samples were of EBLV unspecified. Confirmed cases of EBLV-1 were found in Belgium (1 dead bat originating from Spain), France (6), the Netherlands (10) and Poland (5). The remaining two cases were of *Lyssavirus* unspecified (Germany and Poland). In 2009, in Denmark, France and Spain, the infected bats were positive with EBLV-1. In Finland and the United Kingdom, the infected bats were positive with EBLV-2. In Germany, two of the five infected bats were positive for unspecified EBLV; the rest were positive with unspecified *Lyssavirus*. In Hungary, the Netherlands and Poland, the infected bats were positive for unspecified EBLV. In Romania, the infected bat was positive for unspecified *Lyssavirus*. Additionally, France reported one bat from French Guiana positive for classical rabies virus.

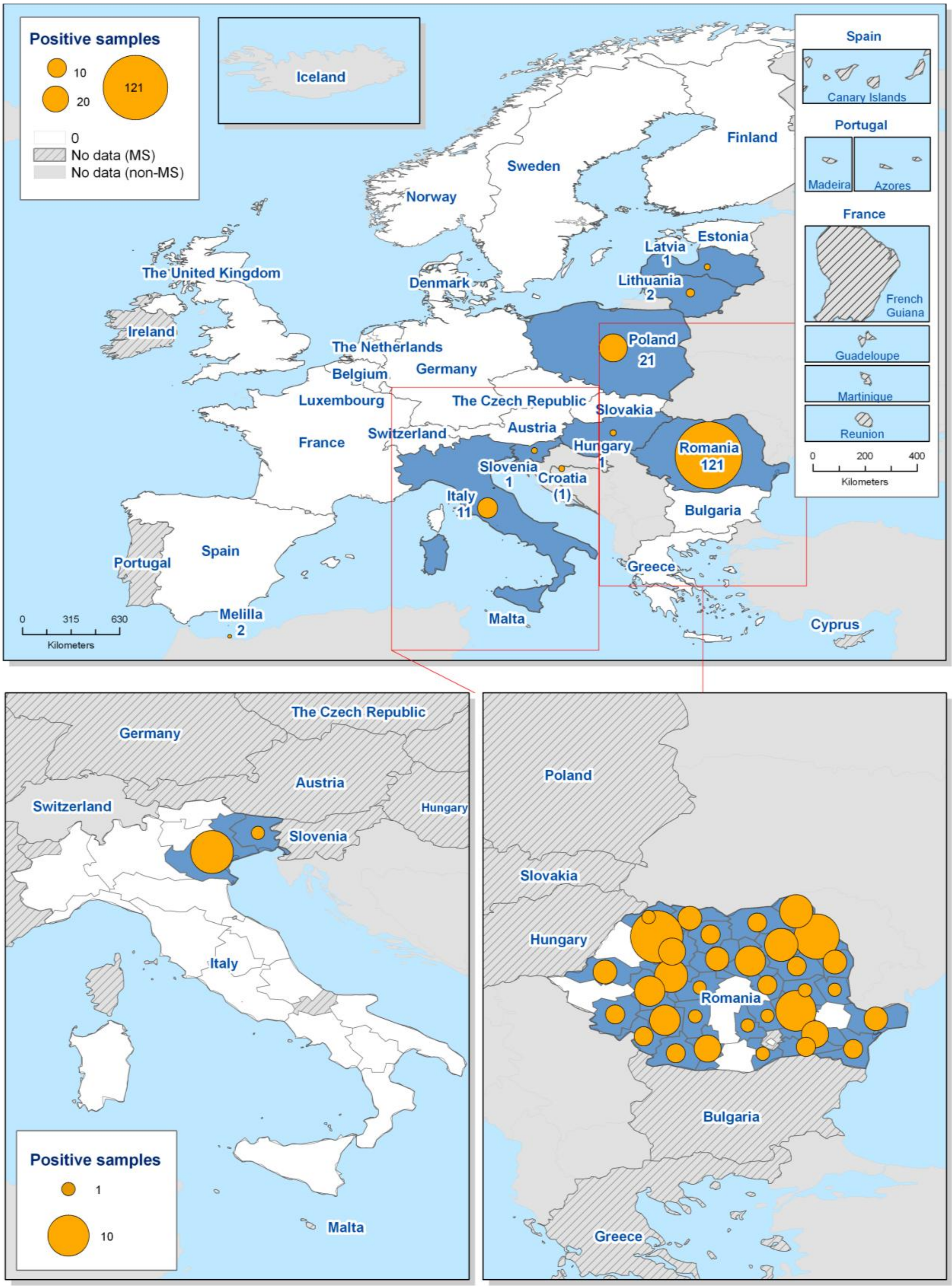
*Figure RA3. Reported cases[1] of classical rabies or unspecified* Lyssavirus *in animals in the Member States and other reporting countries, 2006-2010*




Note: The number of reporting MSs and non-MSs is indicated at the bottom of each bar. The total number of rabid cases is reported at the top of the bar.

1. Imported cases are not included.

***Figure RA4. Classical rabies or unspecified* Lyssavirus *cases in domestic animals, 2010***

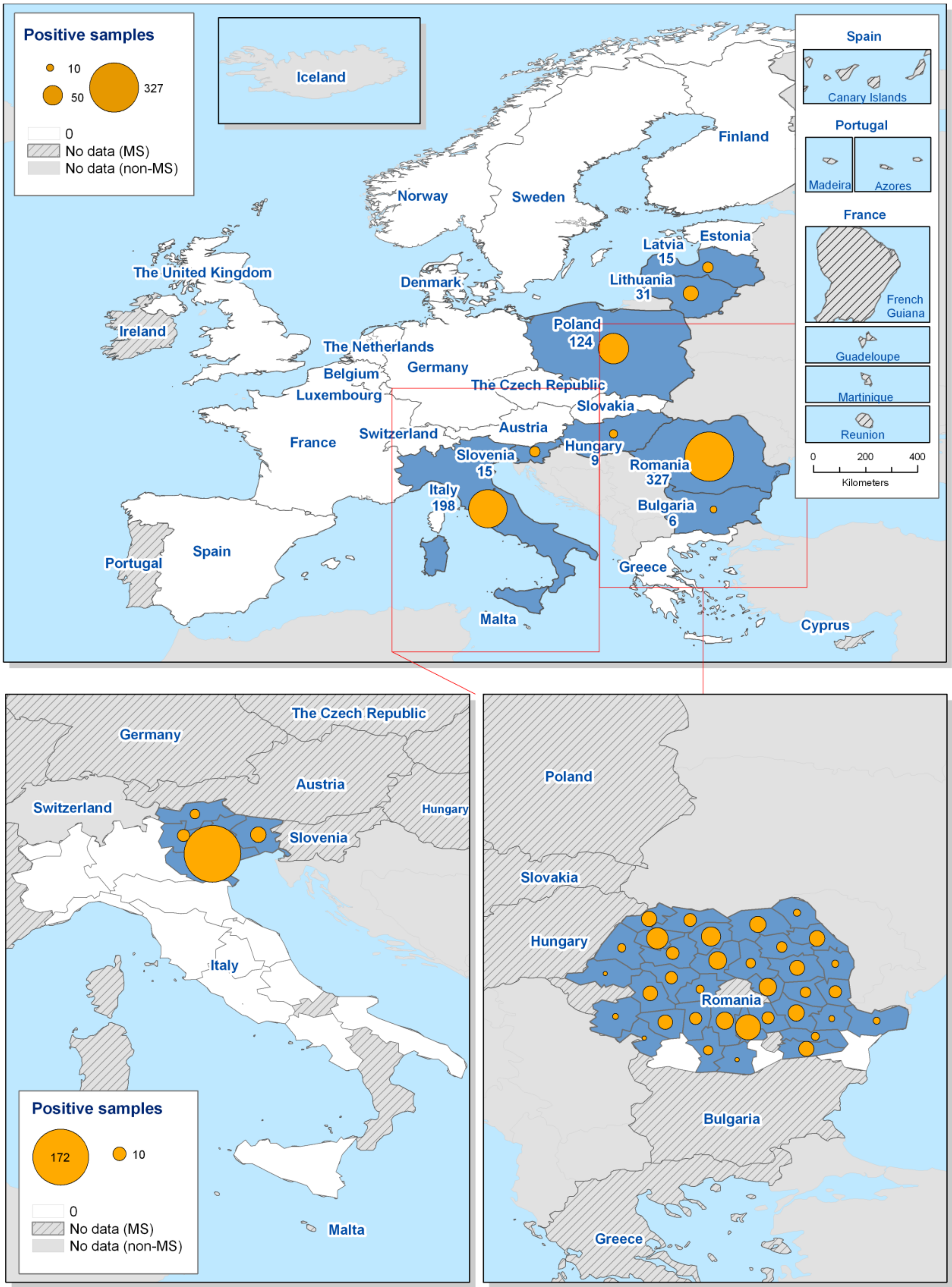



Note: All data provided were based on suspect sampling or other convenience-type sampling.

Note: Findings in the following species are included: broilers, cats (not stray cats), dogs (not stray dogs), cattle (bovine animals), ferrets (pet animals), goats, hamsters (pet animals), rats (pet animals), sheep, solipeds and pigs.

Note: One case of rabies reported in Germany was in a dog imported from Croatia; 2 cases of rabies reported in Spain were in dogs from Melilla (a Spanish city in North Africa).

***Figure RA5.Classical rabies or unspecified* Lyssavirus *cases in wild animals other than bats, 2010***




Note: Most data provided were based on suspicious sampling or other convenience-type sampling.

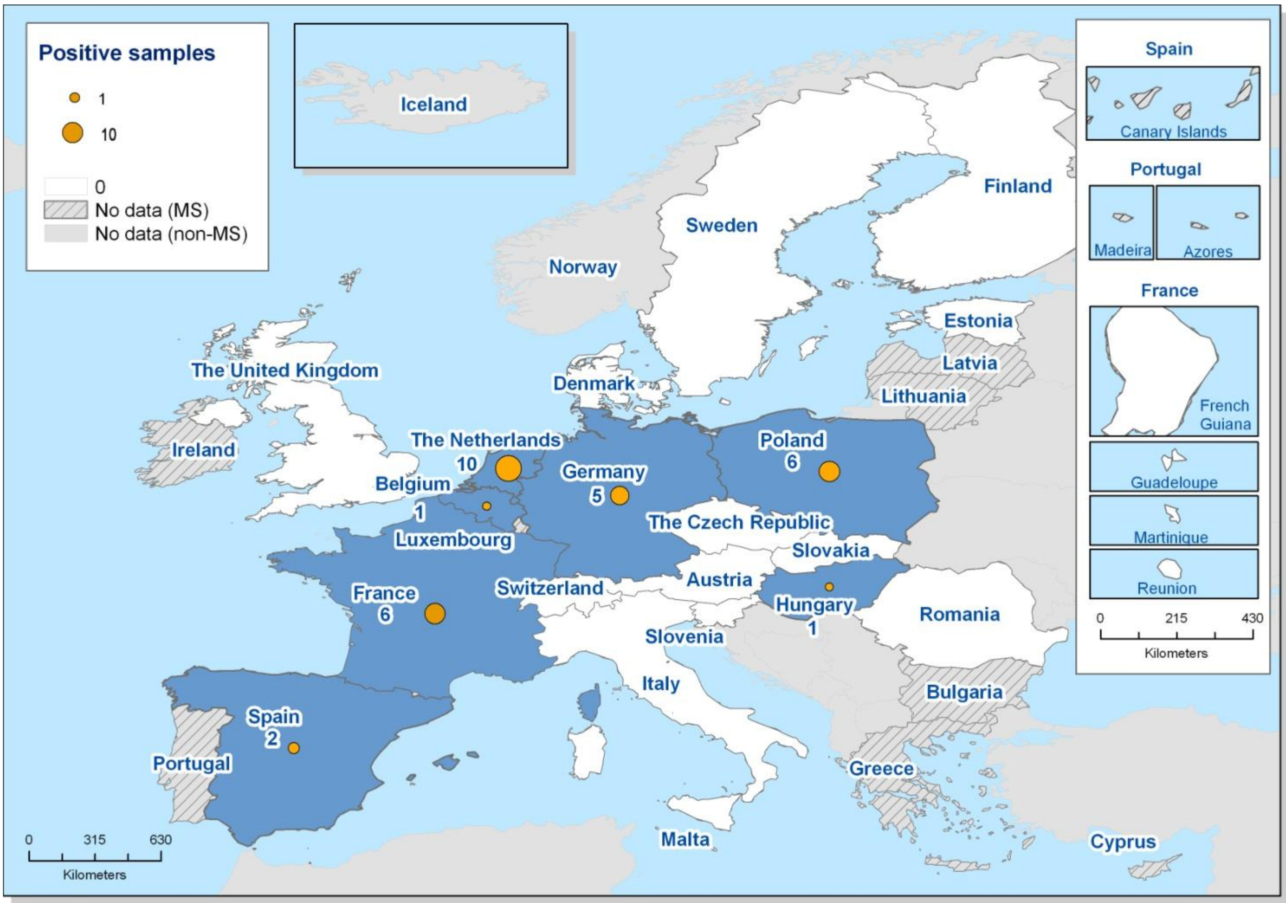
Findings in the following species are included: arctic foxes, alpine chamois, badgers, beavers, chipmunks, cats (stray cats), deer, dogs (stray dogs), dormice, ferrets (not pets), foxes, hamsters (not pets), hares, hedgehogs, jackals, lynxes, martens, mice, minks, moose, other mustelids, otters, polar bears, polecats, rabbits (not pets), raccoons, raccoon dogs, rats, squirrels, weasels, wild boar, wild cats, wolverines, wolves.

***Table RA5. Number of tested animals and positive cases of classical rabies from countries providing data from foxes, 2008-2010***

| Country | 2010 | | 2009 | | 2008 | | Species level |
|---|---|---|---|---|---|---|---|
| | N | Pos | N | Pos | N | Pos | |
| Austria | 2,358 | 0 | 7,515 | 0 | 8,244 | 0 | |
| Belgium | 114 | 0 | 183 | 0 | 245 | 0 | |
| Bulgaria | 259 | 2 | 397 | 47 | 74 | 34 | Classical rabies virus |
| Czech Republic | 5,424 | 0 | 7,844 | 0 | 8,259 | 0 | |
| Denmark | 1 | 0 | - | - | - | - | |
| Estonia | 61 | 0 | 72 | 3 | 80 | 1 | 2008 and 2009: Classical rabies virus |
| Finland | 148 | 0 | 198 | 0 | 437 | 0 | |
| France | 46 | 0 | 63 | 0 | 228 | 0 | |
| Germany | 13,012 | 0 | 15,636 | 0 | 12,561 | 0 | |
| Greece | - | - | - | - | 1 | 0 | |
| Hungary | 5,187 | 9 | 7,019 | 2 | 8,542 | 6 | 2008: unspecified *Lyssavirus* 2009 and 2010: Classical rabies virus |
| Italy | 6,139 | 172 | 2,921 | 61 | 1,865 | 8 | 2009: Classical rabies virus 2008 and 2010: unspecified *Lyssavirus* |
| Latvia | 236 | 11 | 304 | 24 | 397 | 44 | 2009: 18 cases were unspecified *Lyssavirus* 2008 and 2010: Classical rabies virus |
| Lithuania | 447 | 14 | 348 | 17 | 314 | 13 | Unspecified *Lyssavirus.* |
| Luxembourg | 26 | 0 | 23 | 0 | 20 | 0 | |
| Netherlands | 6 | 0 | 2 | 0 | 7 | 0 | |
| Poland | 24,158 | 117 | 23,153 | 6 | 21,293 | 19 | 2009: Classical rabies virus 2008 and 2010: unspecified *Lyssavirus* |
| Portugal | - | - | - | - | 12 | 0 | |
| Romania | 983 | 303 | 1,173 | 404 | 2,350 | 951 | 2008 and 2009: Classical rabies virus 2010: unspecified *Lyssavirus* |
| Slovakia | 2,922 | 0 | 3,203 | 0 | 3,422 | 0 | |
| Slovenia | 2,276 | 15 | 2,482 | 33 | 2,329 | 51 | Classical rabies virus |
| Spain | 25 | 0 | - | - | - | - | |
| Sweden | 1 | 0 | - | - | - | - | |
| United Kingdom | 2 | 0 | 2 | 0 | 5 | 0 | |
| **Total (22 MSs in 2010)** | **63,831** | **643** | **72,538** | **597** | **70,685** | **1,127** | |
| Norway | 8 | 0 | 64 | 0 | 2 | 0 | |
| Switzerland | 37 | 0 | 31 | 0 | 46 | 0 | |

Note: Norway tested 2, 64 and 7 polar foxes in 2008, 2009 and 2010, respectively. In 2010, additional 1 red fox was tested. No positive findings.

***Figure RA6. European Bat* Lyssavirus *(EBLV) or unspecified* Lyssavirus *cases in bats*[1]*, 2010***




Note: Most data provided were based on suspicious sampling or other convenience-type sampling, except for France, Sweden and the United Kingdom, where passive surveillance is carried out.

Note: Belgium had 1 case in a bat. It was a dead bat originating from Spain that was brought to Belgium for diagnosis.

1. Most cases (22) were of type EBLV-1 infections; 9 were of unspecified EBLV. In Belgium, France and the Netherlands, the infected bats were positive with EBLV-1. In Germany, Hungary and Spain, the EBLV type was not specified. In Poland, 5 infected bats were positive for EBLV-1 and 1 bat was positive for an unspecified type.

### 3.11.3 Discussion

Human rabies is a rare and vaccine-preventable zoonosis in Europe. However, the potential burden of disease is high as rabies is invariably fatal in infected unvaccinated humans. In 2010, there were two indigenous cases in 10- and 11-year-old girls from rural Romania. One of them was in close contact with a possibly rabid cat. These cases highlight again the importance of public information and education about the risk of rabies in MSs that are not free of the disease in their animal population.

In animals, most MSs have reported no cases of classical rabies for a number of years. However, rabies is still reported to be prevalent in wildlife in the Baltic MSs and some Eastern and Southern MSs, and consequently cases may occur in farm and pet animals in these MSs. The general decreasing trend in the total number of rabies cases in animals observed in previous years discontinued in 2010, and there was a slight increase in the rabies cases reported in animals. This is the result of ongoing national epidemics in some Eastern and Southern MSs. Eight MSs reported rabies cases in wildlife (Bulgaria, Italy, Latvia, Lithuania, Hungary, Poland, Romania and Slovenia), and seven of them also in domestic animals. In contrast to 2009, Estonia did not report any cases in 2010.

As regards national rabies epidemiological situations, the Baltic MSs (Estonia, Lithuania and Latvia) have progressively reduced cases and progressed towards eradication. Some MSs (Bulgaria, Italy, Poland and Slovenia) face epidemics in wildlife in certain parts of their national territory with occasional spill over into domestic animals. Romania reported endemic rabies in wildlife across the whole national territory and spill over into domestic animals, as a result of which the number of rabies cases slightly increased in 2010 compared with 2009. These MSs are managing the eradication mostly by annual and emergency vaccination campaigns of domestic and wildlife animals. Plans to eradicate rabies are complex, as they require the implementation of repeated vaccination campaigns, targeting wildilfe reservoirs, mostly foxes and raccoon dogs, to elicit appropriate population immunity. Any breakdown in the population immunity of reservoir animals may result in rabies entering the country. Rabies cases in domestic animals represent an important indicator of the risk for humans.

As previously, foxes accounted for the majority of rabies cases among animals, excluding bats. In 2010, Italy and Poland reported more rabies cases in foxes, while Romania reported fewer such cases.

As in previous years, the majority of positive raccoon dog cases were reported by Lithuania. The raccoon dog, which was introduced into the Baltic countries in the twentieth century, is spreading westwards in Europe. Raccoon dogs are now abundant throughout Estonia, Finland, Latvia and Lithuania, and have been described as far away as in Denmark, France, Germany[59], Italy, Romania, Serbia, Sweden, Norway and Switzerland. It is important to monitor this animal species, along with foxes in endemic areas, because it may be a reservoir for rabies.

In total, six MSs reported rabies findings from bats in 2010, compared with 10 MSs in 2009 and five in 2008.

59 Raccoon dogs may be present in Germany, but no data were reported in 2009 and 2010.

## 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

### 3.12 Q fever

Q fever, or query fever, is a zoonotic disease caused by the bacterium *Coxiella burnetii.* Cattle, sheep and goats are the primary domestic animal reservoirs, and the bacteria are excreted in milk, urine and faeces and in high numbers in the amniotic fluid, aborted tissues and placenta at birth. Clinical disease in these animals is rare, although abortion in goats, sheep and cattle as well as metritis and infertility in cattle have been associated with *C. burnetii* infections. Humans are considered accidental hosts.

The bacteria can survive for long periods in the environment and are very resistant to physical and chemical stress. Humans are most often infected when inhaling airborne dust contaminated by placental material, birth fluids or faeces. Only a few organisms may suffice to cause infection. Infection by ingestion of contaminated milk may also be possible.

Only about 40 % of people infected with *C. burnetii* show clinical signs. Clinical signs and symptoms of acute Q fever may include fever, severe headache, muscle pain, discomfort, sore throat, chills, sweats, non-productive cough, nausea, vomiting, diarrhoea, abdominal pain and chest pain. The fever usually lasts for one to two weeks and may result in a life-long immunisation. Acute Q fever is fatal in approximately 2 % of the cases. Chronic Q fever is uncommon, but may develop in persons with a previous history of acute Q fever. A serious complication of chronic Q fever is inflammation of the heart valves, and case fatality rate even with appropriate treatment is about 11 %.

***Table QF1. Overview of countries reporting data on Q fever, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Human | 24 | **All MSs except:** AT, DK, IT<br>**Non-MS:** IS |
| Animal | 20 | **All MSs except:** CZ, EE, FR, LT, LU, MT, SI<br>**Non-MSs:** CH, NO |

#### 3.12.1 Q fever in humans

In 2010, a total of 1,414 confirmed cases of Q fever in humans were reported in the EU (Table QF2). The EU notification rate was 0.36 per 100,000 population. There was a 28.9 % decrease in the number of reported confirmed cases compared with 2009 (1,988 cases). The largest decrease in reported cases was observed in the Netherlands 67 % in 2010 (538) compared with 2009 (1,623). France reported cases for the first time in 2010 and together with the Netherlands and Germany accounted for 81.3 % of the total number of confirmed cases reported in 2010.

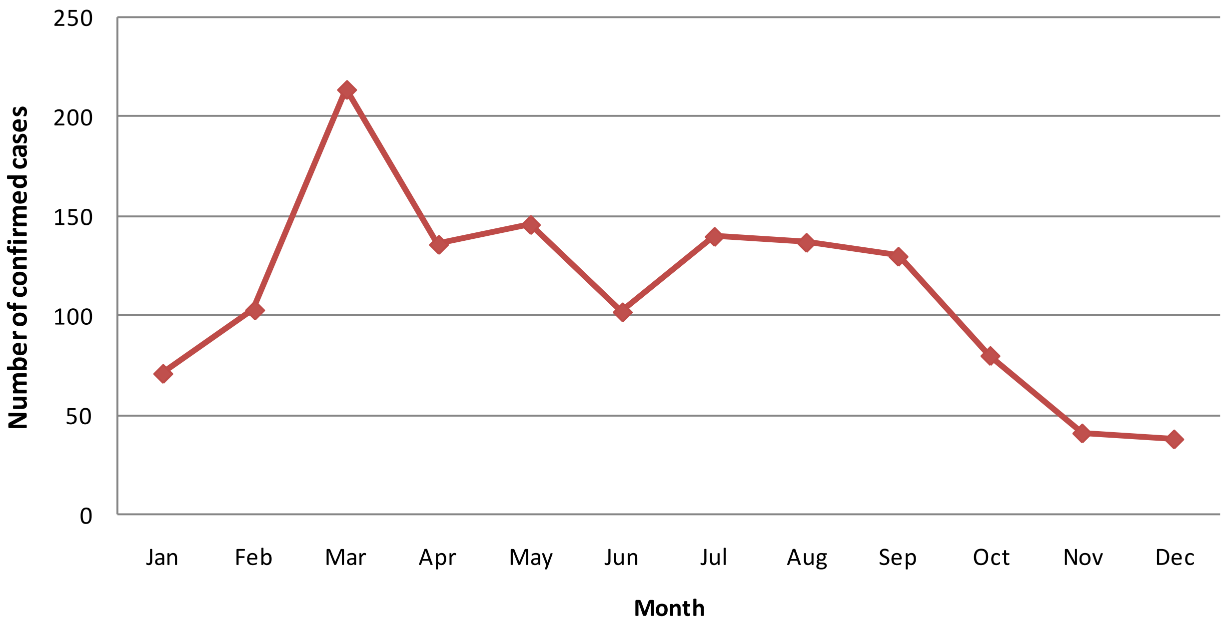
***Table QF2. Reported confirmed Q fever cases in humans, 2007-2010 (TESSy) and notification rates in 2010***

| Country | 2010 | | | | 2009 | 2008 | 2007 |
|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases | Confirmed cases/ 100,000 | Confirmed cases | | |
| Austria | -[2] | - | - | - | - | - | - |
| Belgium | C | 30 | 30 | 0.28 | 33 | 27 | 14 |
| Bulgaria | A | 18 | 14 | 0.19 | 22 | 17 | 33 |
| Cyprus | C | 4 | 4 | 0.50 | 2 | 31 | 8 |
| Czech Republic | U | 0 | 0 | 0 | 0 | - | - |
| Denmark | -[2] | - | - | - | - | - | - |
| Estonia | U | 0 | 0 | 0 | 0 | 0 | 0 |
| Finland | C | 5 | 5 | 0.09 | 1 | 2 | 2 |
| France | C | 286 | 286 | 0.44 | - | - | - |
| Germany | C | 360 | 326 | 0.40 | 191 | 370 | 83 |
| Greece | C | 1 | 1 | 0.01 | 3 | 3 | 0 |
| Hungary | C | 68 | 68 | 0.68 | 19 | 11 | 0 |
| Ireland | C | 9 | 9 | 0.20 | 17 | 10 | 4 |
| Italy | - | - | - | - | - | - | - |
| Latvia | C | 2 | 2 | 0.09 | 0 | 1 | 0 |
| Lithuania | U | 0 | 0 | 0 | 0 | 0 | 0 |
| Luxembourg | U | 0 | 0 | 0 | 0 | - | - |
| Malta | U | 0 | 0 | 0 | 0 | 0 | 0 |
| Netherlands | C | 538 | 538 | 3.25 | 1,623 | 1,007 | 132 |
| Poland | U | 0 | 0 | 0 | 3 | 0 | 0 |
| Portugal | C | 13 | 13 | 0.12 | 14 | 12 | 8 |
| Romania | C | 7 | 7 | 0.03 | 2 | 3 | 6 |
| Slovakia | U | 0 | 0 | 0 | 0 | 0 | 1 |
| Slovenia | C | 1 | 1 | 0.05 | 0 | 0 | 93 |
| Spain[3] | C | 69 | 69 | 0.60 | 34 | 119 | 159 |
| Sweden | C | 11 | 11 | 0.12 | 5 | 7 | 0 |
| United Kingdom | C | 30 | 30 | 0.05 | 19 | 40 | 62 |
| **EU Total** | | **1,452** | **1,414** | **0.36** | **1,988** | **1,660** | **605** |
| Iceland | U | 0 | 0 | 0 | 0 | 0 | 0 |
| Liechtenstein | - | - | - | - | - | 0 | 0 |
| Norway | - | - | - | - | 0 | 0 | 0 |

1. A: aggregated data report; C: case-based report; U: unspecified; –: no report.
2. No surveillance system exists.
3. Surveillance system covers only 25 % of the total population.

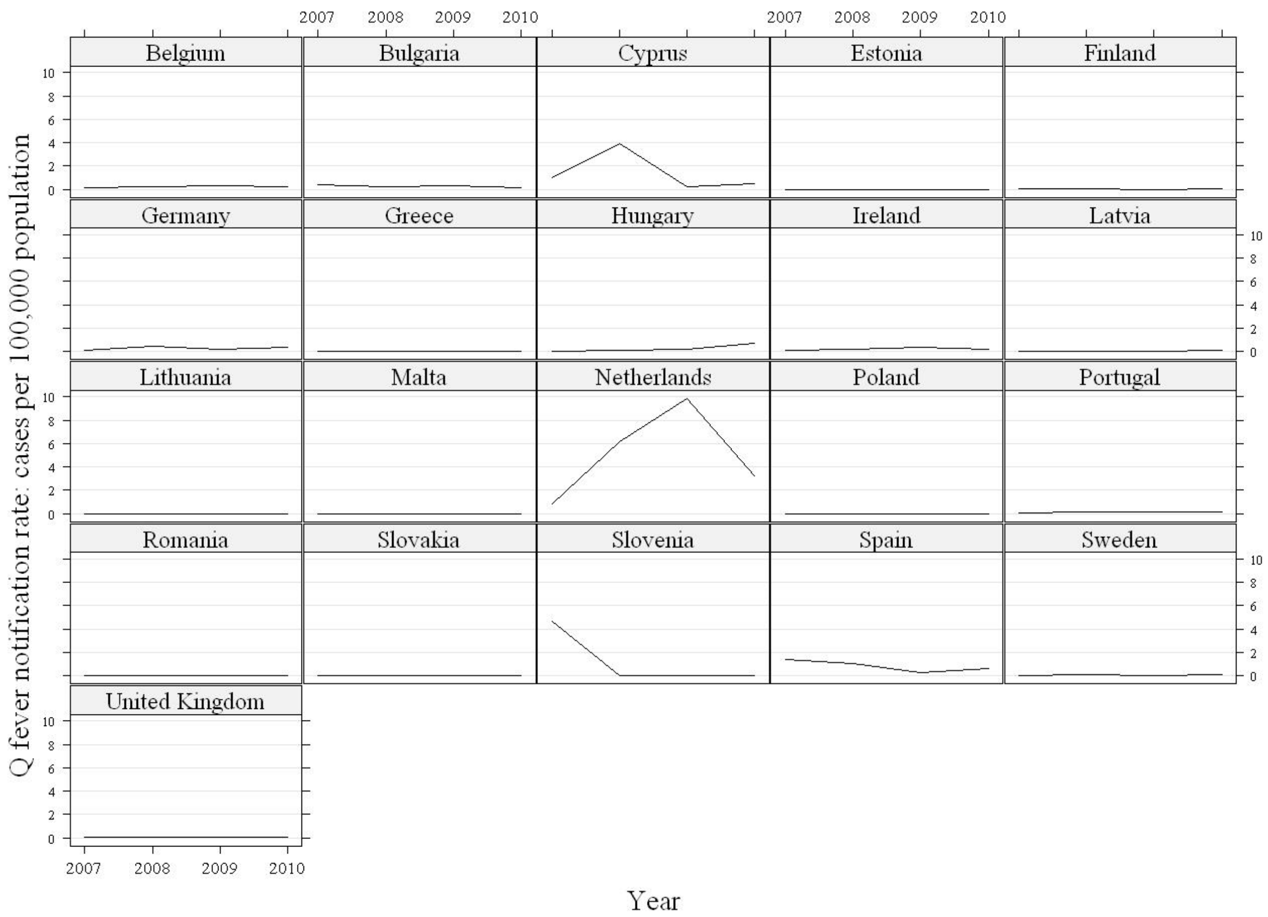
In 2010, as in previous years, the highest notification rate of human Q fever was in the 45 to 64 year-old age group (0.59 cases per 100,000), followed by 25 to 44 year olds (0.42 cases per 100,000). The seasonal pattern observed for Q fever showed a sharp peak in reported cases in March, probably associated with the kidding (goats) and/or lambing (sheep) seasons, followed by two smaller secondary peaks in May and July-September. This contrasts with 2009, when the peak notification rate was in August and was mainly attributed to the large number of cases reported from the Netherlands in that month. In 2010, two individuals with confirmed disease were reported to have died of Q fever: a 56 year-old man and a 69 year-old man both from the Netherlands.

*Figure QF1. Overall seasonal distribution of reported confirmed human cases of Q fever in reporting Member States, 2010*




Source: Belgium, Cyprus, Finland, France, Germany, Greece, Hungary, Ireland, Latvia, Netherlands, Portugal, Slovenia, Spain and Sweden (N=1,338)

*Figure QF2. Notification rates of reported confirmed cases of human Q fever in Member States[1] (cases per 100,000 population), 2007 – 2010*




1. Sentinel surveillance system only covers 25 % of the total population in Spain.

### 3.12.2 *Coxiella burnetii* in animals

In 2010, 17 MSs and two non-MSs provided information regarding Q fever (*C. burnetii)* in animals (Table QF3 and QF4). The majority of sampling was carried out as a result of clinical suspicion, e.g. after abortions and was examined using serological tests. When including MSs also reporting fewer than 25 units, a total of 12 MSs and one non-MSs reported the use of serological testing (Enzyme-Linked Immunosorbent Assay (ELISA), Complement Fixation Test (CFT) or Indirect Fluorescent Antibody Test (IFAT)), four MSs and one non-MS used isolation of the agent and direct identification methods (microscopy (modified Ziehl-Neelsen staining), Polymerase Chain Reaction (PCR), Fluorescence in situ hybridisation (FISH) and Immunohistochemistry (IHC)), and six MSs reported no information on the diagnostic methods used (Appendix Table QF1). Three MSs reported the use of more than one diagnostic technique (serological, molecular or microscopy). All of the MSs for which data were available reported some animals positive to *C. burnetii*. In total, the majority of the samples originated from cattle; however, the highest occurrence was seen in goats (animal and herd-based data) (Tables QF3 and QF4 and Figure QF3). As monitoring and reporting schemes and diagnostic methods can differ considering the country or the period of time, results should be interpreted with caution.

An overview of reported *C. burnetii*-positive farmed ruminants (cattle, sheep and goats) in 2008 to 2010 is shown in Figure QF4.

The occurrence of *C. burnetii* in cattle samples taken at the animal level remained low from 2008 to 2010 (9.9 % in 2008, 9.0 % in 2009 and 2.8 % in 2010) (Table QF3). In 2010, Denmark and Spain reported the highest occurrence of *C. burnetii* in bovine animals (29.0 % and 11.6 %, respectively). For both Denmark and Spain, cattle samples taken at the animal level were analysed using serological methods, and the sampling context was suspect sampling. Both of these circumstances may have contributed to the comparatively higher proportion of *C. burnetii* detected. Belgium, Bulgaria, Italy, Slovakia, Norway and Switzerland all tested high numbers (>2,000) of individual animals for *C. burnetii* in the sampling context of clinical investigation or unreported. The results from this higher level of sampling ranged from 0 % of samples testing positive in Norway, to a moderate occurrence of *C. burnetii* in Slovakia (10.5 %). Denmark reported a large decrease in bovine animals testing positive in an official sampling programme, from 54.5 % in 2009 to 29.0 % in 2010.

In 2010, four MSs submitted herd level data for *C. burnetii* in cattle in the sampling context of monitoring or unreported. Overall, the occurrence of *C. burnetii* was low (6.1 %), which was less than the proportion of positive findings from 2008 (25.5 %) and 2009 (11.9 %) (Table QF3). Germany and Poland each carried out testing on a substantial number of cattle herds (1,382 and 5,241 herds, respectively). Germany detected a moderate level of *C. burnetii* (17.7 %), while in Poland the occurrence of *C. burnetii* was very low (0.6 %). By contrast, Denmark reported an extremely high (75 %) and Sweden a very high (61.4 %) proportion of *C. burnetii*-positive samples, respectively. Both MSs, however, tested these samples using serological methods; sampling in Sweden was conducted in a known high prevalence area and the sampling context for the Danish herds was ‘suspect sampling’.

In 2010, 4.1 % of tested sheep were reported positive at EU level (Table QF4). Germany and Finland both reported data on substantial numbers of sheep (>3,000), and the proportion of animals testing positive for *C. burnetii* was low (4.2 % and none, respectively). For the United Kingdom, in addition to the 192 sheep sampled, an unknown number of sheep were tested following clinical suspicion of infection with *C. burnetii;* one positive animal was detected as a result of these investigations. In 2010, Romania reported in the sampling context of clinical investigation a high occurrence of *C. burnetii* in sheep sampled at the animal level (38.2 %), which was the highest proportion of positive findings detected for that category.

In goats sampled at the animal level, in 2010 the reported occurrence of *C. burnetii* was 11.6 % (Table QF4). Spain reported an occurrence of 62 % of positive animals in one herd tested by serology (ELISA) after clinical suspicion (31 positive findings out of 50 animals sampled). The infection was confirmed by PCR in 10 of the sero-positive goats following the Scientific Report submitted to EFSA on the development of harmonised schemes for the monitoring and reporting of Q-fever in animals in the EU. At herd level, the occurrence of *C. burnetii* in goats was 9.8 % in 2010.

In addition, in 2010, Italy, Portugal, Slovakia, Norway and Switzerland analysed samples from other animal species including alpacas, buffalo, cats, insectivores, pigs, solipeds, water buffalo, wild animals and zoo animals. Of the additional species sampled, only three samples from six pigs in Switzerland tested positive for Q fever.

For additional information on data, refer to the level 3 tables.

In the Netherlands, where a large human Q fever epidemic began in 2007, the number of reported human cases in 2010 was 506. In a review article (Roest et al., 2011) it was noted that the weather conditions in 2010 had been less favourable for disease transmission, and the reduction in human cases was likely to be due to a combination of the veterinary control measures taken to reduce exposure (culling, vaccination, ban on breeding and transportation) and weather conditions. Culling of small ruminants from Q fever positive farms was completed in June 2010 and the breeding ban was lifted in July. There is ongoing annual vaccination of sheep and goats in place in the country. The persistence of the organism in the environment and increased awareness may mean that it will take some time for the levels of Q fever in humans to return to those seen before the epidemic. The Van Dijk Q fever evaluation commission report into this epidemic included recommendations for a proposed model for future partnership between human and veterinary health departments in the case of zoonotic disease outbreaks in order to avoid the mistakes made in managing this outbreak.

Roest HIJ, Tilburg JJHC, van der Hoek W, Vellema P, van Zijderveld GG, Klaassen CHW and Raoult D, 2011. The Q fever epidemic in the Netherlands: history, onset, response and reflection. Epidemiology and Infection 139, 1–12. Van Dijk Q fever evaluation commission report: www.rivm.nl/cib/binaries/VWS100511A_tcm92-71615.pdf

### *Table QF3.* C. burnetii *(Q fever) in cattle in reporting Member States, 2008-2010*

| Country | Sampling unit[1] | 2010 | | | 2009 | | |
|---|---|---|---|---|---|---|---|
| | | Sampling context | N | % pos | Sampling context | N | % pos |
| **Cattle** | | | | | | | |
| Austria | Animal | Clinical investigations | 588 | 2.0 | Clinical investigations | 929 | 3.4 |
| Belgium | Animal | Abortion sampling | 5,254 | 9.6 | Clinical investigations | 1,676 | 12.8 |
| | Herd | - | - | - | Clinical investigations | 1,407 | 70.9 |
| Bulgaria | Animal | - | 33,156 | 0.4 | - | 3,353 | 4.8 |
| Denmark | Animal | Suspect sampling | 62 | 29.0 | Suspect sampling | 268 | 54.5 |
| | Herd | Suspect sampling | 88 | 75.0 | - | - | - |
| Finland | Animal | - | 48 | 0 | - | 25 | 0 |
| | Herd | - | - | - | - | 1,882 | 0.3 |
| Germany | Herd | - | 1,382 | 17.7 | - | 11,771 | 10.6 |
| Hungary | Animal | - | - | - | - | 453 | 7.5 |
| Ireland | Animal | Clinical investigations | 63 | 1.6 | - | - | - |
| Italy[2] | Animal | Mixed | 4,505 | 6.8 | - | - | - |
| | Herd | - | - | - | - | 5,534 | 0.4 |
| Latvia | Animal | - | 140 | 10.0 | - | - | - |
| Netherlands[3] | Animal | - | - | - | - | - | - |
| Poland | Herd | - | 5,241 | 0.6 | - | 369 | 5.4 |
| Romania | Holding | - | - | - | - | 57 | 52.6 |
| Slovakia | Animal | - | 2,889 | 10.5 | - | 664 | 0.9 |
| Slovenia | Animal | - | - | - | Surveillance | 415 | 4.1 |
| Spain | Animal | Suspect sampling | 190 | 11.6 | Clinical investigations | 198 | 30.3 |
| Sweden | Herd[4] | - | - | - | National survey | 537 | 7.6 |
| | Herd[5] | - | - | - | Survey | 41 | 73.2 |
| | Herd[6] | Longitudinal research | 114 | 61.4 | - | - | - |
| United Kingdom[7] | Animal | - | - | - | Clinical investigations | 1,373 | 0.1 |
| **Total cattle (13 MSs in 2010)** | **Animal** | | **46,895** | **2.8** | | **21,494** | **9.0** |
| | **Herd[8]** | | **6,825** | **6.1** | | **9,458** | **11.9** |
| Norway[9] | Animal | Mixed | 3,420 | 0 | Clinical investigations | 68 | 0 |
| | Herd | - | - | - | - | - | - |
| Switzerland[10] | Animal | Clinical investigations | 2,293 | 3.8 | Clinical investigations | 3,294 | 2.5 |

Table continued overleaf.

## Table QF3 (continued). C. burnetii (Q fever) in cattle in reporting Member States, 2008-2010

| Country | Sampling unit[1] | 2008 | | |
|---|---|---|---|---|
| | | Sampling context | N | % pos |
| **Cattle** | | | | |
| Austria | Animal | Clinical investigations | 1,147 | 1.1 |
| Belgium | Animal | Clinical investigations | 314 | 8.0 |
| | Herd | - | - | - |
| Bulgaria | Animal | - | 249 | 10.8 |
| Denmark | Animal | - | - | - |
| | Herd | Suspect sampling | 836 | 46.4 |
| Finland | Animal | - | - | - |
| | Herd | - | - | - |
| Germany | Herd | - | 11,866 | 10.7 |
| Hungary | Animal | - | - | - |
| Ireland | Animal | - | - | - |
| Italy[2] | Animal | Mixed | 1,743 | 18.4 |
| | Herd | Clinical investigations | 34 | 8.8 |
| Latvia | Animal | - | - | - |
| Netherlands[3] | Animal | Mixed | 1,201 | 0.4 |
| Poland | Herd | - | 1,130 | 40.1 |
| Romania | Holding | - | - | - |
| Slovakia | Animal | - | 5,786 | 4.9 |
| Slovenia | Animal | Official sampling | 1,305 | 4.5 |
| Spain | Animal | - | - | - |
| Sweden | Herd[4] | National survey | 1,000 | 8.5 |
| | Herd[5] | - | - | - |
| | Herd[6] | - | - | - |
| United Kingdom[7] | Animal | - | - | - |
| **Total cattle (13 MSs in 2010)** | **Animal** | | **24,741** | **9.9** |
| | **Herd[8]** | | **1,870** | **25.5** |
| Norway[9] | Animal | - | - | - |
| | Herd | Survey | 525 | 0 |
| Switzerland[10] | Animal | Clinical investigations | 2,660 | 2.4 |

Note: Data are presented only for sample sizes ≥25.
Note: In 2010, serological data were submitted by Austria, Denmark (animal data), Ireland, Latvia, Spain, Sweden and Norway.
1. For animal-based data in 2008, samples from Austria, Belgium, Italy, the Netherlands and Slovenia were collected on farm; in 2009, samples from Austria, Denmark, Slovenia and the United Kingdom were collected on farm; for 2010, samples from Austria, Denmark and Italy were collected on farm.
2. Additionally Italy submitted 85 samples with the sampling location unspecified, none of which were positive. In 2008, Italy reported samples analysed in relation to clinical investigations, a control and eradication programme and a national survey; in 2010 Italy reported samples analysed in relation to clinical investigations, surveillance and a survey.
3. In 2008, the Netherlands analysed samples in relation to clinical investigations and selective sampling surveillance.
4. National survey using the ELISA method.
5. Survey using selective sampling and PCR methods on herds previously antibody-positive in bulk milk in 2008.
6. In 2010, of the 114 herds tested by Sweden, 70 (61 %) were antibody positive according to the CHEKIT kit, and 61 (54 %) were positive according to the ELISACox kit. In all, 60 of the herds (53 %) were positive according to both assays. Although testing was not conducted on known-positive herds, the survey was carried on the Isle of Gotland, a known high prevalence area.
7. In 2010, the United Kingdom reported 2 findings of Q fever in cattle in animals sampled on farm; no information on the total number of samples tested was provided. These samples were tested in relation to clinical investigations.
8. The summarised number of herds includes both herds and holdings.
9. In 2010, Norway analysed 5 samples in relation to a clinical investigation and 3,415 with the sampling context unknown.
10. In Switzerland, the 87 samples reported were positive for *Coxiella* spp., unspecified.

*Table QF4. C. burnetii (Q fever) in sheep and goats in reporting Member States, 2008-2010*

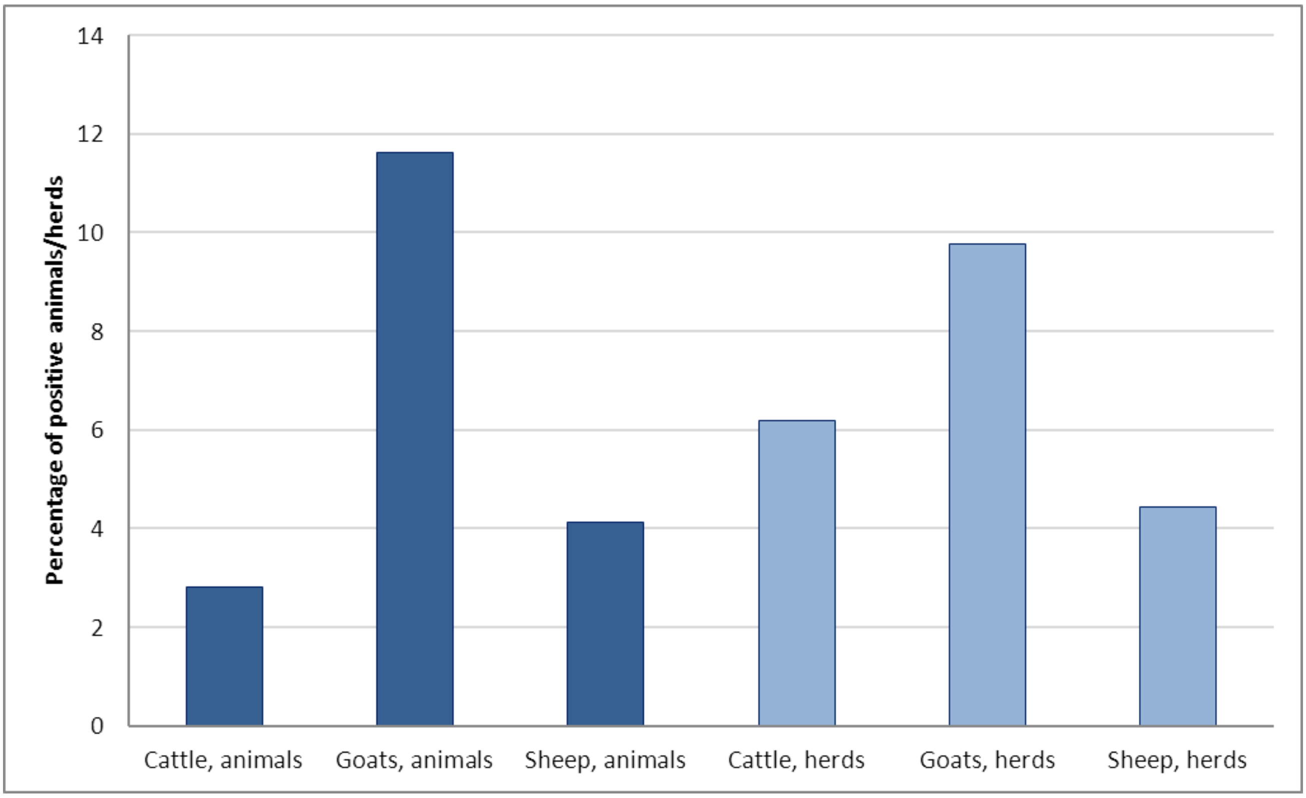
| Country | Sampling unit[1] | 2010 | | | 2009 | | | 2008 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Sampling context | N | % pos | Sampling context | N | % pos | Sampling context | N | % pos |
| **Sheep** | | | | | | | | | | |
| Austria | Animal | Clinical investigations | 165 | 24.2 | Clinical investigations | 35 | 0 | Clinical investigations | 27 | 0 |
| Belgium | Animal | Abortion sampling | 76 | 2.6 | - | - | - | - | - | - |
| Bulgaria | Animal | - | 1,905 | 7.0 | - | 1,709 | 6.8 | - | 820 | 5.0 |
| Finland | Animal | - | 3,374 | 0 | - | - | - | - | - | - |
| Germany | Animal | - | 13,146 | 4.2 | - | 9,605 | 11.4 | Surveillance | 1,880 | 10.3 |
| | Herd | - | 226 | 13.7 | - | - | - | - | - | - |
| Greece | Animal | Clinical investigations | 181 | 17.1 | Clinical investigations | 59 | 13.6 | Clinical investigations | 30 | 26.7 |
| Hungary | Animal | - | - | - | - | 42 | 7.1 | - | - | - |
| Italy[2] | Animal | Mixed | 146 | 9.6 | - | - | - | Mixed | 25 | 16.0 |
| | Flock | - | - | - | - | 253 | 19.8 | - | - | - |
| Netherlands[3] | Animal | - | - | - | - | - | - | Mixed | 129 | 10.1 |
| Portugal | Animal | - | - | - | - | - | - | Monitoring | 727 | 8.8 |
| Romania | Animal | - | 55 | 38.2 | - | - | - | - | - | - |
| Slovakia | Animal | - | 50 | 0 | - | 58 | 0 | - | 1,476 | 0 |
| Spain | Animal | - | - | - | Clinical investigations | 131 | 62.6 | - | - | - |
| Sweden | Herd | National survey | 518 | 0.4 | - | - | - | - | - | - |
| United Kingdom[4] | Animal | Clinical investigations | 192 | 0 | Clinical investigations | 1,709 | 0 | - | - | - |
| | Flock | - | - | - | - | - | - | Clinical investigations | 383 | 9.7 |
| **Total sheep (11 MSs in 2010)** | **Animal[5]** | | **19,290** | **4.1** | | **13,348** | **9.8** | | **5,114** | **6.3** |
| | **Herd[6]** | | **744** | **4.4** | | **253** | **19.8** | | **383** | **9.7** |
| Norway | Animal | Import testing | 49 | 0 | Clinical investigations | 627 | 0 | - | - | - |
| Switzerland | Animal | Clinical investigations | 150 | 2.0 | Clinical investigations | 166 | 0 | Clinical investigations | 141 | 1.4 |

*Table QF4 (continued). C. burnetii (Q fever) in sheep and goats in reporting Member States, 2008-2010*

| Country | Sampling unit[1] | 2010 | | | 2009 | | | 2008 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Sampling context | N | % pos | Sampling context | N | % pos | Sampling context | N | % pos |
| **Goats** | | | | | | | | | | |
| Austria | Animal | Clinical investigations | 134 | 17.9 | Clinical investigations | 93 | 2.2 | Clinical investigations | 109 | 10.1 |
| Belgium | Herd | Surveillance | 115 | 13.0 | - | - | - | - | - | - |
| Bulgaria | Animal | - | 890 | 6.6 | - | 774 | 7.5 | - | 25 | 12.0 |
| Finland | Animal | - | 143 | 0 | - | - | - | - | - | - |
| Germany | Animal | - | 956 | 11.8 | - | 1,453 | 34.8 | Surveillance | 499 | 15.6 |
| | Herd | - | 83 | 10.8 | - | - | - | - | - | - |
| Greece | Animal | Clinical investigations | 114 | 21.9 | - | - | - | - | - | - |
| Italy | Flock | - | - | - | - | 43 | 7.0 | - | - | - |
| Netherlands[3] | Animal | Mixed | 73 | 38.4 | - | - | - | Mixed | 160 | 31.9 |
| | Holding | - | - | - | Monitoring | 1,281 | 5.2 | - | - | - |
| Slovakia | Animal | - | 59 | 1.7 | - | 69 | 0 | - | 130 | 1.5 |
| Spain[7] | Animal | Clinical investigations | 50 | 62.0 | Clinical investigations | 27 | 7.4 | - | - | - |
| Sweden | Herd | National survey | 58 | 1.7 | - | - | - | - | - | - |
| United Kingdom[4] | Herd | - | - | - | - | - | - | Clinical investigations | 142 | 2.8 |
| **Total goats (10 MSs in 2010)** | **Animal[5]** | | **2,419** | **11.6** | | **2,416** | **23.5** | | **923** | **15.7** |
| | **Herd[8]** | | **256** | **9.8** | | **1,324** | **5.2** | | **142** | **2.8** |
| Norway | Herd | - | - | - | - | 349 | 0 | - | - | - |
| Switzerland[9] | Animal | Clinical investigations | 84 | 1.2 | Clinical investigations | 127 | 3.1 | Clinical investigations | 139 | 6.5 |

Note: Data are presented only for sample sizes ≥25.
Note: In 2010, serological data were submitted for sheep by Austria, Greece, Sweden and Norway; and for goats by Austria, Greece, Spain and Sweden.
1. For animal-based data in 2008, samples from Austria, Greece, Italy and the Netherlands were collected on farm; in 2009, samples from Austria, Greece, and the United Kingdom were collected on farm; for 2010, samples from Austria, Greece, Italy and the United Kingdom were collected on farm.
2. In 2008, Italy analysed sheep animal samples in relation to clinical investigations and a survey; in 2010, Italy analysed samples in relation to a clinical investigation and a control and eradication programme.
3. In 2008, the Netherlands analysed sheep and goat animal samples in relation to clinical investigations and surveillance selective sampling; in 2010 goat animal samples were analysed in relation to a clinical investigation and with the sampling context unspecified.
4. In 2010, the United Kingdom reported 2 additional findings of Q fever, 1 in a goat and 1 in a sheep. No information on the total number of samples tested provided, but sampling was conducted in relation to clinical investigations.
5. In 2010, Denmark and Italy tested 112 and 522 'sheep and goats' at animal level; none and 12 were positive for *C. burnetii*, respectively. These data are not included in the table totals.
6. The summarised number of sheep herds includes flocks and herds.
7. In 2010, Spain analysed 50 animals belonging to the same herd in relation to suspect sampling and clinical investigations.
8. The summarised number of goat herds includes flocks, herds and holdings.
9. In Switzerland the 1 goat and 3 sheep were reported as positive for *Coxiella* spp., unspecified.

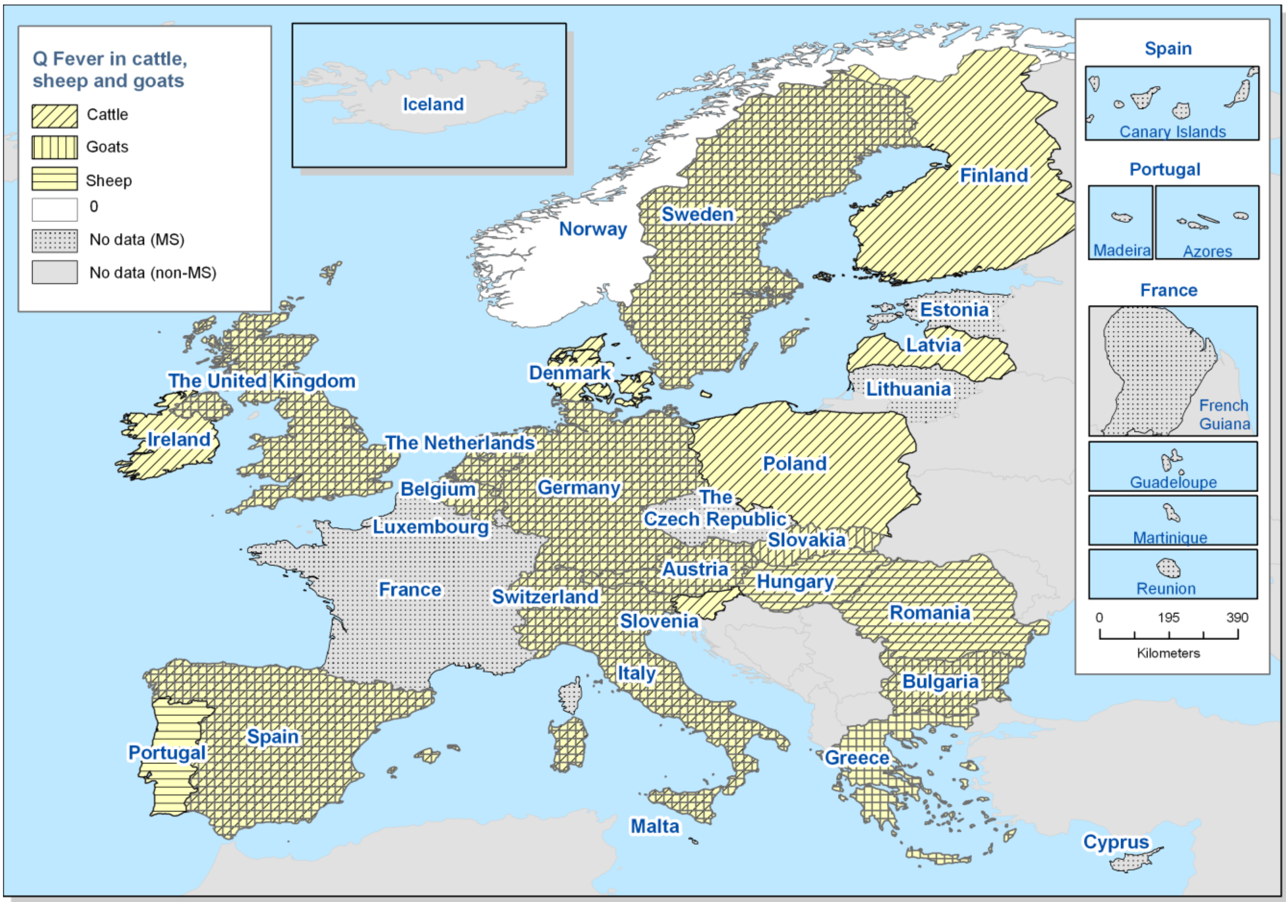
***Figure QF3. Occurrence of* C. burnetii *(Q fever) in the reporting Member States in cattle, sheep and goats, 2010***




Note: Data are included only for sample sizes ≥25.

Source: For cattle, Austria, Belgium, Bulgaria, Denmark, Finland, Germany, Ireland, Italy, Latvia, Poland, Slovakia, Spain and Sweden; for sheep, Austria, Belgium, Bulgaria, Finland, Germany, Greece, Italy, Romania, Slovakia, Sweden and United Kingdom; for goats, Austria, Belgium, Bulgaria, Finland, Germany, Greece, Netherlands, Slovakia, Spain and Sweden.

***Figure QF4. Reported* C. burnetii *(Q fever) positive cattle, sheep and goats, 2008-2010 – split by cattle, sheep and goats***



### 3.12.3 Discussion

In 2010, the number of confirmed human cases of Q fever decreased by 28.9 % compared with 2009. The Netherlands was the MS with the highest decrease in reported cases, 67 %. This positive development in the Netherlands was probably due to the containment of the Q fever outbreak that had been ongoing in the country since 2007. France reported human cases for the first time in 2010 and together with the Netherlands and Germany, accounted for 81.3 % of the total number of confirmed cases reported in 2010.

The number of MSs reporting data on Q fever in 2010 from animals was the same as in the previous year. Since 2008, all reporting MSs have detected *C. burnetii* from at least one of the domestic ruminant species, cattle, sheep or goats. These findings remain in line with EFSA's Animal Health and Welfare Panel (AHAW)'s opinion[60], which states that infection with *C. burnetii* is endemic in domestic ruminants (cattle, sheep and goats) in most, if not all, MSs. The reported prevalence of Q fever varied among MSs, but no clear spatial trend across Europe was evident from the data presented particularly because data among MSs and years are not necessarily comparable. The data reported to EU level were also not comparable enough between the years to enable any conclusions to be made on trends over the years.

Sampling of animals was carried out for a variety of reasons. Reported circumstances include clinical investigations, suspect sampling, the monitoring of bulk milk samples, surveillance, national surveys and a longitudinal research project (reported by Sweden). The method of testing also varied among MSs, including diagnosis based on serology and polymerase chain reaction (PCR). Each of these diagnostic techniques is likely to produce a different proportion of positive samples. In the case of serological testing, a sample that tests positive by serology indicates that the animal has at some point in the past been exposed to Q fever, but does not confirm a current active infection. By contrast, an animal that tests positive by PCR indicates the current presence of *Coxiella* within the sample analysed. Therefore, a higher proportion of positive samples would be anticipated from MSs that reported serological data than from those reporting PCR data.

In 2010, a scientific report was submitted to EFSA on developing harmonised schemes for the monitoring and reporting of Q fever in animals in the EU[61]. The report recommended that MSs focus monitoring and survey schemes on domestic ruminants. A passive monitoring system is recommended rather than an active one. This scheme is based upon identification of clinically affected herds/flocks (i.e. in which a series of abortions has occurred) using laboratory-based diagnosis of Q fever. Alternatively, some principles of active surveillance were also proposed for countries that may wish to evaluate further the prevalence of Q fever in their domestic ruminant populations. It was proposed that a herd/flock should be considered as clinically affected when serial abortions have occurred and the presence of *C. burnetii* is confirmed by PCR and serology by ELISA. Differential diagnoses with other abortive agents are essential. The harmonisation of Q fever reporting and testing recommended by the report would be beneficial for the analysis of spatial and temporal trends in Q fever within the EU.

60 EFSA (European Food Safety Authority), 2010. Scientific Opinion of Panel on Animal Health and Welfare (AHAW) on Q fever. EFSA Journal, 8 (5):1595, 114 pp.

61 Scientific report submitted to EFSA. Development of harmonised schemes for the monitoring and reporting of Q fever in animals in the European Union. Question No EFSA-Q-2009-00511.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.13 Tularaemia

Tularaemia (rabbit fever) is a zoonotic disease caused by *Francisella tularensis*, a gram negative aerobic coccobacillus that is geographically widely distributed. *F. tularensis* has been isolated from more than 200 animal species including vertebrates and invertebrates. Wild animals such as rabbits, voles, muskrats and ticks are considered to be the main reservoir for *F. tularensis*. Wildlife and domestic animals may develop clinical infections that include a wide range of symptoms such as fever, abortions and jaundice. Tularaemia in wild rabbits, hares, rodents and domestic sheep is often fatal.

The bacterium is able to survive for long periods of time in diverse environments such as water, mud and decomposing carcasses.

Tularaemia is a highly infectious pathogen. The main transmission route for humans is tick and mosquito bites, particularly in Scandinavian countries and Russia. Therefore, tularaemia is a disease associated especially with rural environments where people may be in contact with infected ticks and mosquitoes. In addition, transmission may also occur through the skin and mucous membranes after direct contact with infected animals, by mosquito bites or ingestion of contaminated food or water and inhalation of aerosolised soil dust containing bacteria. Human to human transmission has never been described.

Tularaemia in humans has an incubation period that varies usually between three to five days. Although there are six different types of tularaemia highly associated with the course of infection (ulceroglandular, septicaemic, glandular, oculoglandular, oropharyngeal and pneumonic), only two of these types, ulceroglandular and septicaemic infection account for almost 100 % of human cases.

Typical clinical signs of the glandular form include painful and swollen lymph nodes, fever and chills. Clinical symptoms of septicaemic tularaemia include pneumonia, myalgia and high fever. Severe cases of tularaemia may develop complications such as meningitis, pericarditis and osteomyelitis. Long term immunity is developed after recovery, and re-infection is extremely rare. Ulceroglandular tularaemia begins with an ulcer that appears at the bite site.

***Table TUL1.Overview of countries reporting data on tularaemia, 2010***

| Data | Total number of MSs reporting | Countries |
|---|---|---|
| Humans | 23 | **All MSs** except DK, IT, NL, PT<br>**Non-MS:** NO |
| Food and animals | 0 | **Non-MS:** NO |

### 3.13.1 Tularaemia in humans

In 2010, there were 807 confirmed cases of tularaemia in the EU. Thirteen MSs and Norway reported at least one case. However three countries, Sweden, Finland and Hungary, accounted for 87 % of reported confirmed cases in 2010. The overall EU notification rate for that year was 0.20 cases per 100,000 population (Table TUL2).

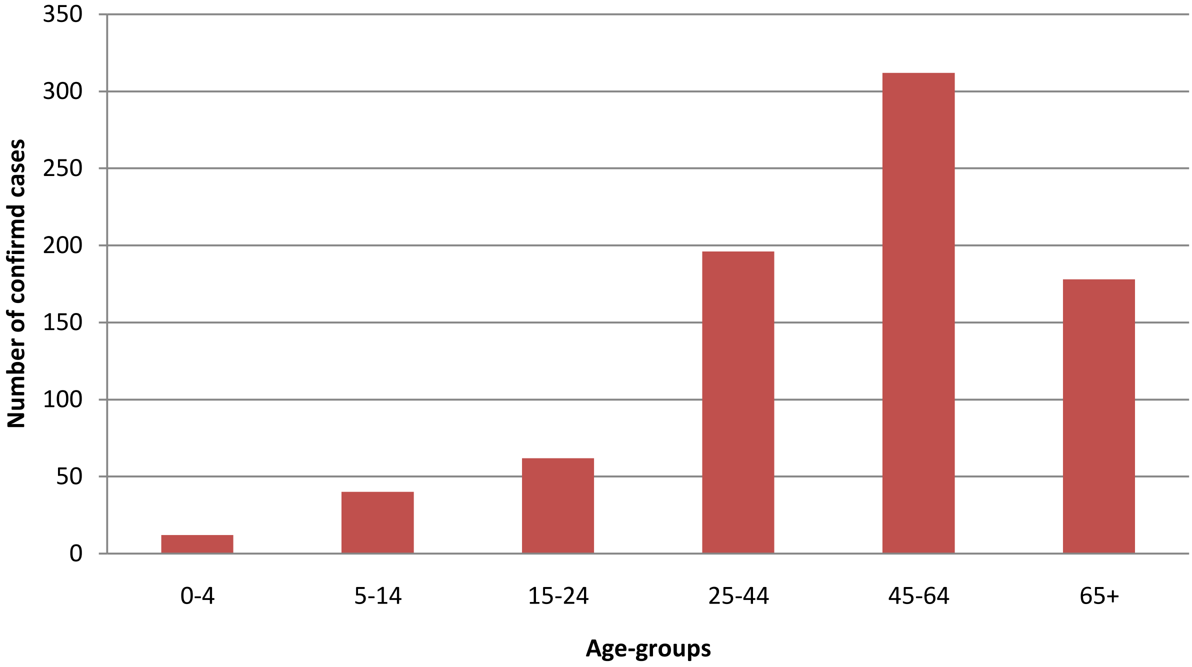
***Table TUL2. Reported cases of tularaemia in humans and notification rates for 2010, TESSy data for 2007-2010***

| Country | 2010 | | | | 2009 | 2008 | 2007 |
|---|---|---|---|---|---|---|---|
| | Report Type[1] | Cases | Confirmed cases | Confirmed cases/ 100,000 | Confirmed cases | | |
| Austria | C | 3 | 3 | 0.04 | 2 | 8 | 4 |
| Belgium | U | 0 | 0 | 0 | 0 | 0 | - |
| Bulgaria | A | 3 | 3 | 0.04 | 7 | 1 | 3 |
| Cyprus | U | 0 | 0 | 0 | 0 | 0 | 0 |
| Czech Republic | C | 50 | 50 | 0.48 | 64 | 109 | 51 |
| Denmark | - | - | - | - | - | - | - |
| Estonia | U | 0 | 0 | 0 | 0 | 1 | 2 |
| Finland | C | 91 | 91 | 1.70 | 405 | 116 | 403 |
| France | C | 41 | 22 | 0.03 | 16 | 104 | 48 |
| Germany | U | 0 | 0 | 0 | 10 | 15 | 20 |
| Greece | U | 0 | 0 | 0 | 0 | 0 | 0 |
| Hungary | C | 126 | 126 | 1.26 | 38 | 25 | 20 |
| Ireland | C | 0 | 0 | 0 | 0 | 0 | 0 |
| Italy | - | - | - | - | 2 | 43 | 0 |
| Latvia | U | 0 | 0 | 0 | 0 | 0 | 0 |
| Lithuania | C | 1 | 1 | 0.03 | 1 | 2 | 1 |
| Luxembourg | U | 0 | 0 | 0 | 0 | 0 | 0 |
| Malta | U | 0 | 0 | 0 | 0 | 0 | 0 |
| Netherlands | - | - | - | - | - | - | - |
| Poland | C | 4 | 4 | | 1 | 0 | 1 |
| Portugal | - | - | - | - | - | - | - |
| Romania | C | 4 | 4 | 0.02 | 0 | 0 | 0 |
| Slovakia | C | 17 | 17 | 0.31 | 22 | 25 | 11 |
| Slovenia | U | 0 | 0 | 0 | 1 | 2 | 1 |
| Spain | C | 1 | 1 | <0.01 | 12 | 58 | 493 |
| Sweden | C | 484 | 484 | 5.18 | 244 | 382 | 174 |
| United Kingdom | C | 1 | 1 | <0.01 | 0 | 0 | 0 |
| **EU Total** | | **826** | **807** | **0.20** | **825** | **891** | **1,232** |
| Iceland | - | - | - | - | - | - | - |
| Liechtenstein | - | - | - | - | - | - | - |
| Norway | - | 33 | 33 | - | 13 | 66 | 49 |

1. A: aggregated data report; C: case-based report; U: unspecified; –: no report.

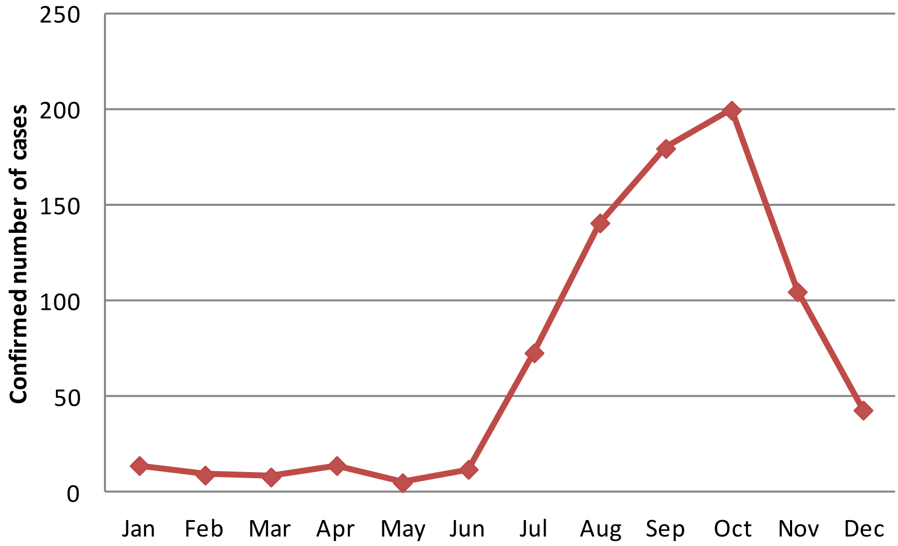
In 2010, the highest number of confirmed reported cases was in the 45-64 years age group (312 cases) followed by 25 to 44 year olds (196 cases) (Figure TUL1). There was a large peak in cases of tularaemia in October which was due to the large number of cases reported by Sweden (Figure TUL2). No deaths were reported due to tularaemia in 2010.

***Figure TUL1. Age-specific distribution of reported confirmed human cases of tularaemia, TESSy data for reporting Member States, 2010***




Source: Austria, Bulgaria, Czech Republic, Finland, France, Hungary, Lithuania, Poland, Romania, Slovakia, Spain, Sweden and United Kingdom (N= 800)

***Figure TUL2. Number of reported confirmed human cases of tularaemia by month, TESSy data for reporting Member States, 2010***




Source: Austria, Bulgaria, Czech Republic, Finland, France, Hungary, Lithuania, Poland, Romania, Slovakia, Spain, Sweden and United Kingdom (N=804)

### 3.13.2 Tularaemia in animals

Only one MS and one non-MS reported data on tularaemia in animals in 2010. As part of a clinical investigation, Norway analysed 18 wild hares, 10 of which were found to be positive for *F. tularensis*. In Sweden, *F. tularensis* was detected in five of 33 animals.

# 3. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

## 3.14 Other zoonoses and zoonotic agents

Table OZ1 presents countries reporting data on other zoonoses not covered by the specific chapters of this report. For this section, only data on cysticerci and mycobacteria other than *M. bovis* were reported in 2010.

***Table OZ1. Overview of countries reporting data on other zoonoses, 2010***

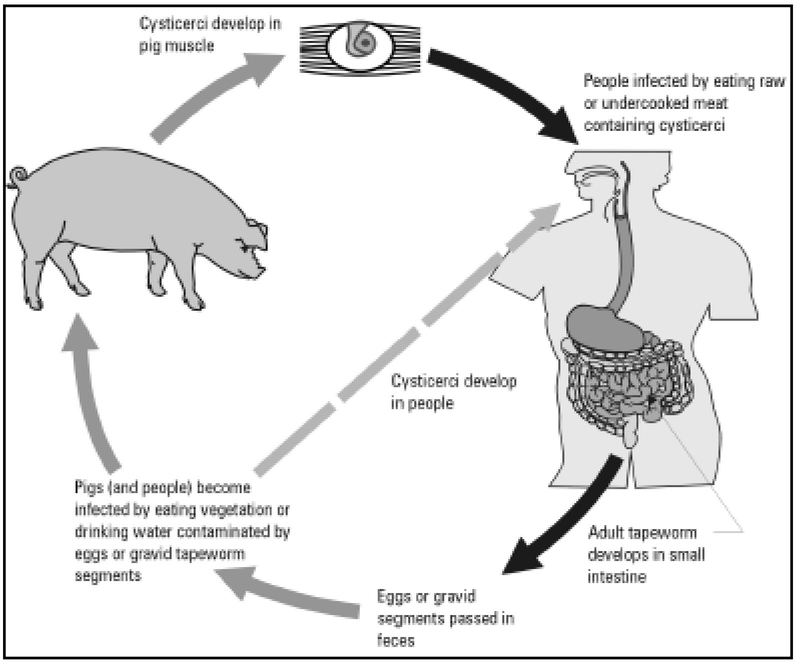
| Zoonoses | Data | Total number of MSs reporting | Countries |
|---|---|---|---|
| Cysticerci | Animals | 2 | **MSs:** EE,SE |
| Mycobacteria other than *M.bovis* | Animals | 19 | **All MSs except:** BG,CY,GR,LU,MT,RO,SL,SK<br>**Non-MS:** NO |

### 3.14.1 Cysticerci

Within Europe, two species of tapeworm living in humans are considered zoonotic, *Taenia solium* and *T. saginata.* Both *T. solium* and *T. saginata* use humans as definite hosts with pigs and cattle, respectively, used as the intermediate hosts. The life cycle of *T. solium* is illustrated in figure OZ1.

Pigs are infected by consuming feed or water contaminated with eggs excreted by a human *Taenia solium* carrier. The eggs hatch in the pigs' small intestine and the oncosphere larval stage migrates to the muscles and organs where it forms a cysticercus. Transmission of cysticerci to the human host is by the consumption of raw or undercooked pork products. Once in the intestinal tract, cysticerci mature into adult tapeworms and excrete eggs or egg-filled gravid segments in the faeces. The lifecycle for *Taenia saginata* is similar, with cattle as the intermediate host. In the case of *Taenia solium,* humans can also be infected through the ingestion of eggs from human faecal matter.

***Figure OZ1. Life cycle of* Cysticercus *(*T. solium*)***




Source: www.dpd.cdc.gov/dpdx/HTML/Cysticercosis.htm

Humans suffering from *taeniasis* harbour adult tapeworms of *T. solium* or *T. saginata,* which colonise the intestine. They generally experience mild symptoms and can easily be treated with antihelminthic drugs. Humans suffering from cysticercosis are infected with the larval stages of *T. solium* (*Cysticercus cellulosae*). Cysticerci can develop in skeletal muscles, heart muscle and subcutaneous tissue, as well as in the eye and brain. When infection occurs in the brain the patient develops neurocysticercosis (NCC), which can lead to epilepsy. Treatment of cystercercosis is intensive and necessitates hospitalisation of patients.
Pigs infected with cysticercosis do not usually present clinical symptoms. Infection is detected through routine slaughterhouse meat inspections, whereby muscle and organs are inspected by veterinary officers for the presence of the typical cysts.

#### Animals

In 2010 two MSs, Estonia and Sweden, provided information on cysticerci in pigs, sheep, cattle and wild boar, all of which were tested at slaughter. Estonia reported 41 (<0.01 %) of 420,496 pigs and one (0.01 %) of 8,506 sheep as positive for *C. tenuicollis*. In addition, 38 pigs had cysticerci visually detected; however this was not confirmed by laboratory analysis. No positive samples were detected in the 41,194 cattle and 2,743 wild boar sampled. *C. tenuicollis* (the larval stage of *T. hydatigena*) is not a zoonotic parasite. In Sweden, *C. bovis* was detected in three of 451,125 cattle, but in none of the pigs analysed.

### 3.14.2 Tuberculosis due to mycobacteria other than *M. bovis*

Several species of mycobacteria are of interest from a zoonotic perspective. These can be divided into two groups: the *Mycobacterium tuberculosis* complex, which causes tuberculosis in the host, and the non-Tuberculosis Mycobacteria complex, which causes a variety of infections other than tuberculosis.

The *Mycobacterium tuberculosis* complex (MTC) includes *M. bovis* (data presented in section 3.4), *M. africanum*, *M. canettii, M. microti, M. pinnipedii, M. tuberculosis*, and the newly defined *M. caprae*[62]*.* The primary host for *M. caprae* is goats, but the organism has also been isolated from humans and other animals[63].

The non-Tuberculosis Mycobacteria complex (NTM) includes species of the *M. avium* complex (MAC), *M. kansasii*, *M. malmoense* and *M. xenopi*[64]. In turn, MAC is made up of several species and subspecies, including *M. intracellulare* and *M. avium* subsp. *avium* (MAA)*, M. avium* subsp. *hominissuis* and *M. avium* subsp. *Paratuberculosis*[65]*.* MAC is of particular significance as it is the most common bacterial infection in patients with acquired immune deficiency syndrome (AIDS). *M. avium* subsp. *paratuberculosis* (MAP) is the causal organism of Johne's disease in ruminants and can be present in milk from cows. Its prevalence in cattle in Europe is of the order of 20 %[66]. The primary host for *M. avium* subsp. *hominissuis* is the pig[67]. It is also thought that pigs may play a central role in harbouring a reservoir of MAA infection[68]. For each of these species, transmission from animals to humans can occur either through the consumption of contaminated foods or via direct contact with an infected animal.

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66 Nielsen SS and Toft N, 2009. A review of prevalences of paratuberculosis in farmed animals in Europe. Preventive Veterinary Medicine 88, 1–14.

67 Álvarez J, Castellanos E, Romero B, Aranaz A, Bezos J, Rodríguez S, Mateos A, Domínguez L and de Juan L, 2011. Epidemiological investigation of a *Mycobacterium avium* subsp. *hominissuis* outbreak in swine. Epidemiology and Infection 139, 143–148.

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fragment length polymorphism patterns of porcine and human isolates. Journal of Clinical Microbiology 37, 1254–1259.

### Animals

In 2010, eight MSs reported the presence of mycobacteria other than *M. bovis* in 10 different animal species (Table OZ2). The most commonly reported mycobacteria other than *M. bovis*, was MAA, which was detected by two MSs in four animal species. France reported MAA in pigs (40.9 %), badgers (10.3 %), wild boar (9.9 %) and cattle (3.7 %). Germany detected MAA in pigs (17.9 %) and in zoo animals (3.9 %). France, Germany, Portugal and Sweden all detected other isolates from the *M. avium* complex group (*M. avium* subsp. *hominissuis* and MAP*, M. intracellulare*, and *M. avium* subsp. 'unspecified'). Each of these bacterial species was detected at low levels, except for *M. avium* subspecies 'unspecified' for which moderate levels were reported by Sweden in pigs (15.7 %). Additionally, *M. caprae* was detected by Austria in eight cattle and Portugal in one wild boar. *M. tuberculosis* was detected by Germany at very low levels in zoo animals and rarely in pigs, and 'atypical' *Mycobacterium* was detected by Italy at low levels in Cantabrian chamois and deer.

The highest prevalence of *Mycobacterium* not reported as *M. bovis* was for 'unspecified' *Mycobacterium*. *Mycobacterium* 'unspecified' was reported at high levels by France (in wild boars: 47.8 %, and badgers: 39.7 %), by the United Kingdom (in pigs: 34.0 %) and by Hungary (in wild boar: 20.5 %), as well as additionally being reported by seven MSs at moderate to very low levels in nine animal species.

### *Table OZ2. Mycobacteria other than* M. bovis*, 2010*

| Country | Species | Sampling unit | Sampling context | Number tested | M. avium complex: *M. avium* subsp. *avium (MAA)* N | M. avium complex: *M. avium* subsp. *avium (MAA)* % pos | M. avium complex: *M. avium* subsp. *hominissuis* N | M. avium complex: *M. avium* subsp. *hominissuis* % pos | M. avium complex: *M. avium* subsp. *paratuberculosis (MAP)* N | M. avium complex: *M. avium* subsp. *paratuberculosis (MAP)* % pos | M. avium complex: *M. avium* unspecified N | M. avium complex: *M. avium* unspecified % pos | M. avium complex: *M. intracellulare* N | M. avium complex: *M. intracellulare* % pos | *M. caprae* N | *M. caprae* % pos | *M. tuberculosis* N | *M. tuberculosis* % pos | *Mycobacteruim* spp., unspecified N | *Mycobacteruim* spp., unspecified % pos | *Mycobacterium*, atypical N | *Mycobacterium*, atypical % pos |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | Cattle (bovine animals) | Animal | Unknown | 7,633 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| France[1] | Badgers | Animal | Hunting (surveillance) | 78 | 8 | 10.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 39.7 | 0 | 0 |
| | Cattle (bovine animals) | Herd | At slaughterhouse | 162 | 6 | 3.7 | 0 | 0 | 1 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 16.7 | 0 | 0 |
| | Pigs | Animal | At slaughterhouse | 44 | 18 | 40.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 11.4 | 0 | 0 |
| | Wild boars | Animal | Hunting (surveillance) | 161 | 16 | 9.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 77 | 47.8 | 0 | 0 |
| Germany | Pigs | Animal | Unknown | 1,040 | 186 | 17.9 | 75 | 7.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.1 | 2 | 0.2 | 0 | 0 |
| | Zoo animals, all | Animal | Unknown | 692 | 27 | 3.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.1 | 10 | 1.4 | 0 | 0 |
| Hungary | Deer | Animal | Survey | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 11.5 | 0 | 0 |
| | Wild boars | Animal | Survey | 210 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 20.5 | 0 | 0 |
| Ireland[2] | Badgers | Animal | Surveillance | 1,031 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0.5 | 0 | 0 |
| | Goats | Animal | Mixed | 1,230 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0.3 | 0 | 0 |
| Italy[3] | Cantabrian chamois | Animal | Control and eradication | 150 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2.0 |
| | Deer | Animal | Mixed | 248 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1.2 |
| | Wild boars | Animal | Mixed | 312,890 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 326 | 0.1 | 0 | 0 |
| | Wild boars | Herd | Control and eradication | 2,022 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 1.1 | 0 | 0 |

Table continued overleaf.

### *Table OZ2 (continued). Mycobacteria other than* M. bovis*, 2010*

| Country | Species | Sampling unit | Sampling context | Number tested | *M. avium* complex | | | | | | | | | | *M. caprae* | | *M. tuberculosis* | | *Mycobacterium* spp., unspecified | | *Mycobacterium*, atypical | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | *M. avium* subsp. *avium (MAA)* | | *M. avium* subsp. *hominissuis* | | *M. avium* subsp. *paratuberculosis (MAP)* | | *M. avium* unspecified | | *M. intracellulare* | | | | | | | | | |
| | | | | | N | % pos | N | % pos | N | % pos | N | % pos | N | % pos | N | % pos | N | % pos | N | % pos | N | % pos |
| Portugal | Deer | Animal | Unknown | 72 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Foxes | Animal | Unknown | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 9.7 | 1 | 3.2 | 0 | 0 | 0 | 0 | 1 | 3.2 | 0 | 0 |
| | Wild boars | Animal | Unknown | 87 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5.7 | 2 | 2.3 | 1 | 1.1 | 0 | 0 | 3 | 3.4 | 0 | 0 |
| Sweden | Pigs | Animal | Unknown | 102 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 15.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| United Kingdom[1] | Badgers | Animal | Survey | 103 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1.9 | 0 | 0 |
| | Pigs | Animal | At slaughterhouse | 341 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 116 | 34.0 | 0 | 0 |
| | Sheep | Animal | At slaughterhouse | 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2.6 | 0 | 0 |
| **Total (9 MSs)** | **All species** | **Animal** | **All sampling contexts** | **326,234** | **255** | **<0.1** | **75** | **<0.1** | **0** | **0** | **27** | **<0.1** | **3** | **<0.1** | **9** | **<0.1** | **2** | **<0.1** | **632** | **0.2** | **0** | **0** |
| | | **Herd** | **All sampling contexts** | **2,184** | **6** | **0.3** | **0** | **0** | **1** | **<0.1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **49** | **2.2** | **0** | **0** |

Note: Data are presented only for sample sizes ≥25 and for species in which MSs have reported mycobacteria other than *M. bovis*.

1. At slaughterhouse: France surveillance, official controls; United Kingdom routine meat inspection.
2. In Ireland, the mixed sampling context for goats includes 1,214 animals (two positive) sampled under 'control and eradication', and 16 animals (two positive) with the sampling context unspecified.
3. In Italy, the mixed sampling context for deer includes 246 animals (three positive) sampled under 'control and eradication', and two animals (no positive) sampled under 'survey'; additionally the mixed sampling context for wild boar sampled at the animal level includes 312,642 animals (321 positive) sampled under 'control and eradication', and 248 animals (five positive) sampled under 'survey'.

### 3.14.3 Discussion

The detection of both *M. avium* subspecies *avium* (MAA) and *M. avium* subsp. *hominissuis* was consistent with current literature. Both *M. avium* subspecies were primarily detected in pigs, and MAA was also detected at lower numbers (and lower prevalence) in wild boar, badgers and cattle. *M. caprae*, which is considered primarily to infect goats, was reported in cattle, goats and wild boar by two MSs. The highest prevalence of *Mycobacterium* not reported as *M. bovis* was for 'unspecified' *Mycobacterium*, reported by several MSs in domestic and wild animal species.

In 2011, a scientific report was published by EFSA on technical specifications for harmonised epidemiological indicators for public health hazards to be covered by the meat inspection of swine[69]. In reference to the detection of mycobacteria, the report proposes that all pig carcasses should be visually inspected at slaughter. Where suspicious lesions are identified they should be confirmed with microscopy (Ziehl-Neelsen staining), culture and molecular characterisation. Such harmonisation would be beneficial to the epidemiological analysis of data across the EU.

69 EFSA, (European Food Safety Authority), 2011. Scientific Report on Technical specifications on harmonised epidemiological indicators for public health hazards to be covered by meat inspection of swine. EFSA Journal. 9(10):2371

# 4. FOOD-BORNE OUTBREAKS

## 4.1 General overview

The reporting of investigated food-borne outbreaks has been mandatory for EU MSs since 2005. Starting from 2007, harmonised specifications on the reporting of these outbreaks at the EU level have been applied[70]. However, it is important to note that the food-borne outbreak investigation systems at the national level are not harmonised among MSs. Therefore, the differences in the numbers and types of reported outbreaks, as well as the causative agents, may not necessarily reflect the levels of food safety situations among MSs; rather they may be indicative of the differences in the efficiency and sensitivity of the national systems for identifying and investigating food-borne outbreaks.

Data from 2010 provide information on the total number of reported food-borne outbreaks attributed to different causative agents, including food-borne outbreaks in which the causative agent was unknown.

In 2010, changed reporting specifications for food-borne outbreaks were implemented[71], and the distinction between 'verified' and 'possible' food-borne outbreaks was abandoned in the reporting; instead, outbreaks were categorised as 'strong evidence' or 'weak evidence' outbreaks based on the strength of evidence implicating a suspect food vehicle. In the former case, i.e. where the evidence implicating a particular food vehicle was strong, based on an assessment of all available evidences, a detailed dataset was reported for food-borne outbreaks. In the latter case, i.e. where no particular food vehicle was suspected or for food-borne outbreaks where the evidence implicating a particular food vehicle was weak, only a limited dataset was reported. This included the number of outbreaks per causative agent and the number of human cases, hospitalisations and deaths. In this chapter the term 'weak evidence outbreak' also covers the outbreaks for which no particular food vehicle was suspected.

In this general overview, all reported food-borne outbreaks, excluding strong evidence waterborne outbreaks, are included in the tables and figures; instead outbreaks caused by drinking water are included only in tables OUT1 and OUT6. In subsequent sections, outbreaks are presented in more detail and categorised by the causative agent. Finally, all strong evidence waterborne outbreaks are addressed separately in section 4.13.

In 2010, 24 MSs and two non-MSs provided data on food-borne outbreaks. An overview of countries reporting data on food-borne outbreaks is provided in Table OUT1. No outbreak data were reported by Bulgaria, Cyprus and Luxembourg.

70 EFSA (European Food Safety Authority), 2007. Report of the Task Force on Zoonoses Data Collection on harmonising the reporting of food-borne outbreaks through Community reporting system in accordance with Directive 2003/99/EC. EFSA Journal,123, 1-16.

71 EFSA (European Food Safety Authority), 2011. Updated technical specifications for harmonised reporting of food-borne outbreaks through the European Union reporting system in accordance with Directive 2003/99/EC. EFSA Journal, 9(4):2101, 24 pp.

### *Table OUT1. Overview of countries reporting data on food-borne outbreaks, 2010*

| Data | Total no of MSs reporting | Countries |
|---|---|---|
| *Salmonella* | 23 | **All MSs** except BG, CY, LU, SI<br>**Non-MSs**: CH, NO |
| *Campylobacter* | 19 | **MSs**: AT, BE, CZ, DE, DK, EE, ES, FI, FR, HU, IE, IT, LT, MT, NL, PL, SE, SK, UK<br>**Non-MSs**: CH, NO |
| Pathogenic *E. coli* | 10 | **MSs**: AT, BE, DE, DK, ES, FR, IE, RO,SE, UK<br>**Non-MS**: NO |
| Other bacterial agents | 16 | **MSs**: AT, BE, CZ, DE, DK, EE, ES, FI, FR, IE, LT, LV, PL, RO, SE, UK<br>**Non-MS**: NO |
| Bacterial toxins | 19 | **MSs**: BE, CZ, DE, DK, ES, FI, FR, HU, IT, LT, LV, MT, NL, PL, PT, RO, SI, SK, UK<br>**Non-MSs**: CH, NO |
| Viruses | 20 | **MS**s: AT, BE, CZ, DE, DK, ES, FI, FR, GR, HU, IE, IT, LT, LV, NL, PL, SE, SI, SK, UK<br>**Non-MSs**: CH, NO |
| Parasites | 11 | **MSs**: AT, BE, DE, ES, FR, IE, IT, LT, PL, RO, SE |
| Other causative agents | 12 | **MSs**: BE, DE, DK, ES, FI, FR, HU, MT, PL, SE, SK, UK<br>**Non-MSs**: CH, NO |
| Unknown | 18 | **MSs**: BE, ES, FI, FR, GR, HU, IE, IT, LT, LV, MT, NL, PL, RO,SE, SI, SK, UK<br>**Non-MS**: CH |

## Number of outbreaks

In 2010, a total of 5,262 food-borne outbreaks, including both weak and strong evidence outbreaks, were reported by the 24 reporting MSs (Table OUT2). Overall these outbreaks caused 43,473 human cases, 4,695 hospitalisations and 25 deaths (case fatalities) (Table OUT3). The total number of food-borne outbreaks was comparable to 2009, where 24 MSs reported a total of 5,550 outbreaks.

The overall reporting rate in 2010 was 1.1 outbreaks per 100,000 population (Table OUT2) which was equal to the 2009 overall reporting rate. As in 2009, Latvia had the highest reporting rate (22.3 outbreaks per 100,000 population) followed by Malta (12.1 outbreaks per 100,000 population).

Within the EU, the causative agent was known in 69.9 % of the reported outbreaks (Table OUT4), ranging from 21.1 % to 100 % among MSs. Thirteen MSs reported the causative agent in more than 75.0 % of their outbreaks.

In 2010, France alone accounted for 19.7 % of all reported outbreaks (Table OUT2). France was also the MS reporting the largest number of outbreaks in 2009 (1,256). France appears to have a sensitive food-borne outbreaks investigation and reporting system, which may be the reason for consistently high levels of reporting. But although France provided the highest number of outbreaks of all MSs, France's reporting rate per 100,000 population was 1.6, which was (only) the ninth highest one amongst the MSs (Table OUT2 and Figure OUT3). The MS reporting the second most outbreaks was Latvia which reported 505 outbreaks (9.6 % of the total). Slovakia and Spain reported 487 and 482 outbreaks respectively, and together, France, Latvia, Slovakia and Spain accounted for 47.8 % of all outbreaks. Hungary experienced an increase in reported outbreaks, with 299 reported outbreaks in 2010, compared with 59 in 2009. In contrast, three MSs reported large reductions in the number of reported outbreaks, Latvia from 805 to 505, Germany from 602 to 439, and Austria from 351 to 193. These changes in the numbers of outbreaks reported may be due to real changes, or changes in the reporting specifications detailed above and the interpretation of the new reporting criteria by individual MSs, or changes in the case definitions used by MSs.

France is committed to comply with the new food-borne outbreaks definition. In France, food-borne outbreaks surveillance is achieved through mandatory notification. This mandatory reporting applies to all food-borne outbreaks, including family outbreaks (36 % of all French outbreaks in 2010). Data provided to the local health authorities are transmitted in real time to the national public health institute. These data are complemented by information coming from the ministry of agriculture. Moreover, as France has also a *Salmonella* surveillance system, and also these data are used to identify outbreaks.
Between 2005 and 2009 France reported a sharp increase in the number of food-borne outbreaks. This increase corresponded to the use of a new specific notification and investigation software by the local health authorities.
In 2010 an important effort was made to comply with the new EU definition and for France the number of outbreaks with detailed dataset decreased. Many outbreaks without any particular food incriminated that were previously classified as 'verified' are now classified as 'weak evidence outbreaks' or outbreaks where no particular food vehicle is suspected.

A total of 698 strong evidence outbreaks was reported by MSs, representing 13.3 % of the total number of food-borne outbreaks recorded in 2010 (Table OUT4). Considering each causative agent, the highest proportion of strong evidence outbreaks was reported for parasites (50.0 %), followed by ‘other bacterial agents’ (29.7 %). The strong evidence outbreaks reported by MSs involved 12,409 human cases; of these, 1,422 people (11.5 %) were admitted to hospital and 15 people died (0.12 %) (Table OUT3). Spain, Poland and France accounted for 55.7 % of strong evidence outbreaks between them; this is similar to the data reported for 2009, with the exception of France, which reported 358 verified outbreaks in 2009, but only 75 strong evidence outbreaks in 2010, and Latvia, which reported 111 verified outbreaks in 2009 but only seven strong evidence outbreaks in 2010. This decline in the numbers of strong evidence outbreaks reported is probably due to the changes in the reporting system for 2010 and the interpretation by MSs. In the non-MSs, Norway and Switzerland, strong evidence outbreaks comprised 294 human cases with 42 hospitalisations and no fatalities.

### Deaths

In 2010, a total of 15 deaths were reported related to strong evidence food-borne outbreaks (Table OUT3). Of these fatalities, nine were associated with *Salmonella*, four with *Listeria monocytogenes,* one with *Clostridium botulinum* toxins and one death with mushroom toxins. There were also 10 deaths reported relating to weak evidence food-borne outbreaks. Of these fatalities, seven were associated with *Salmonella*, one with mycotoxins and two deaths were associated with other agents. One death from a weak-evidence outbreak in which the causative agent was norovirus was also reported by a non-MS.

### Causative agents

*Salmonella* remained the most frequently detected causative agent in food-borne outbreaks reported in the EU (Figures OUT1 and OUT2). In 2010, *Salmonella* was responsible for 30.5 % of all reported outbreaks followed by viruses and *Campylobacter* which accounted for 15.0 % and 8.9 % of the outbreaks, respectively. In 30.1 % of all outbreaks, the causative agent was unknown and this proportion was slightly higher than previous years (Table OUT4).

There was a continuation in the decline of the total number of *Salmonella* outbreaks within the EU during the period from 1,888 outbreaks in 2008 to 1,604 outbreaks in 2010. Also the total number of outbreaks caused by viruses decreased to 790 in 2010 after an increase to 1,043 in 2009 from 697 in 2008 (Figure OUT2 and Table OUT4). The number of outbreaks caused by parasites decreased by 41.2 % in 2010 compared with 2009; this is primarily due to a decrease in *Trichinella* outbreaks in Romania from 31 outbreaks in 2009 to just three in 2010.

*Table OUT2. Total number of reported food-borne outbreaks (excluding strong evidence waterborne outbreaks) in the EU, 2008-2010*

| Country | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | Weak evidence outbreaks (n) | Strong evidence outbreaks (n) | N | Reporting rate per 100,000 | Possible outbreaks (n) | Verified outbreaks (n) | N | Reporting rate per 100,000 | Possible outbreaks (n) | Verified outbreaks (n) |
| Austria | 193 | 2.3 | 183 | 10 | 351 | 4.2 | 340 | 11 | 368 | 4.4 | 354 | 14 |
| Belgium | 105 | 1.0 | 89 | 16 | 105 | 1.0 | 91 | 14 | 104 | 1.0 | 89 | 15 |
| Czech Republic | 25 | 0.2 | 25 | 0 | 25 | 0.2 | 23 | 2 | 23 | 0.2 | 22 | 1 |
| Denmark | 76 | 1.4 | 28 | 48 | 51 | 0.9 | 35 | 16 | 82 | 1.5 | 66 | 16 |
| Estonia | 32 | 2.2 | 30 | 2 | 23 | 1.7 | 22 | 1 | 51 | 3.8 | 46 | 5 |
| Finland | 43 | 0.8 | 19 | 24 | 54 | 1.0 | 24 | 30 | 41 | 0.8 | 33 | 8 |
| France | 1,039 | 1.6 | 964 | 75 | 1,256 | 2.0 | 898 | 358 | 1,081 | 1.7 | 808 | 273 |
| Germany | 439 | 0.5 | 399 | 40 | 602 | 0.7 | 567 | 35 | 1,068 | 1.3 | 1,038 | 30 |
| Greece | 3 | <0.1 | 3 | 0 | 53 | 0.5 | 53 | 0 | 55 | 0.5 | 54 | 1 |
| Hungary | 299 | 3.0 | 269 | 30 | 59 | 0.6 | 38 | 21 | 114 | 1.1 | 79 | 35 |
| Ireland | 13 | 0.3 | 10 | 3 | 28 | 0.6 | 27 | 1 | 25 | 0.6 | 23 | 2 |
| Italy | 225 | 0.4 | 225 | 0 | 248 | 0.4 | 248 | 0 | 245 | 0.4 | 245 | 0 |
| Latvia[1] | 505 | 22.3 | 498 | 7 | 805 | 35.6 | 694 | 111 | 45 | 2.0 | 35 | 10 |
| Lithuania | 148 | 4.4 | 141 | 7 | 175 | 5.2 | 167 | 8 | 228 | 6.8 | 216 | 12 |
| Luxembourg | - | - | - | - | - | - | - | - | 2.0 | 0.4 | 2 | 0 |
| Malta | 50 | 12.1 | 50 | 0 | 46 | 11.1 | 46 | 0 | 64 | 15.6 | 64 | 0 |
| Netherlands | 251 | 1.5 | 238 | 13 | 247 | 1.5 | 214 | 33 | 324 | 2.0 | 289 | 35 |
| Poland | 451 | 1.2 | 333 | 118 | 313 | 0.8 | 203 | 110 | 484 | 1.3 | 329 | 155 |
| Portugal | 4 | <0.1 | 0 | 4 | 11 | 0.1 | 0 | 11 | 35 | 0.3 | 24 | 11 |
| Romania | 29 | 0.1 | 10 | 19 | 54 | 0.3 | 0 | 54 | 46 | 0.2 | 9 | 37 |
| Slovakia | 487 | 9.0 | 467 | 20 | 303 | 5.6 | 297 | 6 | 75 | 1.4 | 66 | 9 |
| Slovenia | 3 | 0.2 | 0 | 3 | 5 | 0.2 | 2 | 3 | 17 | 0.8 | 16 | 1 |
| Spain | 482 | 1.1 | 286 | 196 | 416 | 0.9 | 275 | 141 | 551 | 1.2 | 337 | 214 |
| Sweden | 293 | 3.2 | 280 | 13 | 224 | 2.4 | 213 | 11 | 154 | 1.7 | 148 | 6 |
| United Kingdom | 67 | 0.1 | 17 | 50 | 96 | 0.2 | 96 | 0 | 50 | 0.1 | 50 | 0 |
| **EU Total** | **5,262** | **1.1** | **4,564** | **698** | **5,550** | **1.1** | **4,573** | **977** | **5,332** | **1.1** | **4,442** | **890** |
| Norway | 53 | 1.1 | 49 | 4 | 47 | 1.0 | 42 | 5 | 63 | 1.3 | 59 | 4 |
| Switzerland | 11 | 0.1 | 5 | 6 | 13 | 0.2 | 7 | 6 | 11 | 0.1 | 5 | 5 |

Note: 2010 data on outbreaks were based on strength of evidence (strong or weak) rather than in previous years in which outbreaks were defined as verified or suspected.
1. For Latvia, household outbreaks included in 2009 and 2010 data, but not in previous years.

***Table OUT3. Number of human cases in food-borne outbreaks (weak and strong evidence - excluding strong evidence waterborne outbreaks) in the EU, 2010***

| Country | Strong evidence outbreaks | | | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|---|---|
| | N | Human cases | | | N | Human cases | | |
| | | Cases | Hospitalised | Deaths | | Cases | Hospitalised | Deaths |
| Austria | 10 | 317 | 48 | 1 | 183 | 521 | 107 | 1 |
| Belgium | 16 | 651 | 45 | 0 | 89 | 543 | 15 | 0 |
| Czech Republic | - | - | - | - | 25 | 807 | 42 | 0 |
| Denmark | 48 | 1,485 | 7 | 0 | 28 | 743 | 4 | 0 |
| Estonia | 2 | 105 | 7 | 0 | 30 | 215 | 31 | 0 |
| Finland | 24 | 562 | 1 | 0 | 19 | 361 | 6 | 0 |
| France | 75 | 1,407 | 224 | 1 | 964 | 8,561 | 466 | 0 |
| Germany | 40 | 500 | 66 | 2 | 399 | 1,878 | 273 | 1 |
| Greece | - | - | - | - | 3 | 193 | 48 | 0 |
| Hungary | 30 | 932 | 61 | 0 | 269 | 1,731 | 387 | 2 |
| Ireland | 3 | 43 | 19 | 0 | 10 | 55 | 10 | 0 |
| Italy | - | - | - | - | 225 | 1,205 | - | - |
| Latvia | 7 | 77 | - | 0 | 498 | 1,438 | 2 | 0 |
| Lithuania | 7 | 83 | 54 | 0 | 141 | 402 | 300 | 0 |
| Malta | - | - | - | - | 50 | 166 | 3 | 0 |
| Netherlands | 13 | 213 | 63 | 2 | 238 | 1,001 | 12 | 1 |
| Poland | 118 | 1,407 | 354 | 1 | 333 | 4,709 | 752 | 0 |
| Portugal | 4 | 56 | 0 | 0 | 0 | - | - | - |
| Romania | 19 | 329 | 95 | 1 | 10 | 143 | 119 | 0 |
| Slovakia | 20 | 262 | 65 | 0 | 467 | 2,405 | 513 | 0 |
| Slovenia | 3 | 121 | 0 | 0 | 0 | - | - | - |
| Spain | 196 | 2,474 | 225 | 2 | 286 | 1,551 | 153 | 5 |
| Sweden | 13 | 292 | 12 | 0 | 280 | 2,078 | 20 | 0 |
| United Kingdom | 50 | 1,093 | 76 | 5 | 17 | 358 | 10 | 0 |
| **EU Total** | **698** | **12,409** | **1,422** | **15** | **4,564** | **31,064** | **3,273** | **10** |
| Norway | 4 | 242 | 0 | 0 | 49 | 547 | 8 | 0 |
| Switzerland | 6 | 52 | 42 | 0 | 5 | 54 | 1 | 1 |

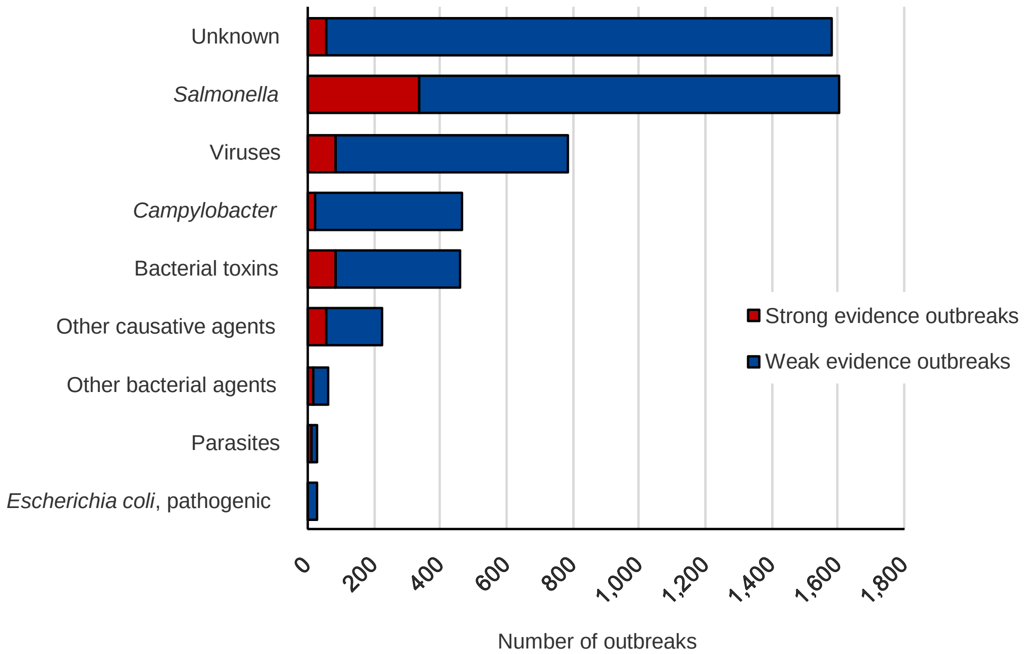
***Table OUT4. Causative agents in all food-borne outbreaks (weak and strong evidence - excluding strong-evidence waterborne outbreaks) in the EU, 2008-2010***

| Causative agent | 2010 | | | | 2009 | | | | 2008 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | Outbreaks: Strong evidence outbreaks (n) | Outbreaks: Weak evidence outbreaks (n) | N | % | Outbreaks: Verified outbreaks (n) | Outbreaks: Possible outbreaks (n) | N | % | Outbreaks: Verified outbreaks (n) | Outbreaks: Possible outbreaks (n) |
| *Salmonella* | 1,604 | 30.5 | 341 | 1,263 | 1,722 | 31.0 | 324 | 1,398 | 1,888 | 35.4 | 490 | 1,398 |
| Viruses | 790 | 15.0 | 87 | 703 | 1,043 | 18.8 | 70 | 973 | 697 | 13.1 | 38 | 659 |
| *Campylobacter* | 470 | 8.9 | 27 | 443 | 333 | 6.0 | 16 | 317 | 488 | 9.2 | 21 | 467 |
| Bacterial toxins | 461 | 8.8 | 87 | 374 | 558 | 10.1 | 218 | 340 | 525 | 9.8 | 159 | 366 |
| Other causative agents | 229 | 4.4 | 61 | 168 | 214 | 3.9 | 55 | 159 | 167 | 3.1 | 68 | 99 |
| Other bacterial agents | 64 | 1.2 | 19 | 45 | 52 | 0.9 | 18 | 34 | 20 | 0.4 | 11 | 9 |
| *Escherichia coli,* pathogenic | 31 | 0.6 | 2 | 29 | 75 | 1.4 | 18 | 57 | 75 | 1.4 | 10 | 65 |
| Parasites | 30 | 0.6 | 15 | 15 | 51 | 0.9 | 40 | 11 | 70 | 1.3 | 38 | 32 |
| *Yersinia* | - | - | - | - | - | - | - | - | 22 | 0.4 | 2 | 20 |
| Unknown | 1,583 | 30.1 | 59 | 1,524 | 1,502 | 27.1 | 218 | 1,284 | 1,380 | 25.9 | 53 | 1,327 |
| **EU Total** | **5,262** | **100** | **698** | **4,564** | **5,550** | **100** | **977** | **4,573** | **5,332** | **100** | **890** | **4,442** |

Note: 2010 data on outbreaks were based on strength of evidence (strong or weak) rather than in previous years in which outbreaks were defined as verified or suspected.

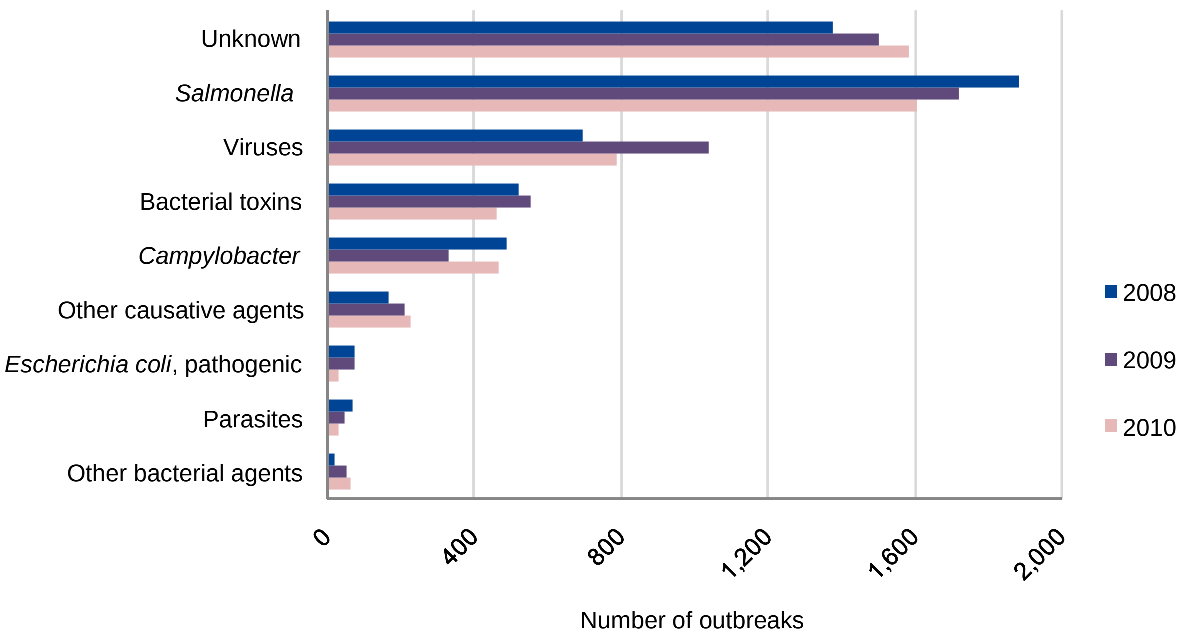
Note: Food-borne viruses include calicivirus, flavivirus, rotavirus, hepatitis A virus and other unspecified food-borne viruses. Bacterial toxins include toxins produced by *Bacillus*, *Clostridium* and *Staphylococcus*. Other causative agents include mushroom toxins, marine biotoxins, histamine, mycotoxins,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

***Figure OUT1. Distribution of food-borne outbreaks (weak and strong evidence - excluding strong evidence waterborne outbreaks) per causative agent in the EU, 2010***



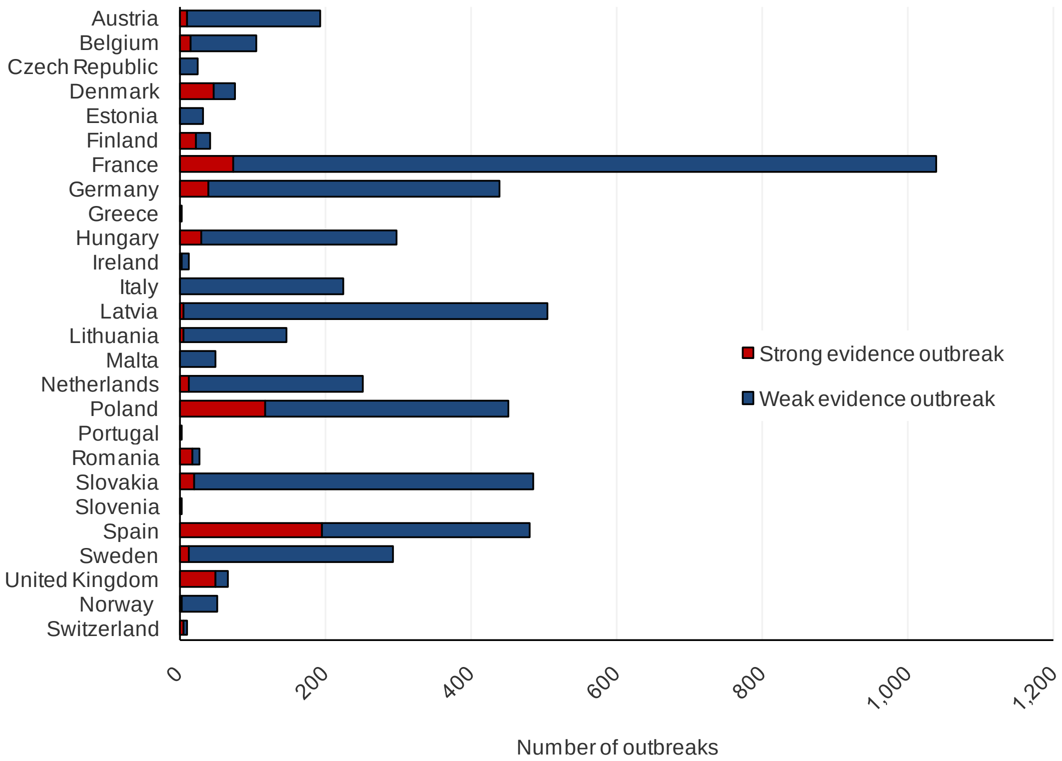

Note: Food-borne viruses include calicivirus, flavivirus, rotavirus, hepatitis A virus and other unspecified food-borne viruses. Bacterial toxins include toxins produced by *Bacillus*, *Clostridium* and *Staphylococcus*. Other causative agents include mushroom toxins, marine biotoxins, histamine, mycotoxins,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

***Figure OUT2. Total number of food-borne outbreaks (weak and strong evidence - excluding strong evidence waterborne outbreaks) in the EU, 2008-2010***




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

***Figure OUT3. Distribution of food-borne outbreaks (weak and strong evidence - excluding strong evidence waterborne outbreaks) in Member States and non-Member States, 2010***




## Strong and weak evidence outbreaks

There were large differences among MSs in the proportion of strong and weak evidence outbreaks reported in 2010 (Figure OUT3). This may be explained by differences between the MS-specific outbreak investigation and reporting systems, and so the type of information that is available on each outbreak. It is also possible that not all MSs interpreted the new reporting specification in the same way, or the MSs were not yet able to fully implement the new reporting specifications. Eighteen MSs and two non-MSs reported both strong and weak evidence outbreaks, whereas, the Czech Republic, Greece, Italy, and Malta reported only weak-evidence outbreaks, providing no detailed information on implicated food vehicles, settings or contributing factors. Portugal and Slovenia reported only strong evidence outbreaks. France, Latvia and the Netherlands reported fewer strong evidence outbreaks in 2010 than verified outbreaks in 2009. The opposite was the case for Slovakia and the United Kingdom.

## Strong evidence outbreaks

In strong evidence outbreaks, *Salmonella,* viruses and bacterial toxins were responsible for most human cases, accounting for 73.8 % of the outbreaks and 80.2 % of reported human cases (Table OUT5). Furthermore, these outbreaks accounted for 86.2 % of hospitalisations and 66.7 % of deaths related to strong evidence outbreaks. However, the *Brucella* outbreaks had the highest proportion of hospitalised cases (three cases, 100 %). Also outbreaks caused by *Clostridium botulinum* and *Listeria* had a high proportion of hospitalisations (95.2 % and 84.6 %, respectively).

The setting of the outbreak was provided in 96.4 % of strong evidence outbreaks (Figure OUT5). Households were reported as the setting in 38.7 % of outbreaks (15.0 % of human cases). Apart from households, the most common settings in strong evidence outbreaks were restaurants/cafes and similar premises (30.8 % of outbreaks, 26.0 % of human cases).

***Table OUT5. Number of outbreaks and human cases per causative agent in strong evidence food-borne outbreaks in the EU, 2010***

| Causative agent | Strong evidence outbreaks | | | | |
|---|---|---|---|---|---|
| | N | % | Human cases | | |
| | | | Cases | Hospitalised | Deaths |
| *Salmonella* | 341 | 48.9 | 5,212 | 994 | 9 |
| Viruses | 87 | 12.5 | 2,441 | 17 | 0 |
| Bacterial toxins | 87 | 12.5 | 2,297 | 215 | 1 |
| Other causative agents | 61 | 8.7 | 334 | 49 | 1 |
| *Campylobacter* | 27 | 3.9 | 398 | 10 | 0 |
| Other bacterial agents | 19 | 2.7 | 473 | 40 | 4 |
| Parasites | 15 | 2.1 | 360 | 74 | 0 |
| *Escherichia coli,* pathogenic | 2 | 0.3 | 58 | 2 | 0 |
| Unknown | 59 | 8.5 | 836 | 21 | 0 |
| **EU total** | **698** | **100** | **12,409** | **1,422** | **15** |

Note: Data from 698 outbreaks are included: Austria (10), Belgium (16), Denmark (48), Estonia (2), Finland (24), France (75), Germany (40), Hungary (30), Ireland (3), Latvia (7), Lithuania (7), Netherlands (13), Poland (118), Portugal (4), Romania (19), Slovakia (20), Slovenia (3), Spain (196), Sweden (13) and United Kingdom (50).

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

An outbreak is defined as either a household outbreak, in which only members of a single household are affected, or as a general outbreak, in which members of more than one household are affected. Of the 698 strong evidence outbreaks in 2010, 66.6 % were general outbreaks, 31.7 % were household outbreaks and 1.7 % were unknown. It should be kept in mind that the reporting and investigation systems in some MSs do not include household outbreaks at all.

### Types of evidence

Types of evidence supporting the categorisation of 'strong evidence' outbreaks are summarised in Table OUT6. More than one type of evidence can be reported for one outbreak. The causative agent was detected from both the food vehicle or food chain and human cases in 22.5 % of strong evidence outbreaks including strong evidence waterborne outbreaks, and the agent was laboratory characterised from the food vehicle or food chain where symptoms were pathognomonic to the causative agent in 22.6 % of outbreaks. The detection of the causative agent in the food chain or its environment was reported for the first time in 2010. Analytical epidemiological evidence supported the link between human cases and food vehicles in 46.6 % of strong evidence outbreaks and strong descriptive epidemiological evidence was reported in 45.5 % of strong evidence outbreaks. In 183 strong evidence outbreaks (25.7 %) reported by MSs, descriptive epidemiological evidence was the only supporting evidence, including 93 outbreaks in which the causative agent was *Salmonella* and 30 outbreaks in which the causative agent was norovirus. Fifteen strong evidence outbreaks were supported by detection of the causative agent in the food chain or its environment in combination with detection in humans and 4 outbreaks by the combination of descriptive epidemiological evidence, detection of the causative agent in the food chain or its environment and detection in humans. These evidence categories were new for outbreaks in which more detailed data were reported. Thus, it appears that approximately one-third (29.0 %) of the strong evidence outbreaks are different in nature compared with the verified outbreaks in 2009 and that the new reporting specifications have an impact on the reported outbreaks. Interestingly some MSs used these new evidence categories (alone) more than others to support the outbreaks than others (Table OUT6).

### Food vehicle

In 2010, the majority of strong evidence outbreaks were associated with foodstuffs of animal origin (Figure OUT4). As in previous years the most common single foodstuff category reported as food vehicle was eggs and egg products, responsible for 154 (22.1 %) outbreaks. Mixed or buffet meals were the next most common category (13.9 %), followed by vegetables, juices and products thereof (8.7 %) and crustaceans, shellfish, molluscs and products thereof (8.5 %). It is interesting that the number of outbreaks caused by vegetables, juices and products thereof has increased compared with 2009 (21 outbreaks in 2009, 61 outbreaks in 2010). In 2010 these outbreaks were primarily caused by lettuce contaminated with norovirus. The foodstuff was reported in all 698 strong evidence outbreaks, which shows an improvement in the detail of the data submitted compared with 2009 where there were 22.1 % of verified outbreaks from an unknown food source.

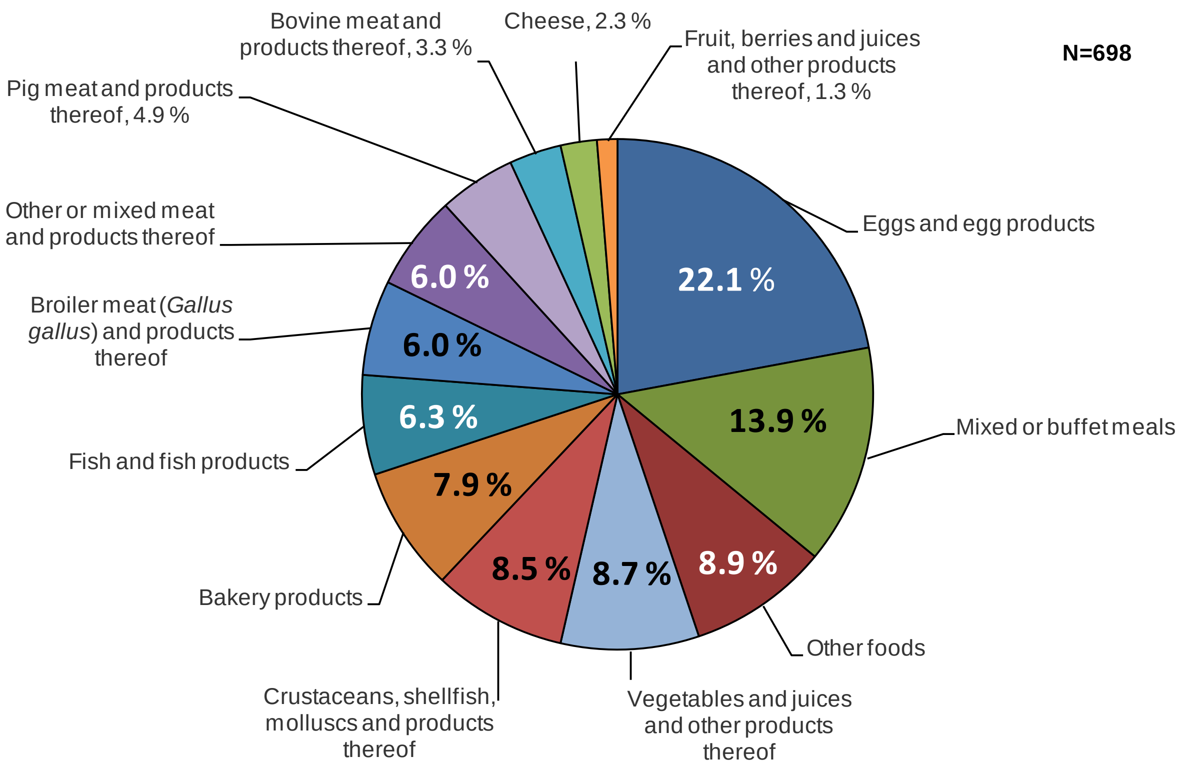
***Table OUT6. Evidence in strong evidence food-borne outbreaks (including strong evidence waterborne outbreaks) in the EU, 2010***

| Country | N | Analytical epidemiological evidence | Descriptive epidemiological evidence (this evidence alone) | Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans | Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans (this evidence alone) | Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent | Detection of causative agent in food chain or its environment - Symptoms and onset of illness pathognomonic to causative agent (this evidence alone) |
|---|---|---|---|---|---|---|---|
| Austria | 10 | 4 | 6 (3) | 1 | 3 | - | - |
| Belgium | 17 | 1 | 15 (11) | - | - | 5 | - |
| Denmark | 50 | 20 | 40 (18) | 9 | - | 12 | - |
| Estonia | 2 | 1 | 1 (1) | - | - | - | - |
| Finland | 25 | 8 | 25 (8) | 4 | - | 6 | - |
| France | 75 | 17 | 46 (45) | 2 | - | 10 | - |
| Germany | 40 | 2 | 1 (1) | 14 | 14 (14) | 8 | 1 (1) |
| Hungary | 30 | 15 | 1 (1) | 2 | - | 12 | - |
| Ireland | 4 | 2 | 2 | 2 | 1 | - | - |
| Latvia | 7 | 6 | - | - | - | 1 | - |
| Lithuania | 7 | 1 | 1 (1) | - | - | 5 | - |
| Netherlands | 13 | 4 | 1 (1) | 3 | - | 5 | - |
| Poland | 121 | 51 | 116 (43) | 51 | 18 | 47 | 12 |
| Portugal | 4 | - | - | - | - | 4 | - |
| Romania | 19 | - | - | 8 | - | 11 | - |
| Slovakia | 20 | - | 15 (15) | 5 | - | - | - |
| Slovenia | 3 | 1 | 1 (1) | 1 | - | - | - |
| Spain | 196 | 185 | - | - | - | 19 | - |
| Sweden | 18 | 2 | 15 (6) | 9 | 1 | - | - |
| United Kingdom | 51 | 12 | 38 (28) | 8 | 4 (1) | 3 | - |
| **EU Total** | **712** | **332** | **324 (183)** | **119** | **41 (15)** | **148** | **13 (1)** |
| Norway | 4 | - | - | 4 | - | - | - |
| Switzerland | 6 | 1 | 2 (2) | 1 | - | 2 | - |

Note: Data from waterborne outbreaks included.

Note: The evidences 'Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans' and 'Descriptive epidemiological evidence' were reported together in 4 outbreaks (2 from Austria, 1 from Sweden and 1 from the United Kingdom).

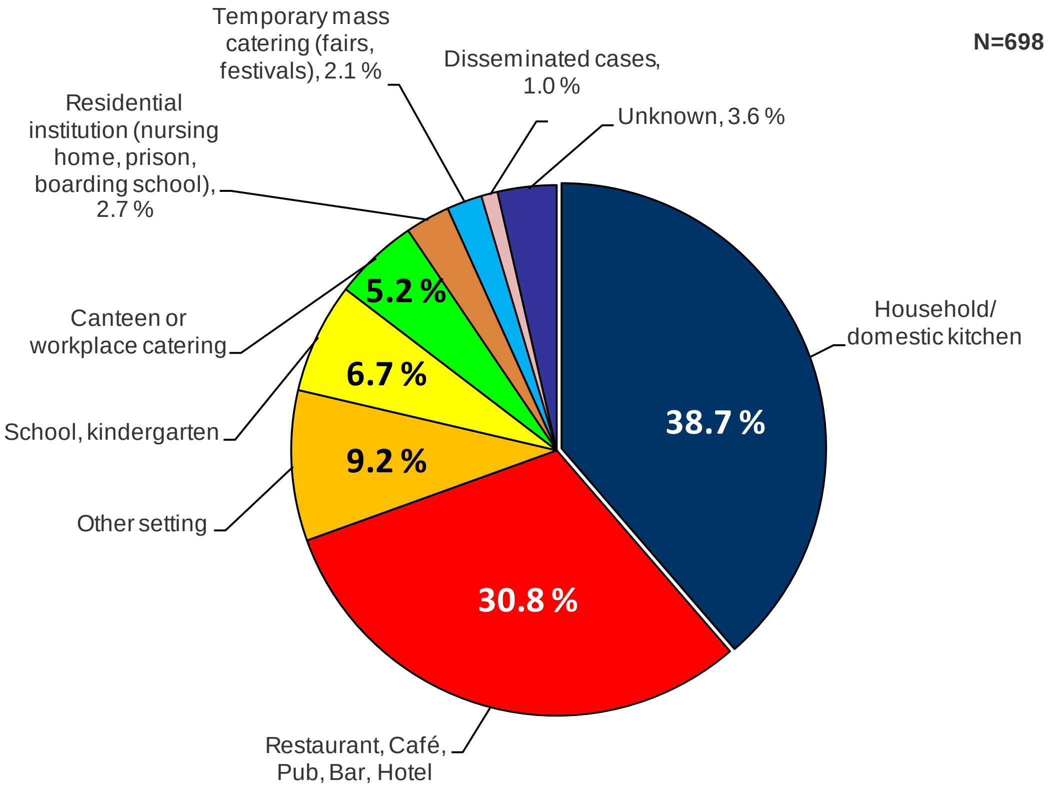
***Figure OUT4. Distribution of strong evidence outbreaks by food vehicle in the EU, 2010***




Note: Data from 698 outbreaks are included: Austria (10), Belgium (16), Denmark (48), Estonia (2), Finland (24), France (75), Germany (40), Hungary (30), Ireland (3), Latvia (7), Lithuania (7), Netherlands (13), Poland (118), Portugal (4), Romania (19), Slovakia (20), Slovenia (3), Spain (196), Sweden (13) and United Kingdom (50).

Note: Other foodstuffs (N=62) include: dairy products (other than cheeses) (4), cereal products including rice and seeds/pulses (nuts, almonds) (11), milk (8), herbs and spices (1), sweets and chocolate (4), canned food products (1) and other foods (33).

***Figure OUT5. Distribution of strong evidence outbreaks by settings in the EU, 2010***




Note: Data from 698 outbreaks are included: Austria (10), Belgium (16), Denmark (48), Estonia (2), Finland (24), France (75), Germany (40), Hungary (30), Ireland (3), Latvia (7), Lithuania (7), Netherlands (13), Poland (118), Portugal (4), Romania (19), Slovakia (20), Slovenia (3), Spain (196), Sweden (13) and United Kingdom (50).

Note: Other settings (N=65) include: take-away or fast-food outlet (5), camp, picnic (5), mobile retailer, market/street vendor (2), aircraft, ship, train (2), hospital/ medical care facility (4), farm (primary production) (3) and other settings (43).

### Detailed information on causative agents in selected food vehicles

The following section provides a more detailed view of different food vehicles and shows the distribution of the causative agents related to strong evidence outbreaks caused by eggs and egg products (Figure OUT6); mixed or buffet meals (Figure OUT7); fruit and vegetables (Figure OUT8); crustaceans, shellfish, molluscs and products thereof (OUT9); fish and fish products (OUT10) and meat from pigs and products thereof (OUT11).

Egg and egg products were implicated in 154 outbreaks of which 96.8 % were caused by *Salmonella* spp. (Figure OUT6). The majority of outbreaks were associated with *S*. Enteritidis (66.9 %). One *Staphylococcus aureus* outbreak in Spain was attributed to eggs and egg products.

Mixed and buffet meals were implicated in 97 outbreaks. *Salmonella* was the most frequently detected causative agent (43.3 %) followed by calicivirus (19.6 %), staphylococcal toxins (9.3 %) and *Bacillus* spp. (9.3 %) (Figure OUT7).

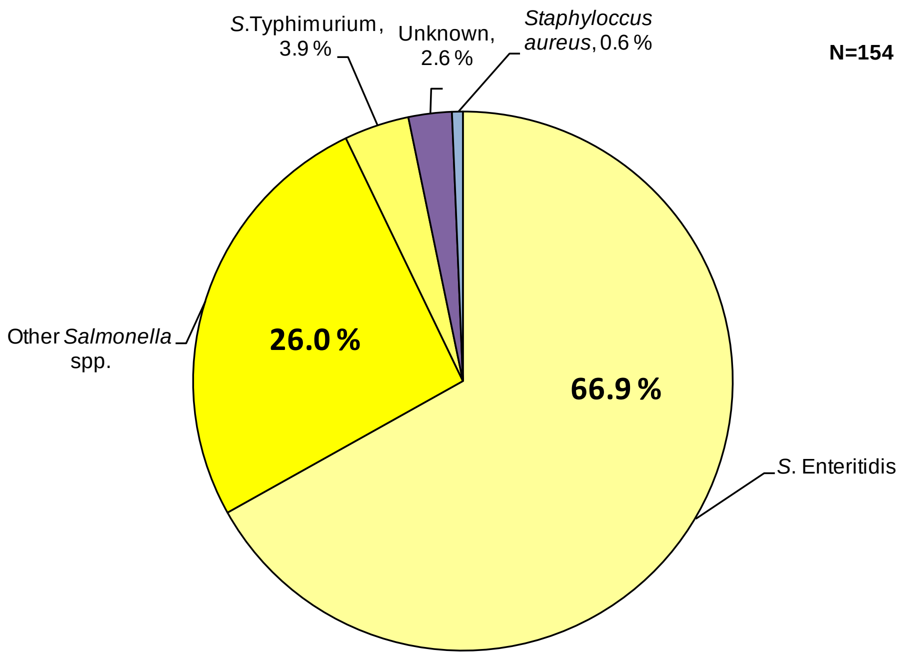
In 2010, fruit and vegetables were implicated in 70 outbreaks (Figure OUT8). The causative agent was primarily viruses (50.0 %) with the majority of these outbreaks being caused by norovirus attributed to contaminated lettuce.

There were 59 outbreaks attributed to crustaceans, shellfish, molluscs and products thereof (Figure OUT9). The majority were caused by calicivirus (35.6 %), followed by marine biotoxins (18.6 %). Eight calicivirus outbreaks and eight outbreaks in which the causative agent was unknown were linked to oyster consumption.

Fish and fish products were implicated in 44 outbreaks (Figure OUT10). The majority of outbreaks were caused by histamine (30 outbreaks, 68.2 %) and the majority of these (17 outbreaks) were reported by Spain. The second most frequent agent was calicivirus, causing three (6.8 %) outbreaks.

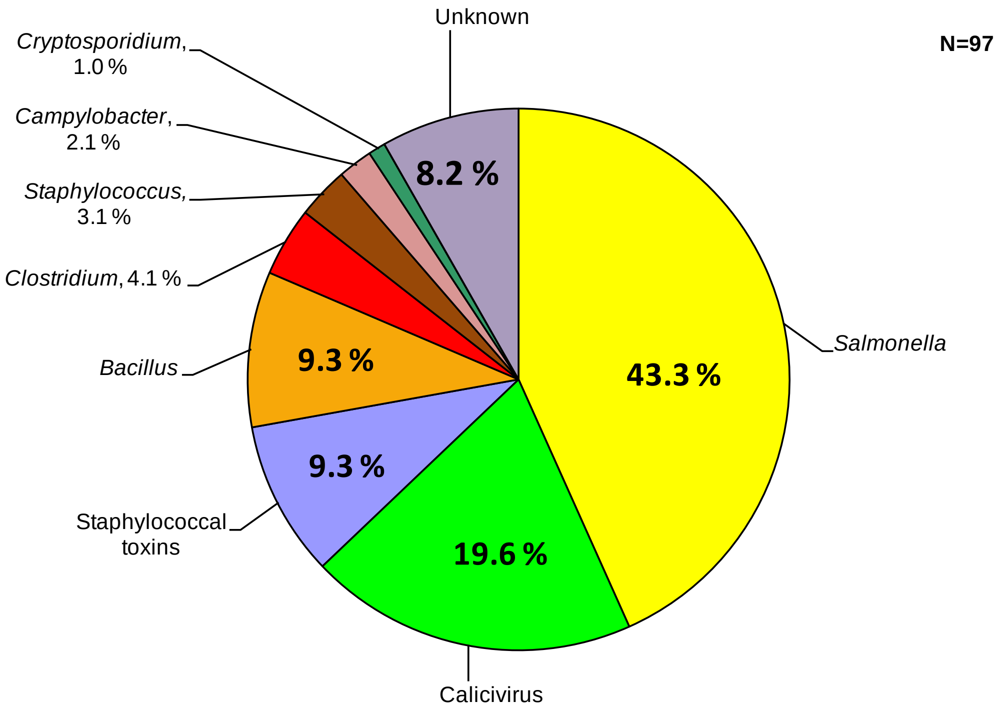
Of 34 outbreaks caused by pig meat and products thereof, 52.9 % were due to *Salmonella* (Figure OUT11). France reported 44.4 % of these outbreaks with the remainder being reported by Denmark, Germany, Hungary, the Netherlands, Poland, Romania and Sweden. *Trichinella* accounted for 26.5 % of these 34 strong evidence outbreaks (reported by Lithuania and Romania). *Clostridium* (reported by Germany, Poland and Romania) accounted for 11.8 % of the outbreaks. Twenty-seven per cent of human cases in the outbreaks caused by pig meat and products thereof were reported in one outbreak in which norovirus was the causative agent.

***Figure OUT6. Distribution of strong evidence outbreaks caused by eggs and egg products by causative agent in the EU, 2010***



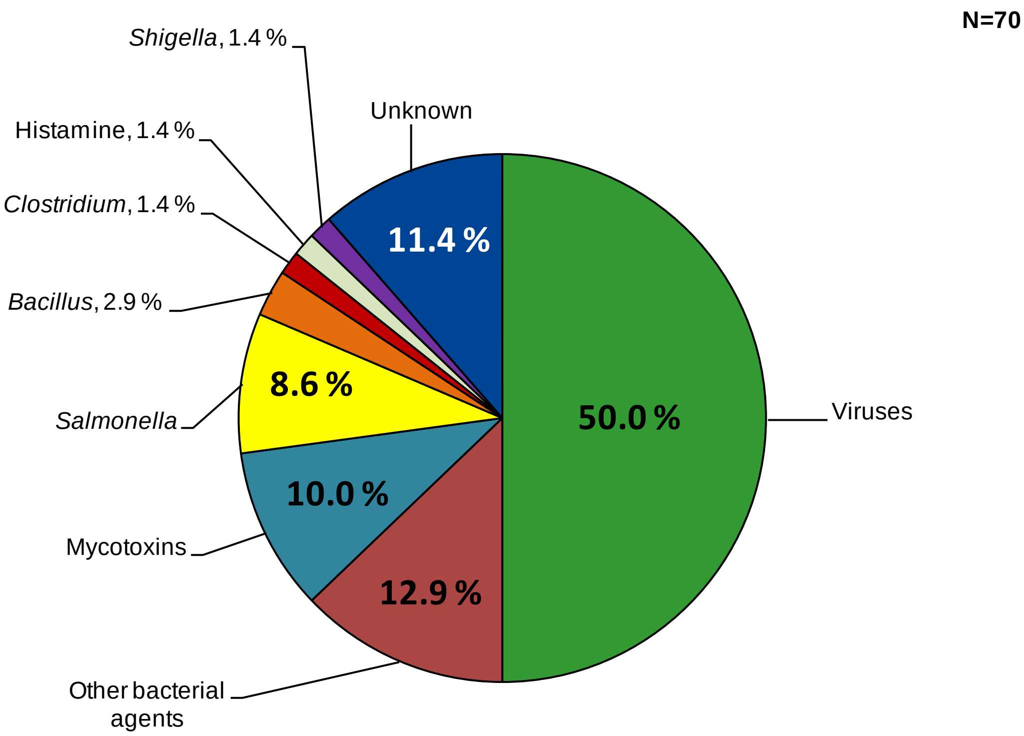

Note: Data from 154 outbreaks included: Austria (5), Belgium (1), Estonia (2), France (15), Germany (3), Hungary (1), Ireland (1), Latvia (3), Poland (36), Slovakia (12), Spain (74) and United Kingdom (1).

**Figure OUT7. Distribution of strong evidence outbreaks caused by mixed or buffet meals by causative agent in the EU, 2010**



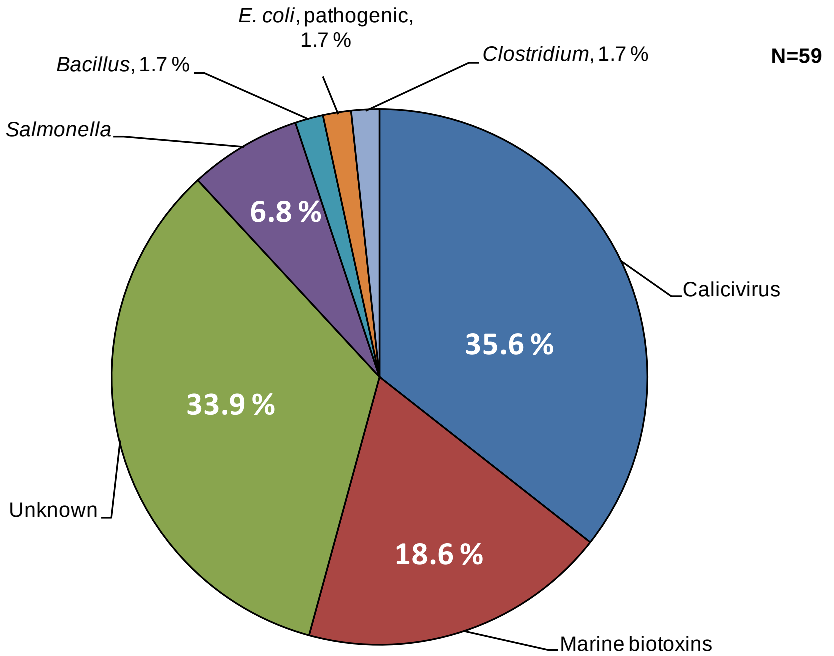

Note: Data from 97 outbreaks included: Austria (3), Belgium (6), Denmark (6), Finland (3), France (3), Germany (12), Hungary (21), Netherlands (1), Poland (14), Portugal (3), Slovakia (2), Spain (17), Sweden (2) and United Kingdom (4) .

**Figure OUT8. Distribution of causative agents in strong evidence outbreaks caused by fruit and vegetables in the EU, 2010**



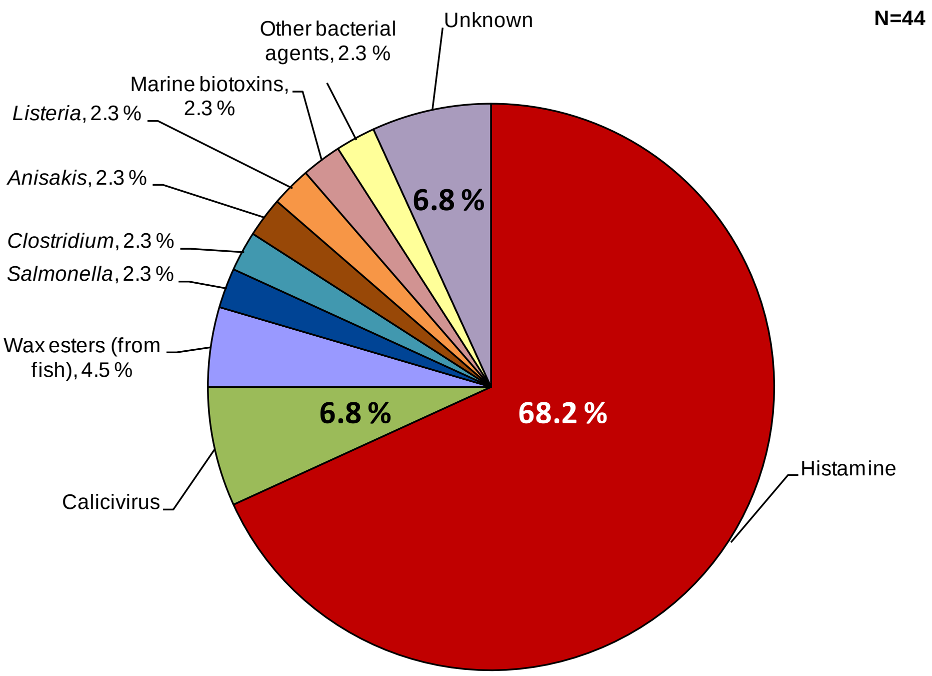

Note: Data from 70 outbreaks included: Belgium (1), Denmark (27), Finland (11), France (6), Germany (3), Netherlands (1), Poland (1), Spain (12), Sweden (4) and United Kingdom (4).
Note: Other bacterial agents (N=9) include: toxin of *Pseudomonas fluorescens* (7) and unspecified agents (2).

***Figure OUT9. Distribution of strong evidence outbreaks caused by crustaceans, shellfish, molluscs and products thereof by causative agent in the EU, 2010***



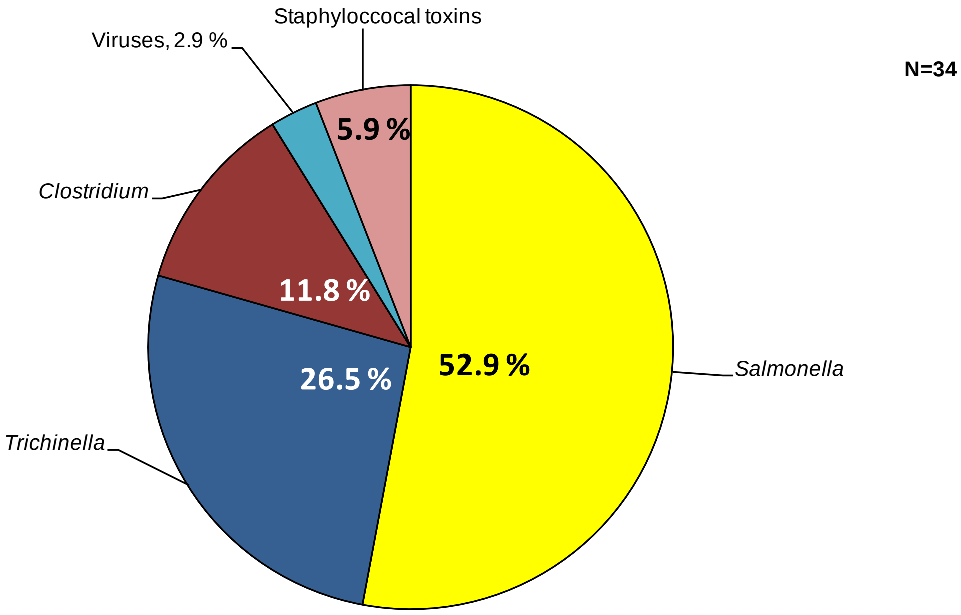

Note: Data from 59 outbreaks included: Belgium (1), Denmark (1), Finland (2), France (16), Netherlands (1), Spain (23), Slovenia (1), Sweden (1) and United Kingdom (13).

***Figure OUT10. Distribution of strong evidence outbreaks caused by fish and fish products by causative agent in the EU, 2010***




Note: Data from 44 outbreaks included: Denmark (4), Finland (2), Germany (4), Poland (3), Slovenia (1), Spain (23), Sweden (4) and United Kingdom (3).

***Figure OUT11. Distribution of strong evidence outbreaks caused by pig meat and products thereof by causative agent in the EU, 2010***




Note: Data from 34 outbreaks included: Belgium (1), Denmark (2), France (9), Germany (3), Hungary (2), Lithuania (6), Netherlands (1), Poland (3), Romania (5), Slovakia (1) and Sweden (1).

## 4.2 *Salmonella*

In 2010, 24 MSs reported a total of 1,604 food-borne outbreaks of human salmonellosis, which constituted 30.5 % of the total number of reported outbreaks of food-borne illness in the EU (Table OUT4).

The majority of *Salmonella* outbreaks (79.8 %) were reported by France, Germany, Hungary, Italy, Poland, Slovakia and Spain. Within the EU, the overall reported incidence was 0.33 outbreaks per 100,000 population; ranging from 0.01 per 100,000 population in Greece, Portugal and the United Kingdom to 5.15 per 100,000 population in Slovakia. Norway and Switzerland reported a total of four *Salmonella* outbreaks (Table OUT7).

The annual total number of *Salmonella* outbreaks within the EU has decreased markedly during recent years and this reduction continued in 2010. From 2008 to 2010, the total number of *Salmonella* outbreaks decreased by 15.0 %, from 1,888 to 1,604 outbreaks (Table OUT4). This reduction parallels the general decline in notified human salmonellosis cases observed within the EU over the same period. The majority of *Salmonella* outbreaks are still attributed to eggs and egg products; however the number of these outbreaks has also declined over the period 2007-2010. It is thought that the decrease observed in the EU is probably the result of the effect of the harmonised *Salmonella* control programmes that have been implemented in breeding and laying hen flocks across the EU, since 2007.

As in previous years, *S.* Enteritidis was the predominant serovar associated with the S*almonella* outbreaks, accounting for 61.3 % of all strong evidence *Salmonella* outbreaks and 46.6 % of human cases involved in these outbreaks. Furthermore, *S.* Enteritidis accounted for 19.6 % of all human cases, 39.0 % of all hospitalisations and 20.0 % of all deaths connected with strong evidence food-borne outbreaks. In contrast, *S.* Typhimurium was associated with 13.8 % of the strong evidence *Salmonella* outbreaks and 26.9 % of human cases involved in these. Overall, *S.* Typhimurium accounted for 11.3 % of all human cases, 14.3 % of all hospitalisations and 26.7 % of all deaths connected to strong evidence food-borne outbreaks in 2010. For 18.8 % of strong evidence outbreaks caused by *Salmonella,* the serovar was not reported or unknown. Only 13.7 % of outbreaks due to *S*. Enteritidis and *S*. Typhimurium included information on the phage type of isolates (Table OUT8).

In 2010 Germany reported three monophasic *S.* Typhimurium food-borne outbreaks involving 45 human cases with 10 hospitalisations and one death. In one outbreak the food vehicle was pig meat and products thereof whereas buffet meals in which pork products or other food were served were the food vehicles in two outbreaks.

**Largest *Salmonella* food-borne outbreak ever documented in a school setting in France.**
In October 2010, a severe *Salmonella* outbreak occurred in schools in Poitiers, France. *S. enterica* serotype 4,5,12:i:- was isolated from stool samples of the first cases. Environmental investigations identified frozen beef burger meat from a single brand served in schools as the cause of the outbreak, and a food trace-back investigation led to identification and recall of the beef burger. A retrospective cohort study was carried out (questionnaire to students and personnel attending the exposed schools) to assess the extent of the outbreak. Clinical cases were defined as anyone reporting diarrhoea or fever with at least one digestive sign in the five days after eating the suspect school meal. A total of 554 cases were identified (544 adolescents and 10 adults) of the 1,559 responders (response rate 86 %) who ate at school on the day the burger meat was served. The overall attack rate was 36.5 %. The attack rate was significantly lower for one school (17 %, $p < 0.01$) than for the three others. Adolescents (<20 years old) were at greater risk than adults of developing signs (relative risk = 2.3; 95 % confidence interval 1.3-4.2). About half of the cases (53 %) sought medical care, of which 31 (6 %) were hospitalised over 24 hours. The concentration of *Salmonella* in the burger meat varied between 270 and 18,000 cfu/g. More information can be found at www.invs.sante.fr/pmb/invs/(id)/PMB_9863

In 19.2 % of the 341 strong evidence *Salmonella* outbreaks, the causative agent was isolated in the food vehicle or in the food chain while the human cases had symptoms and onset of illness pathognomonic to the causative agent. The causative agent was detected in the food vehicle or in the food chain as well as in the human cases in 27.7 % of those outbreaks. Analytical epidemiological evidence was presented for 50.4 % of outbreaks and strong descriptive epidemiological evidence was present in 49.6 % of outbreaks (Table OUT9). Often more than one type of evidence was included for a specific outbreak.

***Table OUT7. Strong and weak evidence food-borne outbreaks caused by* Salmonella *(excluding strong evidence waterborne outbreaks), 2010***

| Country | Total outbreaks | | Strong evidence outbreaks | | | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | N | Human cases | | | N | Human cases | | |
| | | | | Cases | Hospitalised | Deaths | | Cases | Hospitalised | Deaths |
| Austria | 98 | 1.17 | 8 | 242 | 47 | 1 | 90 | 298 | 71 | 1 |
| Belgium | 5 | 0.05 | 4 | 48 | 14 | 0 | 1 | 7 | 1 | 0 |
| Czech Republic | 19 | 0.18 | - | - | - | - | 19 | 466 | 36 | 0 |
| Denmark | 13 | 0.24 | 8 | 310 | 3 | 0 | 5 | 48 | 3 | 0 |
| Estonia | 24 | 1.64 | 2 | 105 | 7 | 0 | 22 | 192 | 29 | 0 |
| Finland | 1 | 0.02 | - | - | - | - | 1 | 10 | 1 | 0 |
| France | 140 | 0.22 | 47 | 827 | 105 | 0 | 93 | 530 | 66 | 0 |
| Germany | 215 | 0.26 | 18 | 217 | 45 | 1 | 197 | 971 | 211 | 1 |
| Greece | 1 | 0.01 | - | - | - | - | 1 | 11 | 3 | 0 |
| Hungary | 162 | 1.61 | 16 | 279 | 54 | 0 | 146 | 1,131 | 141 | 0 |
| Ireland | 7 | 0.16 | 2 | 38 | 18 | 0 | 5 | 26 | 9 | 0 |
| Italy | 107 | 0.18 | - | - | - | - | 107 | 575 | - | - |
| Latvia | 58 | 2.56 | 7 | 77 | - | 0 | 51 | 313 | - | 0 |
| Lithuania | 40 | 1.19 | 1 | 6 | 2 | 0 | 39 | 124 | 97 | 0 |
| Malta | 6 | 1.45 | - | - | - | - | 6 | 38 | 3 | 0 |
| Netherlands | 18 | 0.11 | 4 | 159 | 63 | 2 | 14 | 38 | 8 | 1 |
| Poland | 187 | 0.49 | 96 | 1,076 | 284 | 0 | 91 | 573 | 187 | 0 |
| Portugal | 1 | 0.01 | 1 | 6 | - | 0 | 0 | - | - | - |
| Romania | 6 | 0.03 | 6 | 77 | 45 | 1 | 0 | 0 | 0 | 0 |
| Slovakia | 279 | 5.15 | 17 | 236 | 62 | 0 | 262 | 876 | 206 | 0 |
| Spain | 190 | 0.41 | 95 | 971 | 182 | 2 | 95 | 707 | 132 | 4 |
| Sweden | 19 | 0.21 | 3 | 63 | 10 | 0 | 16 | 177 | 1 | 0 |
| United Kingdom | 8 | 0.01 | 6 | 475 | 53 | 2 | 2 | 29 | 2 | 0 |
| **EU Total** | **1,604** | **0.33** | **341** | **5,212** | **994** | **9** | **1,263** | **7,140** | **1,207** | **7** |
| Norway | 3 | 0.06 | - | - | - | - | 3 | 25 | 5 | 0 |
| Switzerland | 1 | 0.01 | 1 | 8 | 1 | 0 | 0 | - | - | - |

***Table OUT8.* Salmonella *serovars reported for strong evidence food-borne outbreaks in the EU, 2010***

| Serovar | Phagetypes | Outbreaks | | Human cases | | |
|---|---|---|---|---|---|---|
| | | N | % of EU total | N | Hospitalised | Deaths |
| *S.* Enteritidis | Unspecified | 182 | 53.4 | 2,068 | 486 | 2 |
| | PT 4 | 11 | 3.2 | 138 | 22 | 1 |
| | PT 8 | 4 | 1.2 | 30 | 12 | 0 |
| | PT 21 | 4 | 1.2 | 82 | 17 | 0 |
| | PT 2 | 6 | 1.8 | 88 | 14 | 0 |
| | PT 6 | 2 | 0.6 | 25 | 4 | 0 |
| *S.* Typhimurium | Unspecified | 36 | 10.6 | 948 | 150 | 2 |
| | Other | 1 | 0.3 | 172 | 0 | 0 |
| | DT 10 | 1 | 0.3 | 7 | 0 | 0 |
| | DT 120 | 1 | 0.3 | 20 | 0 | 0 |
| | DT 41 | 1 | 0.3 | 9 | 0 | 0 |
| | DT 8 | 2 | 0.6 | 116 | 23 | 1 |
| | DT 104 | 1 | 0.3 | 44 | 11 | 0 |
| | Not Typeable | 1 | 0.3 | 42 | 10 | 0 |
| *S.* Typhimurium, monophasic | DT 193 | 2 | 0.6 | 43 | 8 | 1 |
| | Unspecified | 1 | 0.3 | 2 | 2 | 0 |
| *S.* Newport | | 2 | 0.6 | 16 | 0 | 0 |
| *Salmonella* spp. | | 62 | 18.2 | 542 | 112 | 1 |
| *S.* Mbandaka | | 2 | 0.6 | 161 | 33 | 0 |
| *S.* Infantis | | 5 | 1.5 | 201 | 8 | 0 |
| *S.* Virchow | | 1 | 0.3 | 3 | 0 | 0 |
| *S.* Montevideo | | 1 | 0.3 | 4 | 1 | 0 |
| *S.* Ohio | | 1 | 0.3 | 4 | 0 | 0 |
| *S.* Paratyphi B var. Java | | 2 | 0.6 | 132 | 17 | 0 |
| *S.* Saintpaul | | 1 | 0.3 | 5 | 1 | 0 |
| *S.* Choleraesuis | | 1 | 0.3 | 15 | 15 | 0 |
| *S.* Dublin | | 1 | 0.3 | 3 | 0 | 0 |
| *S.* group D | | 1 | 0.3 | 39 | 9 | 0 |
| *S.* group D1 | | 1 | 0.3 | 3 | 3 | 0 |
| *S.* Bareilly | | 1 | 0.3 | 241 | 32 | 1 |
| *S.* Kottbus | | 1 | 0.3 | 4 | 0 | 0 |
| Other Serovars | | 2 | 0.6 | 5 | 4 | 0 |
| **EU Total** | | **341** | **100** | **5,212** | **994** | **9** |

Note: It does not include one outbreak of *S.* Newport from Switzerland, involving 8 cases and causing 1 hospitalisation.

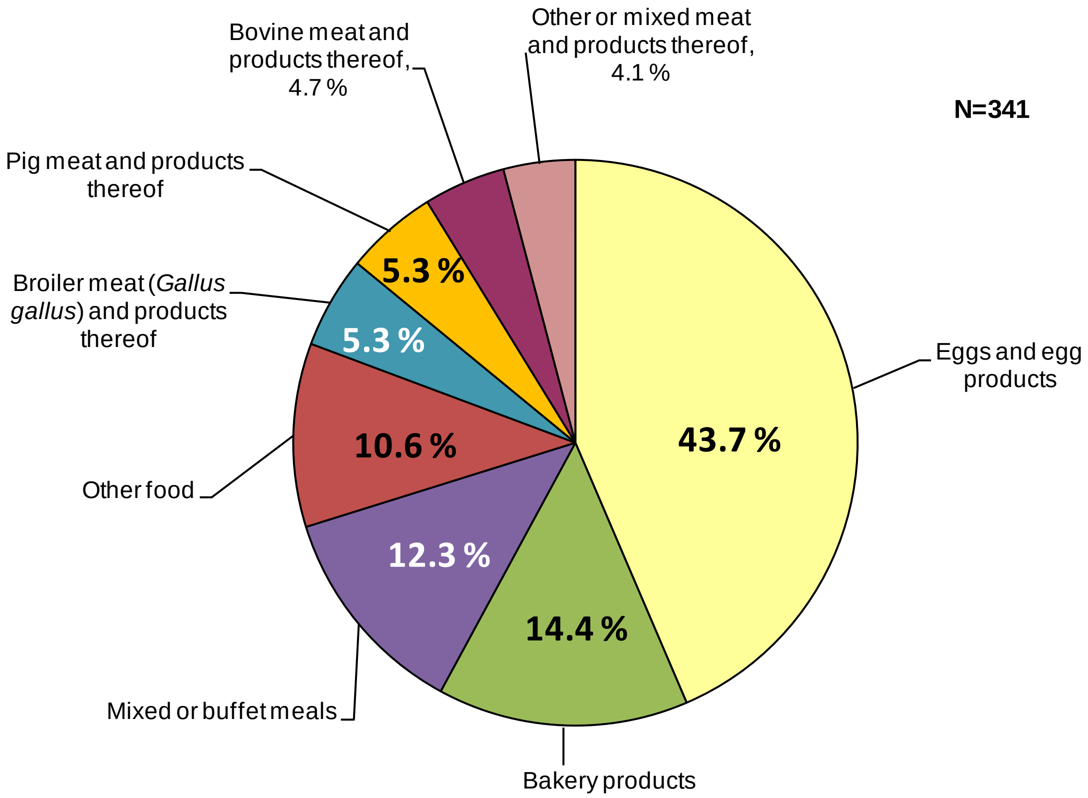
***Table OUT9. Evidence in strong evidence* Salmonella *outbreaks (including one strong evidence waterborne outbreak), 2010***

| Country | N | Analytical epidemiological evidence | Descriptive epidemiological evidence | Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans | Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans | Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent | Detection of causative agent in food chain or its environment - Symptoms and onset of illness pathognomonic to causative agent |
|---|---|---|---|---|---|---|---|
| Austria | 8 | 3 | 5 | 1 | 3 | - | - |
| Belgium | 4 | - | 4 | - | - | - | - |
| Denmark | 8 | 3 | 7 | 2 | - | - | - |
| Estonia | 2 | 1 | 1 | - | - | - | - |
| France | 47 | 6 | 33 | 2 | - | 6 | - |
| Germany | 18 | 1 | 1 | 7 | 9 | - | - |
| Hungary | 16 | 9 | - | 1 | - | 6 | - |
| Ireland | 2 | - | 2 | 2 | 1 | - | - |
| Latvia | 7 | 6 | - | - | - | 1 | - |
| Lithuania | 1 | 1 | - | - | - | - | - |
| Netherlands | 4 | 3 | - | 1 | - | - | - |
| Poland | 97 | 44 | 97 | 39 | 11 | 38 | 9 |
| Portugal | 1 | - | - | - | - | 1 | - |
| Romania | 6 | - | - | 4 | - | 2 | - |
| Slovakia | 17 | - | 13 | 4 | - | - | - |
| Spain | 95 | 94 | - | 0 | - | 3 | - |
| Sweden | 3 | - | 2 | 3 | - | - | - |
| United Kingdom | 6 | 2 | 4 | 3 | 2 | - | - |
| **EU Total** | **342** | **173** | **169** | **69** | **26** | **57** | **9** |
| Switzerland | 1 | 1 | - | - | - | - | - |

### Detailed information from strong evidence outbreaks

Figure OUT12 shows the distribution of the most common food vehicles implicated in the strong evidence *Salmonella* outbreaks in 2010. As in previous years, eggs and egg products were the most frequently identified food vehicles causing 43.7 % of those outbreaks. The proportion of strong evidence *Salmonella* outbreaks caused by eggs and egg products was lower than in 2009 (49.1 %) but higher than in 2007 and 2008 (42.0 % and 40.8 % respectively). The second most common implicated food vehicle category was bakery products (14.4 % of strong evidence outbreaks). The third most implicated food was mixed or buffet meals, for which the frequency increased from 5.6 % in 2009 to 12.3 % in 2010. As in 2009, broiler meat and products thereof were the fourth most important food vehicle category in *Salmonella* outbreaks and the overall proportion of outbreaks caused by these products has been quite stable over the past reporting years.

***Figure OUT12. Distribution of food vehicles in strong evidence outbreaks caused by* Salmonella *in the EU, 2010***

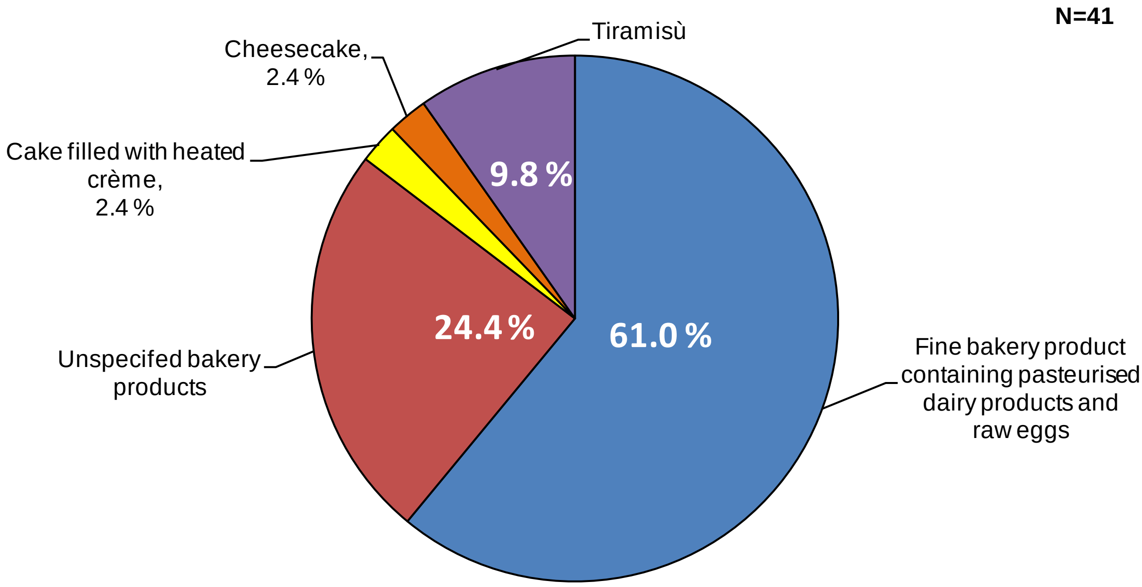



Note: Data from 341 outbreaks are included: Austria (8), Belgium (4), Denmark (8), Estonia (2), France (47), Germany (18), Hungary (16), Ireland (2), Latvia (7), Lithuania (1), Netherlands (4), Poland (96), Portugal (1), Romania (6), Slovakia (17), Spain (95), Sweden (3) and United Kingdom (6).

Note: Other foodstuffs (N=36) include: dairy products (other than cheeses) (2), fish and fish products (1), cheese (3), crustaceans, shellfish, molluscs and products thereof (4), sweets and chocolate (3), vegetables and juices and other products thereof (6), cereal products including rice and seeds/pulses (nuts, almonds) (4), milk (2) and other foods (11).

*S.* Enteritidis was identified as the causative agent in 41 of the 49 (83.7 %) strong evidence outbreaks attributed to bakery products (including Tiramisu). In 63.4 % of these outbreaks–including one outbreak in which the foodstuff was tiramisu - the food implicated was reported to contain raw egg. Fine bakery products containing pasteurised dairy products and raw eggs were reported as the largest food category for *S*. Enteritidis outbreaks (Figure OUT13).

***Figure OUT13. Distribution of food vehicles (different kinds of bakery products) in strong evidence outbreaks caused by S. Enteritidis in the EU, 2010***




Note: Data from 41 outbreaks are included: Austria (2), Belgium (2), Germany (2), Hungary (1), Lithuania (1), Poland (29) and Spain (4).

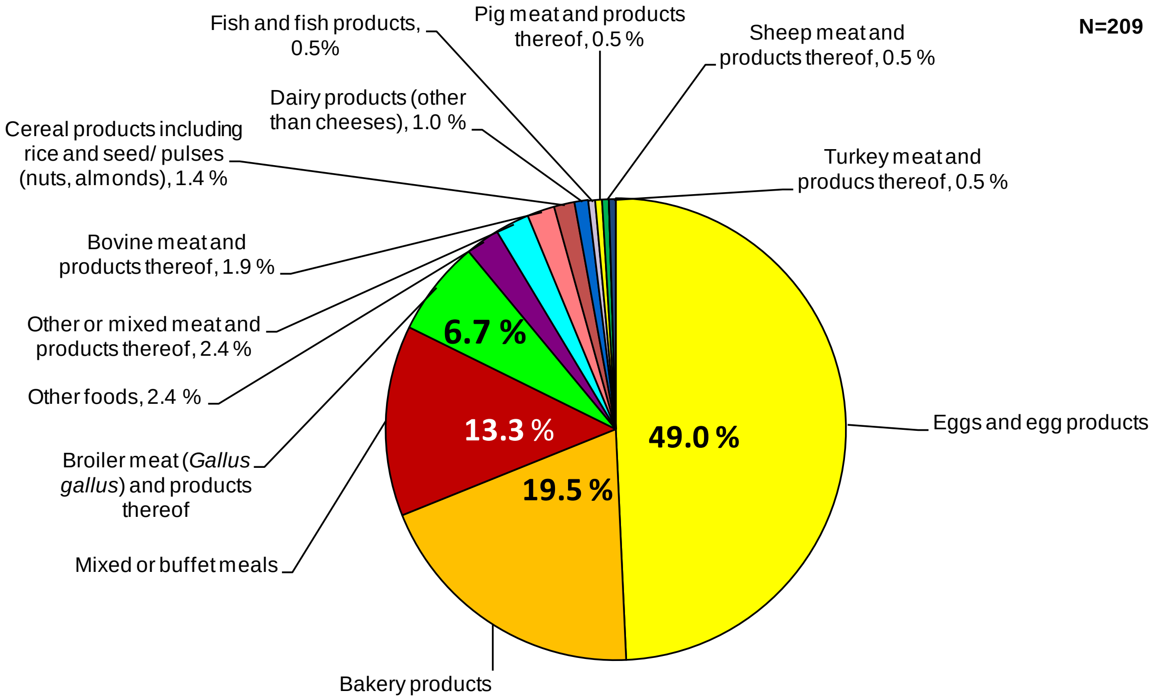
The highest number of outbreaks (49.0 %) among strong evidence outbreaks caused by *S*. Enteritidis were attributed to egg and egg products, followed by bakery products (19.5 % of the outbreaks in strong evidence *S.* Enteritidis outbreaks), mixed or buffet meals (13.3 %) and broiler meat and products thereof (6.7 %) (Figure OUT14). The order of the most common food vehicles remains the same as that reported in 2009, although the frequency of eggs and egg products was lower, while the other categories increased. In addition, a case of a waterborne outbreak caused by *S.* Enteritidis was reported in Poland (Table OUT24)

The most frequently reported vehicle of *S.* Typhimurium outbreaks (29.8 %) was related to pig meat and products thereof. Other important sources were bovine meat and products thereof, and eggs and egg products (21.3 % and 12.8 % respectively) (Figure OUT15). No reported outbreaks appear to have been associated with turkey meat. These results differ from those reported in 2009 in which eggs and egg products were the main vehicle of *S.* Typhimurium outbreaks.

In 2010 the United Kingdom reported one *S.* Bareilly food-borne outbreak in which the implicated food identified was bean sprouts, causing 241 human cases, 32 hospitalisations and one death. Contributing factors were unprocessed contaminated ingredients and inadequate heat treatment. The bean sprouts were not ready-to-eat products and were reported as being imported from outside the EU. Public health interventions resulting from this investigation focused on communications to the public and to public and environmental health professionals advising on the correct preparation of bean sprouts, and on improving ambiguous food labelling. More information can be found in *Eurosurveillance, Volume 15, Issue 48, 2 December 2010.*

Information about the origin of the food was reported in 73.0 % of the 341 strong evidence *Salmonella* outbreaks. In those outbreaks with an implicated food vehicle of known origin, the food vehicle was domestically produced except for 10 outbreaks (2.9 % of strong evidence *Salmonella* outbreaks) in which the food vehicle came from another MS and one outbreak of *S*. Bareilly in the United Kingdom in which bean sprouts had been imported from outside the EU (see dedicated text box).

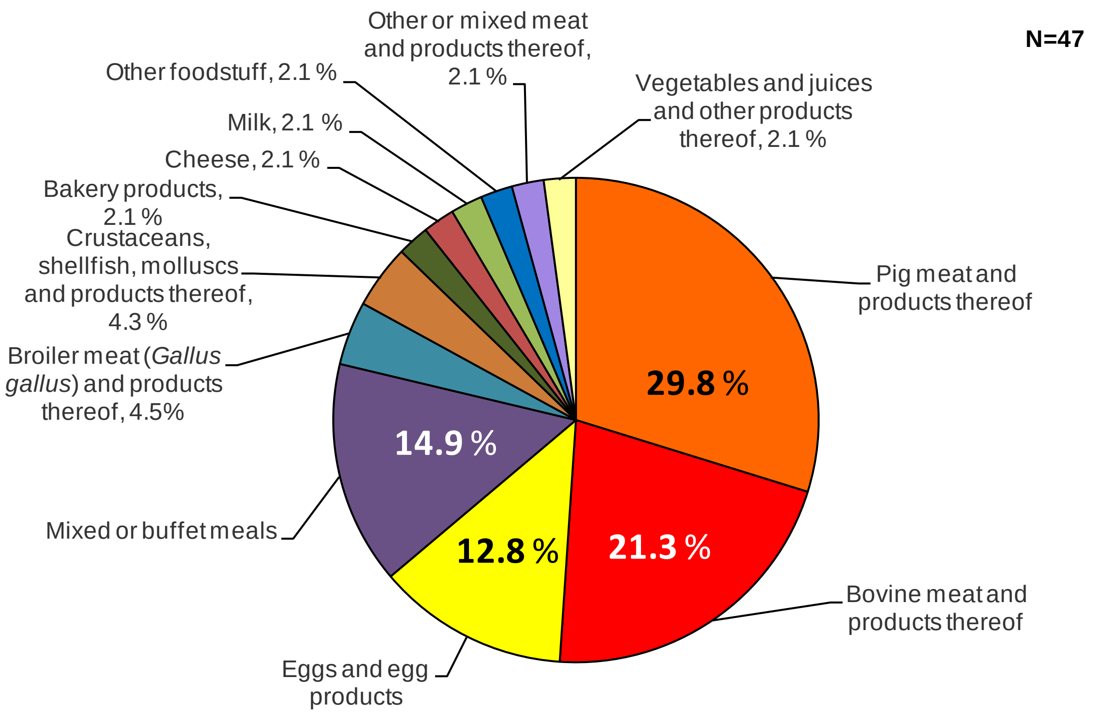
***Figure OUT14. Distribution of food vehicles in strong evidence outbreaks caused by* S. Enteritidis *in the EU, 2010***




Note: Data from 209 outbreaks included: Austria (7), Belgium (4), Denmark (2), Estonia (2), Germany (11), Hungary (14), Latvia (7), Lithuania (1), Poland (90), Portugal (1), Slovakia (17), Spain (51) and United Kingdom (2).

In 2010 Ireland reported an outbreak of *S.* Typhimurium DT8 that was associated with exposure to duck egg. By the end of 2010, there were 32 confirmed and one probable case of *S.* Typhimurium DT8 linked with this outbreak, 18 of which were reported to have been admitted to hospital for treatment. The cases were dispersed across seven of the eight Irish Health Service Executive- areas, with onset dates ranging from mid- August 2009 to the end of October. Descriptive and microbiological evidence indicated duck eggs as being the most likely source of these infections. Reported consumption of, or exposure to, duck eggs explained 70 % of cases. Trace-back investigations identified *S.* Typhimurium from several egg-laying duck flocks that were indistinguishable on molecular typing from strains producing human illness. More information can be found at www.lenus.ie/hse/bitstream/10147/129310/1/iss4duckegg.pdf. After the news release, the final confirmed number of cases was 35.

***Figure OUT15. Distribution of food vehicles in strong evidence outbreaks caused by S. Typhimurium in the EU, 2010***

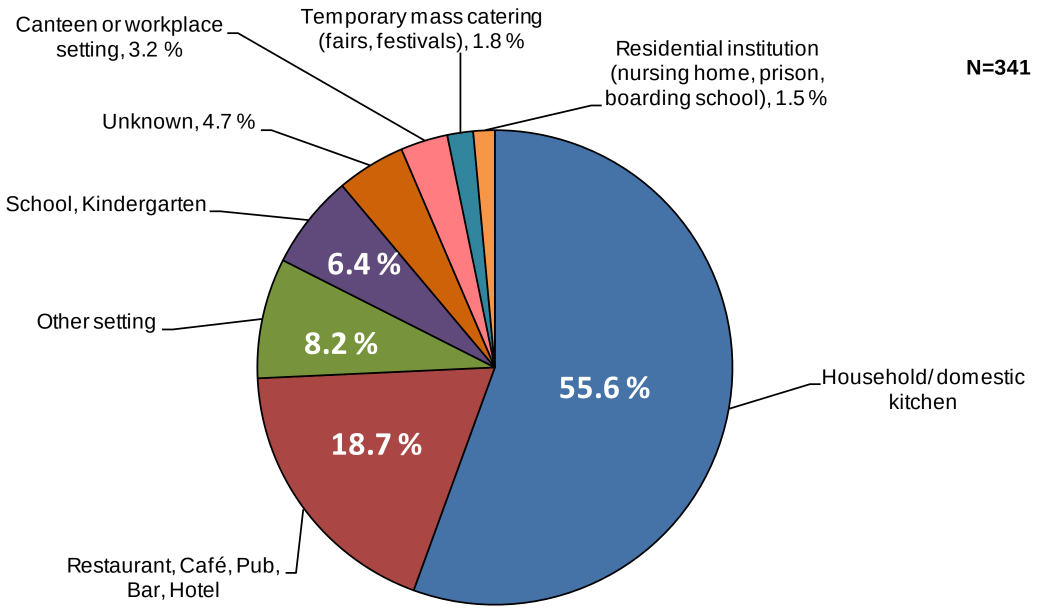



Note: Data from 47 outbreaks are included: Denmark (4), France (25), Germany (4), Hungary (2), Ireland (2), Netherlands (4), Poland (1), Spain (3), Sweden (1) and United Kingdom (1).

Households were the most important settings reported in strong evidence *Salmonella* outbreaks, followed by eating out at restaurants, cafes, pubs, bars and hotels (Figure OUT16). These two categories comprised 74.5 % of outbreaks and 50.6 % of human cases. Households were also reported to be the most frequent setting in *S*. Enteritidis outbreaks in 2010 (121 outbreaks, 57.9 %).

*S. enterica* serovar Typhimurium definitive phage type (DT) 8 is uncommon in humans in the UK. In July 2010, the Health Protection Agency reported an excess isolation rate of pan-susceptible *S.* Typhimurium DT8 in England and Northern Ireland. By the end of October, this amounted to 81 laboratory-confirmed human cases for all regions of England and Northern Ireland in 2010, an increase of 26 % and 41 % on 2009 and 2008, respectively. Descriptive epidemiological investigation found a strong association with infection and consumption of duck eggs. Duck eggs contaminated with *S*. Typhimurium DT8 were collected from a patient's home and also at farms in the duck-egg supply chain. Although duck eggs form a small part of total UK egg sales, there has been significant growth in sales in recent years. This was the first known outbreak of salmonellosis linked to duck eggs in the UK since 1949 and highlighted the impact of a changing food source and market on the re-emergence of salmonellosis linked to duck eggs. Control measures implemented by the duck egg industry should be improved, and there is a continued need to remind the public and commercial caterers of the potential high risks of contracting salmonellosis from duck eggs. More information can be found in Noble DJ, Lane C, Little CL, Davies R, de Pinna E, Larkin L, and Morgan D, 2011. Revival of an old problem: An increase of *Salmonella enterica* serovar Typhimurium Definitive Phage Type 8 Infections in 2010 in England and Northern Ireland linked to duck eggs. *Epidemiology and Infection (2012), 140, 146-149.*

***Figure OUT16. Distribution of settings in strong evidence outbreaks caused by* Salmonella *in the EU, 2010***




Note: Data from 341 outbreaks are included: Austria (8), Belgium (4), Denmark (8), Estonia (2), France (47), Germany (18), Hungary (16), Ireland (2), Latvia (7), Lithuania (1), Netherlands (4), Poland (96), Portugal (1), Romania (6), Slovakia (17), Spain (95), Sweden (3) and United Kingdom (6).

Other settings (N=28) include: take-away or fast-food outlet (3), mobile retailer, market/street vendor (1), farm (primary production) (1), disseminated cases (5) and other settings (18).

## 4.3 *Campylobacter*

In 2010, 19 MSs reported a total of 470 food-borne *Campylobacter* outbreaks (Table OUT10), representing 8.9 % of the total reported food-borne outbreaks. Germany and Slovakia reported 52.6 % of the total number of *Campylobacter* outbreaks. The overall reporting rate in the EU was 0.10 per 100,000 population, which was the same as 2008 but higher than 2009 (0.07 per 100,000). Only 27 (5.7 %) *Campylobacter* outbreaks were classified as strong evidence outbreaks and were reported primarily by the United Kingdom, which reported no verified outbreaks in 2009.

*Table OUT10. Strong and weak evidence food-borne outbreaks caused by* Campylobacter *(excluding strong evidence waterborne outbreaks), 2010*

| Country | Total outbreaks | | Strong evidence outbreaks | | | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | N | Human cases | | | N | Human cases | | |
| | | | | Cases | Hospitalised | Deaths | | Cases | Hospitalised | Deaths |
| Austria | 82 | 0.98 | - | - | - | - | 82 | 185 | 27 | 0 |
| Belgium | 2 | 0.02 | - | - | - | - | 2 | 4 | 0 | 0 |
| Czech Republic | 3 | 0.03 | - | - | - | - | 3 | 26 | 0 | 0 |
| Denmark | 3 | 0.09 | 2 | 46 | 1 | 0 | 1 | 2 | 1 | 0 |
| Estonia | 6 | 0.45 | - | - | - | - | 6 | 13 | 0 | 0 |
| Finland | 3 | 0.06 | 1 | 3 | 0 | 0 | 2 | 10 | 4 | 0 |
| France | 20 | 0.03 | - | - | - | - | 20 | 168 | 9 | 0 |
| Germany | 149 | 0.18 | 3 | 42 | 0 | 0 | 146 | 381 | 24 | 0 |
| Hungary | 29 | 0.29 | - | - | - | - | 29 | 66 | 11 | 0 |
| Ireland | 1 | 0.02 | 1 | 5 | 1 | 0 | 0 | 0 | 0 | 0 |
| Italy | 6 | 0.01 | - | - | - | - | 6 | 12 | - | - |
| Lithuania | 1 | 0.03 | - | - | - | - | 1 | 2 | 2 | 0 |
| Malta | 19 | 4.59 | - | - | - | - | 19 | 48 | - | 0 |
| Netherlands | 17 | 0.10 | 2 | 24 | 0 | 0 | 15 | 43 | 3 | 0 |
| Poland | 5 | 0.01 | - | - | - | - | 5 | 20 | 4 | 0 |
| Slovakia | 98 | 1.81 | 2 | 20 | 1 | 0 | 96 | 289 | 28 | 0 |
| Spain | 2 | <0.01 | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 0 |
| Sweden | 6 | 0.06 | - | - | - | - | 6 | 25 | 5 | 0 |
| United Kingdom | 18 | 0.03 | 16 | 258 | 7 | 0 | 2 | 92 | 4 | 0 |
| **EU Total** | **470** | **0.10** | **27** | **398** | **10** | **0** | **443** | **1,391** | **122** | **0** |
| Norway | 5 | 0.10 | - | - | - | - | 5 | 18 | 0 | 0 |
| Switzerland | 1 | 0.01 | - | - | - | - | 1 | 3 | 0 | 0 |

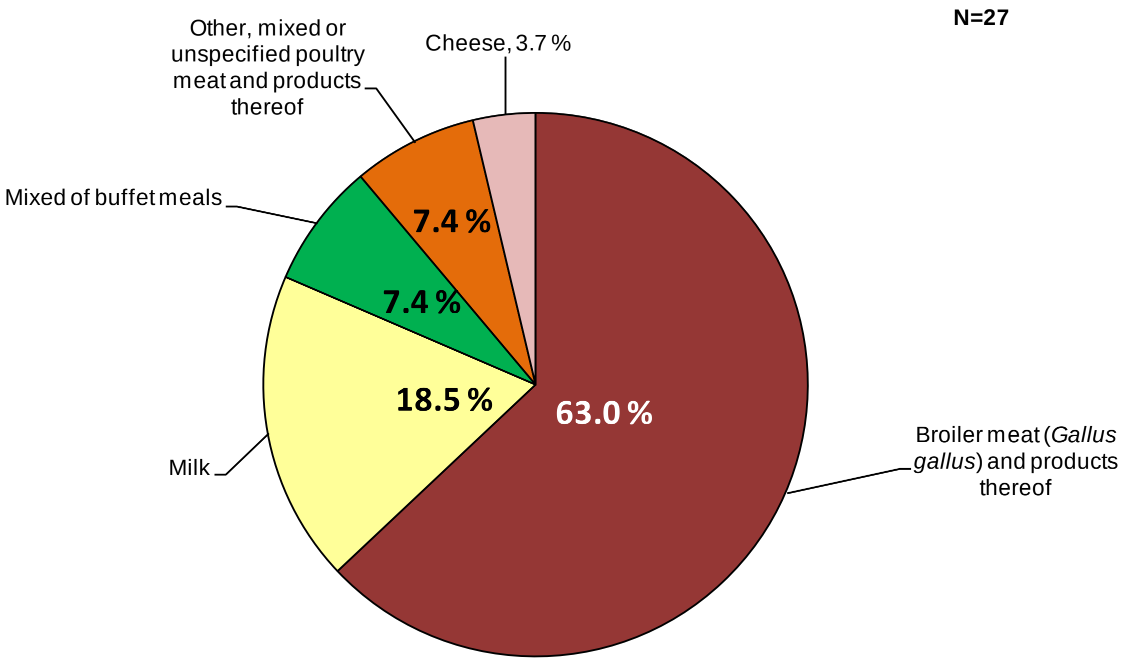
### Detailed information from strong evidence outbreaks

Of the 27 strong evidence *Campylobacter* outbreaks, 26 were categorised as general outbreaks and one as a household outbreak.

Broiler meat was the most commonly implicated food vehicle in 17 (63.0 %) of the strong evidence *Campylobacter* outbreaks and caused 71.1 % of human *Campylobacter* cases (Figure OUT17). Fifteen (88.2 %) of these outbreaks due to broiler meat were reported by the United Kingdom and the remaining two by Denmark. The second most reported food vehicle was milk (18.5 %) and more specifically in these cases the milk was raw. There was one strong evidence *Campylobacter* outbreak in which the implicated food vehicle was reported as handmade cheese. In addition, waterborne outbreaks attributable to *Campylobacter* spp. are listed in Table OUT24.

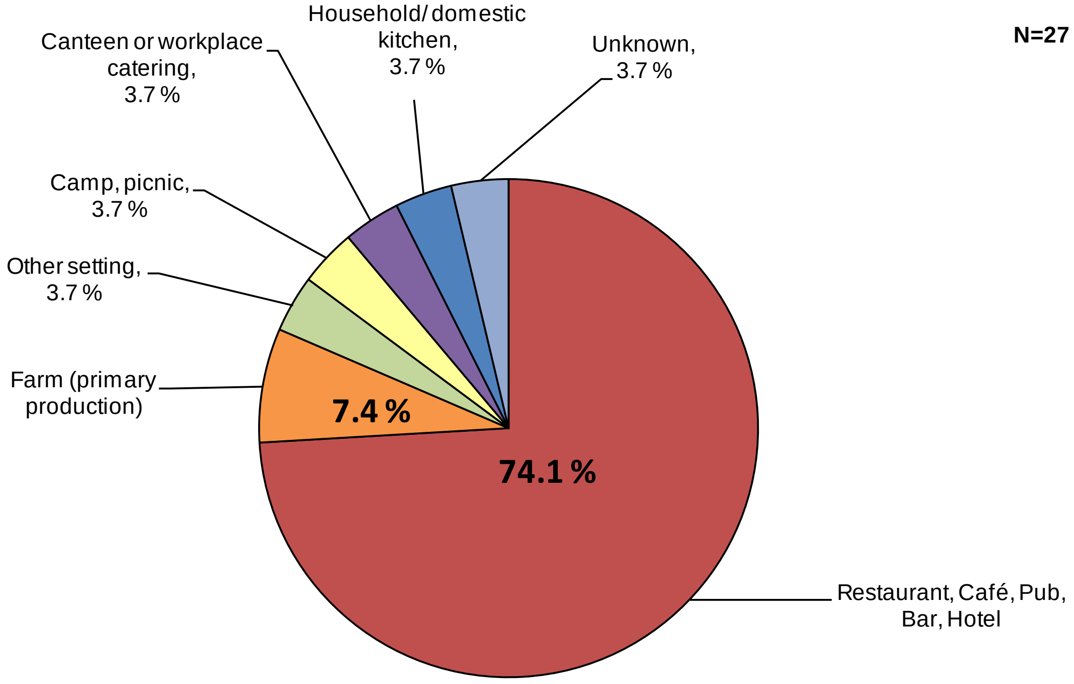
In 2010, restaurants, cafes, pubs, bar or hotels (20 outbreaks, 74.1 %) were reported as the most frequent setting for *Campylobacter* outbreaks (Figure OUT18) and caused the majority of human *Campylobacter* cases (72.6 %).

***Figure OUT17. Distribution of food vehicles in strong evidence* Campylobacter *outbreaks in the EU, 2010***




Note: Data from 27 outbreaks are included: Denmark (2), Finland (1), Germany (3), Ireland (1), Netherlands (2), Slovakia (2) and United Kingdom (16).

***Figure OUT18. Distribution of settings in strong evidence* Campylobacter *outbreaks in the EU, 2010***




Note: Data from 27 outbreaks are included: Denmark (2), Finland (1), Germany (3), Ireland (1), Netherlands (2), Slovakia (2) and United Kingdom (16).

## 4.4 Verotoxigenic *Escherichia coli* and other food-borne pathogenic *Escherichia coli*

Ten MSs reported a total of 31 food-borne outbreaks caused by human pathogenic *E. coli* (Table OUT11), which was 0.6 % of the total number of reported food-borne outbreaks in the EU and was lower than in 2009 (n=75, 1.4 %). France, Germany, Romania and Sweden together reported 64.5 % of pathogenic *E. coli* outbreaks. The overall reporting rate in the EU in 2010 was <0.01 per 100,000 population, which is lower than the reporting rates in 2007, 2008 and 2009 (0.02 per 100,000).

Only two *E. coli* outbreaks (6.5 %) were supported by strong evidence and they were reported by Germany and Spain. Two (3.4 %) of 58 human cases caused by these two strong evidence outbreaks were hospitalised. These hospitalisations occurred in Germany and affected two (50 %) of the four German cases. No case fatalities were reported in 2010 (Table OUT11).

***Table OUT11. Strong and weak evidence food-borne outbreaks (excl. strong evidence waterborne outbreaks) caused by pathogenic* E. coli*, 2010***

| Country | Total outbreaks | | Strong evidence outbreaks | | | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | N | Human cases | | | N | Human cases | | |
| | | | | Cases | Hospitalised | Deaths | | Cases | Hospitalised | Deaths |
| Austria | 3 | 0.04 | - | - | - | - | 3 | 13 | 3 | 0 |
| Belgium | 2 | 0.02 | - | - | - | - | 2 | 6 | 3 | 0 |
| Denmark | 1 | 0.02 | - | - | - | - | 1 | 3 | 0 | 0 |
| France | 7 | 0.01 | - | - | - | - | 7 | 41 | 1 | 0 |
| Germany | 5 | 0.01 | 1 | 4 | 2 | 0 | 4 | 12 | 0 | 0 |
| Ireland | 1 | 0.02 | - | - | - | - | 1 | 2 | 0 | 0 |
| Romania | 4 | 0.02 | - | - | - | - | 4 | 17 | 17 | 0 |
| Spain | 2 | <0.01 | 1 | 54 | 0 | 0 | 1 | - | - | - |
| Sweden | 4 | 0.04 | - | - | - | - | 4 | 32 | 3 | 0 |
| United Kingdom | 2 | 0.03 | - | - | - | - | 2 | 5 | 1 | 0 |
| **EU Total** | **31** | **<0.01** | **2** | **58** | **2** | **0** | **29** | **131** | **28** | **0** |
| Norway | 1 | 0.02 | - | - | - | - | 1 | 3 | 3 | 0 |

### Detailed information from strong evidence outbreaks

The two strong evidence pathogenic *E. coli* outbreaks were reported as general outbreaks, and detailed information on the food vehicle was presented for both.

In the strong evidence outbreak reported by Germany that caused four cases and two hospitalisations, cheese - predominantly raw milk cheese – was the implicated food. The setting was household and the identified strain was VTEC O26.

In the Spanish outbreak the implicated food vehicles were: crustaceans, shellfish, molluscs and products thereof. It was a general outbreak affecting 54 human cases of whom no one was hospitalised. Restaurant/ cafe/ pub/ bar /hotel /catering service was the reported setting.

In both the strong evidence outbreaks the foodstuff was of domestic origin.

## 4.5 Other bacterial agents

In the following section, outbreaks reported in 2010 caused by *Brucella, Listeria, Shigella,* and *Yersinia* are described.

With regard to the weak evidence outbreaks causative agent specific information was available on *Listeria, Shigella* and *Yersinia* (Table OUT12). The rest of the outbreaks caused by other bacterial agents are reported under ‘other’ (agents) because it was not specified which bacterial agent was involved.

Two weak evidence outbreaks caused by *Listeria* were reported by Austria and Denmark causing 12 human cases of whom one was hospitalised. Eleven weak evidence *Yersinia* outbreaks, affecting 84 people, were reported by six MSs. Twelve MSs reported 23 weak evidence *Shigella* outbreaks, affecting 289 people and causing 32 hospitalisations.

***Table OUT12. Weak evidence food-borne outbreaks caused by other bacterial agents (excluding strong evidence waterborne outbreaks), 2010***

| Country | Weak evidence outbreaks | | | | |
|---|---|---|---|---|---|
| | Agent | N | Human cases | | |
| | | | Cases | Hospitalised | Deaths |
| Austria | *Listeria* | 1 | 3 | 1 | 0 |
| Austria | *Shigella* | 3 | 11 | 3 | 0 |
| Austria | *Yersinia* | 1 | 2 | 0 | 0 |
| Czech Republic | *Shigella* | 1 | 145 | 6 | 0 |
| Denmark | *Listeria* | 1 | 9 | 0 | 0 |
| Estonia | *Shigella* | 1 | 8 | 2 | 0 |
| Estonia | *Yersinia* | 1 | 2 | 0 | 0 |
| Finland | *Yersinia* | 1 | 42 | 0 | 0 |
| France | *Shigella* | 3 | 14 | 3 | 0 |
| France | *Yersinia* | 2 | 22 | 0 | 0 |
| France | Other | 2 | 10 | 1 | 0 |
| Germany | *Shigella* | 5 | 15 | 0 | 0 |
| Germany | *Yersinia* | 5 | 14 | 1 | 0 |
| Germany | Other | 4 | 10 | 0 | 0 |
| Ireland | *Shigella* | 1 | 3 | 1 | 0 |
| Latvia | *Shigella* | 1 | 2 | - | 0 |
| Lithuania | *Shigella* | 2 | 5 | 5 | 0 |
| Lithuania | *Yersinia* | 1 | 2 | 2 | 0 |
| Poland | *Shigella* | 1 | 7 | 1 | 0 |
| Poland | Other | 3 | 63 | 2 | 0 |
| Romania | *Shigella* | 1 | 13 | 11 | 0 |
| Spain | *Shigella* | 1 | - | - | - |
| Sweden | *Shigella* | 3 | 66 | 0 | 0 |
| **EU Total** | | **45** | **468** | **39** | **0** |
| Norway | Other | 1 | 3 | 0 | 0 |

Table OUT13 presents 19 strong evidence food-borne outbreaks caused by other bacterial agents reported in 2010. In 73.7 % of these outbreaks the causative agent was not identified. Regarding the outbreaks in which the causative agent was specified, three were caused by *Listeria monocytogenes*, one by *Shigella flexneri* and one by *Brucella*.

***Table OUT13. Strong evidence food-borne outbreaks caused by other bacterial agents (excluding strong evidence waterborne outbreaks), 2010***

| Agent | Country | Strong evidence outbreaks | | | |
|---|---|---|---|---|---|
| | | N | Human cases | | |
| | | | Cases | Hospitalised | Deaths |
| *Listeria monocytogenes* | Germany | 1 | 12 | 8 | 1 |
| | United Kingdom | 2 | 14 | 14 | 3 |
| | **EU Total** | **3** | **26** | **22** | **4** |
| *Shigella flexneri* | Poland | 1 | 2 | 1 | 0 |
| | **EU Total** | **1** | **2** | **1** | **0** |
| *Brucella* | Spain | 1 | 3 | 3 | 0 |
| | **EU Total** | **1** | **3** | **3** | **0** |
| Unspecified bacterial agent | Denmark | 3 | 271 | 1 | 0 |
| | Finland | 7 | 142 | 0 | 0 |
| | Poland | 1 | 16 | 2 | 0 |
| | Romania | 3 | 13 | 11 | 0 |
| | **EU Total** | **14** | **442** | **14** | **0** |

### Detailed information from strong evidence outbreaks

Five outbreaks, one caused by *Brucella,* and one by *Shigella,* and three by unspecified bacterial agents*,* affected all together 18 human cases and were reported as household outbreaks. The other 14 strong evidence outbreaks were general outbreaks.

The outbreaks caused by *L. monocytogenes* were caused by fish and fish products, in particular herring casserole in vegetable oil (one outbreak) and other or mixed meat (one outbreak), and one outbreak was from an unspecified food source. The *S. flexneri* outbreak in Poland was attributed to fruit, berries and juices and in the *Brucella* outbreak in Spain the implicated food was cheese. The outbreaks reported as unspecified bacterial agent were caused by dried beans (two outbreaks), poultry sandwich meat (one outbreak), fish and fish products (one outbreak), cheese (two outbreaks), dairy products (one outbreak) and raw beetroot (seven outbreaks in Finland).

The setting was specified for all but one strong evidence outbreaks. Canteen and workplace settings were the setting for seven outbreaks with a total of 237 cases. The outbreak of *S. flexneri* reported restaurants as the setting; restaurants were also the setting for two of the other bacterial agent outbreaks.

For 14 of the strong evidence outbreaks the place of origin of the implicated food vehicle was reported; the products in three *Listeria* outbreaks, one *Brucella* outbreak, and 10 unspecified bacterial agents were of domestic origin. In addition, two cases of waterborne outbreaks in Poland were caused by unspecified bacterial agents (Table OUT24).

In 2010 Finland reported outbreaks due to other bacterial agents linked to the consumption of raw beetroot. Caterers bought ready peeled beetroot in 5 kg sacks that were packed moist after rinsing. The beetroot was stored cold for 2–9 days before serving. It was served raw and shredded as salad. The symptoms occurred almost immediately, within 15 minutes to 1 hour of eating. The most common symptoms were vomiting, nausea and abdominal pain. Some affected people suffered from diarrhoea later. In six of the seven outbreaks there was strong analytical epidemiological evidence showing that beetroot was the food vehicle to blame. A total of 142 cases were reported, which represents 15 % of all cases in 2010. Except for a high total count, nothing was found in the laboratory analyses at first. No *Staphylococcus* or *Bacillus* toxins were found. Then, approximately $10^5$-$10^6$ cfu/g of a haemolytic, oxidase-positive, Gram-negative rod was found, and identified as *Pseudomonas fluorescens*. It is uncertain whether the findings are relevant. Further research to identify a possible toxin from the bacteria is ongoing. To prevent the food poisoning risk from raw beetroot, proper cooking of beetroot before consumption has been recommended by the Finnish Food Safety Authority Evira.

## 4.6 *Bacillus*

This section details food-borne outbreaks in which the causative agent was reported as *Bacillus* toxins.

The emetic toxin of *Bacillus cereus* has high heat tolerance and cannot be destroyed by normal heat treatment. *B. cereus* may produce emetic and diarrhoeagenic toxins. Depending on the type of toxin, *B. cereus* may cause severe nausea, vomiting and watery diarrhoea.

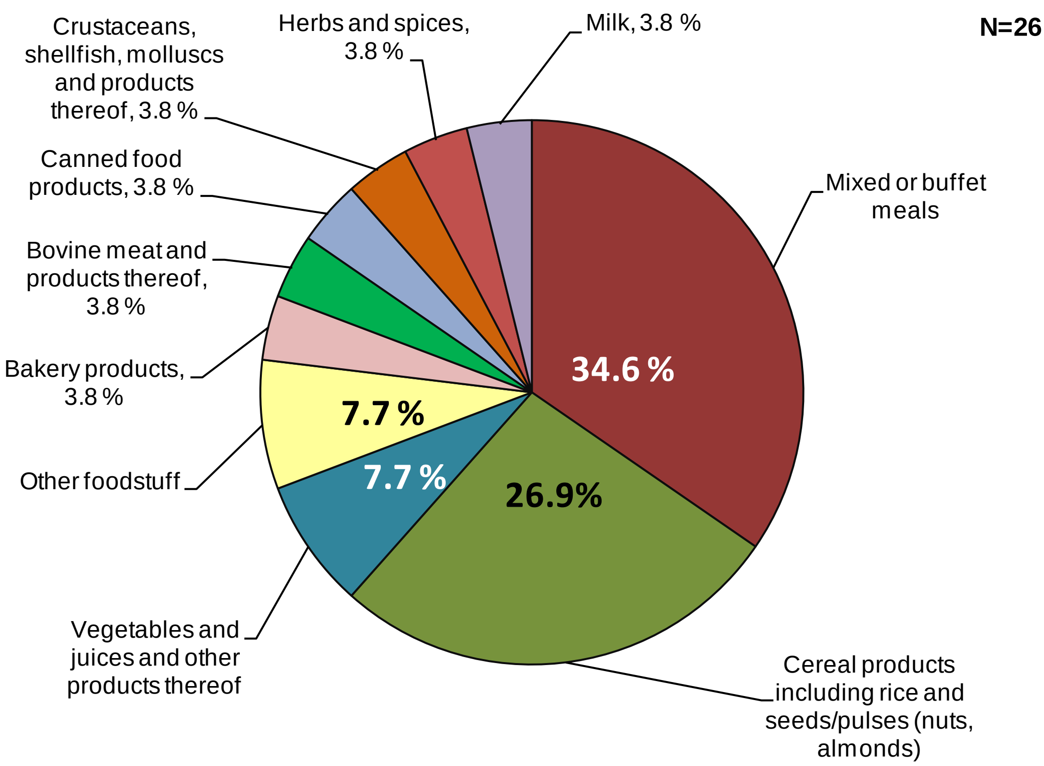
Nine MSs together reported 99 outbreaks in which *Bacillus* toxins were the causative agent in 2010. The overall reporting rate in the EU was 0.02 per 100,000. As in 2009, France reported the majority (61.6 %) of these outbreaks; outbreaks reported by France involved 703 human cases and 51 hospitalisations (Table OUT14).

*Table OUT14. Strong and weak evidence food-borne outbreaks caused by* Bacillus *toxins, 2010*

| Country | Total outbreaks | | Strong evidence outbreaks | | | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | N | Human cases | | | N | Human cases | | |
| | | | | Cases | Hospitalised | Deaths | | Cases | Hospitalised | Deaths |
| Belgium | 2 | 0.02 | 2 | 11 | 0 | 0 | 0 | - | - | - |
| Denmark | 2 | 0.04 | 2 | 117 | 0 | 0 | 0 | - | - | - |
| Finland | 4 | 0.08 | 4 | 20 | 0 | 0 | 0 | 0 | 0 | 0 |
| France | 61 | 0.09 | 1 | 62 | 0 | 0 | 60 | 641 | 51 | 0 |
| Germany | 3 | <0.01 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hungary | 6 | 0.06 | 6 | 314 | 3 | 0 | 0 | 0 | 0 | 0 |
| Italy | 1 | <0.01 | - | - | - | - | 1 | 5 | - | - |
| Netherlands | 12 | 0.07 | 5 | 10 | 0 | 0 | 7 | 24 | - | - |
| Spain | 8 | 0.02 | 3 | 24 | 0 | 0 | 5 | 11 | 0 | 0 |
| **EU Total** | **99** | **0.02** | **26** | **561** | **3** | **0** | **73** | **681** | **51** | **0** |
| Norway | 2 | 0.04 | - | - | - | - | 2 | 5 | 0 | 0 |

In 2010, 26 strong evidence outbreaks, comprising 561 human cases, caused by *Bacillus* toxins were reported in the EU, with the distribution of these strong evidence cases split evenly among the eight reporting MSs (Table OUT14). Only three (0.5 %) of these human cases were hospitalised, all in Hungary. Both the number of strong evidence outbreaks and the number of cases were lower in 2010 than in 2009 (59 outbreaks, 929 cases). There were no reported deaths caused by *Bacillus* toxins in 2010.

***Figure OUT19. Distribution of food vehicles in strong evidence outbreaks caused by* Bacillus toxins *in the EU, 2010***




Note: Data from 26 outbreaks are included: Belgium (2), Denmark (2), Finland (4), France (1), Germany (3), Hungary (6), Netherlands (5) and Spain (3).

### Detailed information from strong evidence outbreaks

In strong evidence outbreaks mixed or buffet meals were most commonly implicated (34.6 % of outbreaks) and were reported by Germany, Hungary and Spain. The second most frequently reported implicated food vehicle was cereal products (26.9 % of outbreaks) (Figure OUT19).

Information on the type of outbreak was available for all the strong evidence outbreaks: eight were household outbreaks, involving 23 cases, and 18 were general outbreaks, involving 538 cases and three hospitalisations.

Inadequate chilling or storage time or temperature abuse was a contributing factor in 15 of the 26 outbreaks, with other reasons being cross contamination or unprocessed contaminated ingredients.

## 4.7 *Clostridium*

Twelve MSs reported 88 food-borne outbreaks caused by *Clostridium* spp. (Table OUT15), which was lower than in 2009 (141). This represents 1.7 % of all food-borne outbreaks reported in 2010. Twenty-three of these outbreaks (26.1 %) were strong evidence outbreaks as compared with 50.4 % of *Clostridium* outbreaks being categorised as verified in 2009.

Seven of the strong evidence outbreaks were caused by *C. botulinum* and one case fatality was reported by France (Table OUT16). Two weak evidence outbreaks due to *C. botulinum* were reported by France and Lithuania involving seven human cases, all of which were hospitalised. Almost all human cases involved in these outbreaks required hospitalisation

*Table OUT15. Strong and weak evidence food-borne outbreaks caused by* Clostridium *toxins, 2010*

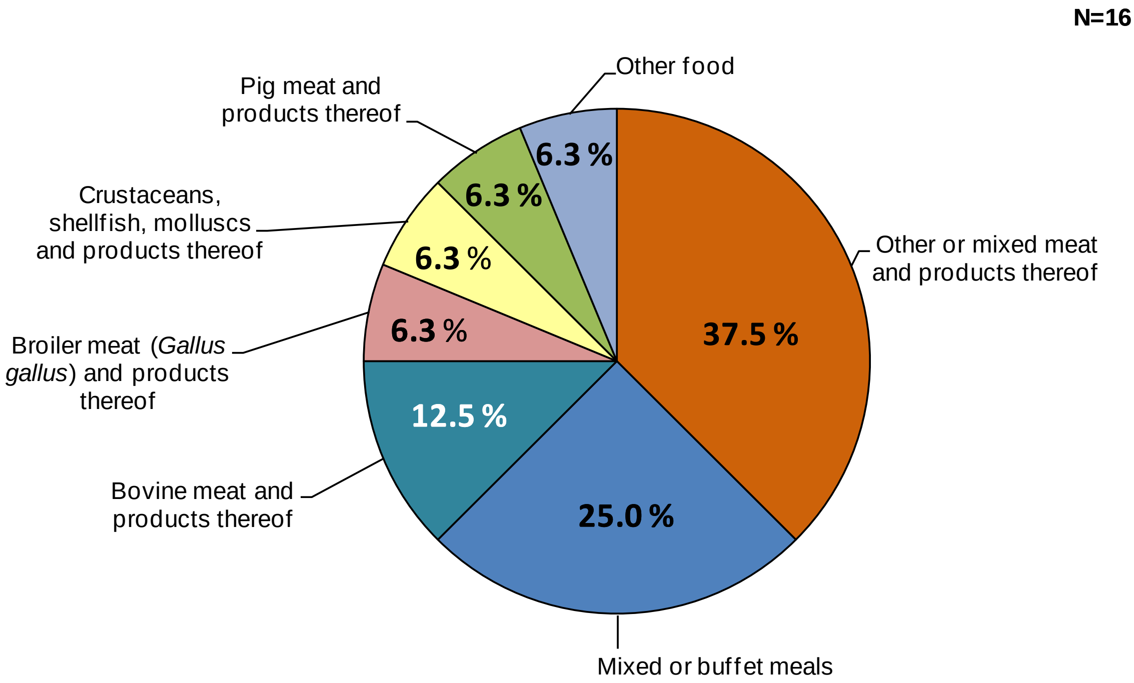
| Country | Total outbreaks | | Strong evidence outbreaks | | | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | N | Human cases | | | N | Human cases | | |
| | | | | Cases | Hospitalised | Deaths | | Cases | Hospitalised | Deaths |
| Denmark | 2 | 0.04 | 2 | 107 | 0 | 0 | 0 | - | - | - |
| Finland | 2 | 0.04 | 1 | 60 | 1 | 0 | 1 | 8 | 0 | 0 |
| France | 47 | 0.07 | 2 | 17 | 4 | 1 | 45 | 876 | 14 | 0 |
| Germany | 3 | <0.01 | 3 | 23 | 2 | 0 | 0 | 0 | 0 | 0 |
| Hungary | 2 | 0.02 | 1 | 123 | 1 | 0 | 1 | 10 | 0 | 0 |
| Italy | 6 | 0.01 | - | - | - | - | 6 | 74 | - | - |
| Lithuania | 1 | 0.03 | - | - | - | - | 1 | 2 | 2 | 0 |
| Poland | 5 | 0.01 | 3 | 6 | 6 | 0 | 2 | 16 | 2 | 0 |
| Portugal | 1 | 0.01 | 1 | 34 | 0 | 0 | 0 | - | - | - |
| Romania | 1 | <0.01 | 1 | 4 | 4 | 0 | 0 | - | - | - |
| Spain | 13 | 0.03 | 6 | 368 | 5 | 0 | 7 | 232 | 0 | 0 |
| United Kingdom | 5 | 0.01 | 3 | 53 | 0 | 0 | 2 | 33 | 2 | 0 |
| **EU Total** | **88** | **0.02** | **23** | **795** | **23** | **1** | **65** | **1,251** | **20** | **0** |

Note: Data include outbreaks caused by *Clostridium botulinum, Clostridium perfringens,* and *Clostridium* spp., unspecified.

*Table OUT16. Strong evidence food-borne outbreaks caused by* C. botulinum *toxins, 2010*

| Country | Strong evidence outbreaks | | | |
|---|---|---|---|---|
| | N | Human cases | | |
| | | Cases | Hospitalised | Deaths |
| France | 1 | 5 | 4 | 1 |
| Germany | 1 | 2 | 2 | 0 |
| Poland | 3 | 6 | 6 | 0 |
| Romania | 1 | 4 | 4 | 0 |
| Spain | 1 | 4 | 4 | 0 |
| **EU Total** | **7** | **21** | **20** | **1** |

***Figure OUT20. Distribution of food vehicles in strong evidence outbreaks caused by* Clostridium *toxins (not including* C. botulinum*) in the EU, 2010***




Note: Data from 16 outbreaks are included: Denmark (2), Finland (1), France (1), Germany (2), Hungary (1), Portugal (1), Spain (5) and United Kingdom (3).

### Detailed information from strong evidence outbreaks

Comprising 37.5 % of strong evidence outbreaks, other or mixed meat and products thereof were the most frequently identified food vehicles, followed by mixed or buffet meals (25.0 %) (Figure OUT20).

In addition, pig meat was the most common food vehicle implicated in strong evidence outbreaks caused by *C. botulinum* (three out of seven). The other four reported *C. botulinum* outbreaks had fish and fish products (one outbreak), vegetables, juices and products thereof (one outbreak) and unspecified other foods (two outbreaks) as implicated foodstuffs. Contributory factors were reported for four out of seven *C. botulinum* outbreaks: storage time/temperature abuse was reported in one outbreak, and inadequate heat treatment and cross-contamination in one outbreak each.

For 20 out of 23 strong evidence outbreaks information on the setting was provided: 40 % were attributed to household outbreaks and 25 % to restaurants, cafes and bars.

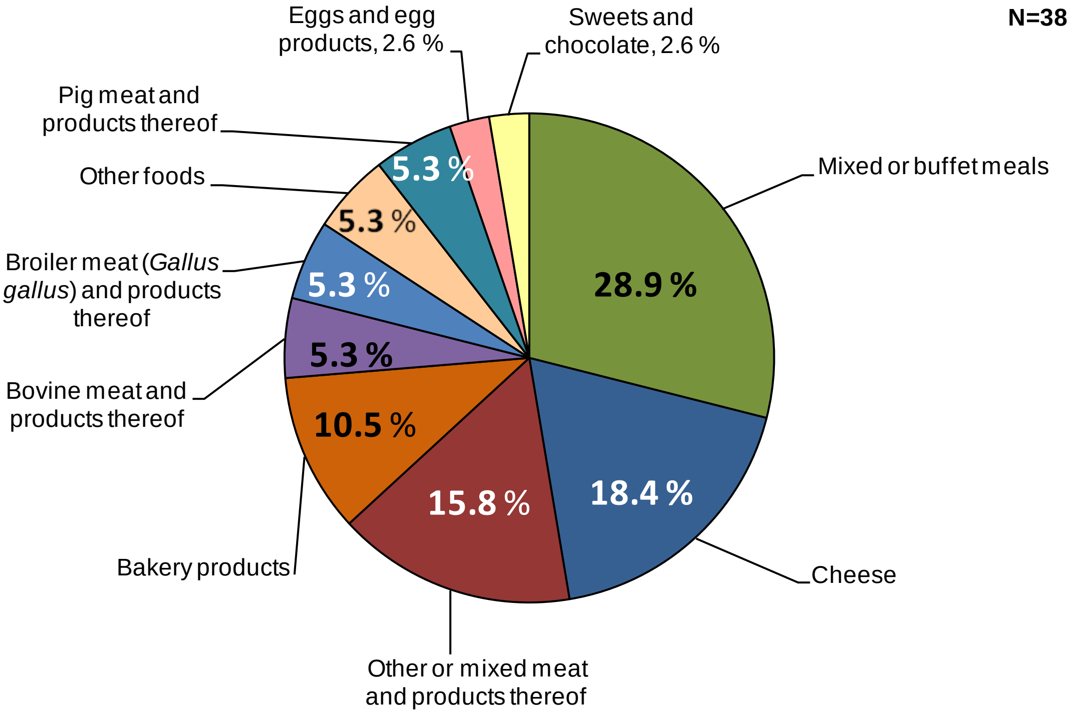
## 4.8 Staphylococcal enterotoxins

Fourteen MSs reported 274 food-borne outbreaks caused by *Staphylococcus* spp., and 13.9 % of these were strong evidence outbreaks with 941 cases of which 20.1 % were hospitalised (Table OUT17). There were no case fatalities in 2010.

*Table OUT17. Strong and weak evidence food-borne outbreaks caused by staphylococcal toxins, 2010*

| Country | Total outbreaks | | Strong evidence oubreaks | | | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | N | Human cases | | | N | Human cases | | |
| | | | | Cases | Hospitalised | Deaths | | Cases | Hospitalised | Deaths |
| Belgium | 2 | 0.02 | 2 | 49 | 31 | 0 | 0 | - | - | - |
| Czech Republic | 1 | 0.01 | - | - | - | - | 1 | 81 | 0 | 0 |
| France | 220 | 0.34 | 8 | 380 | 99 | 0 | 212 | 1,643 | 166 | 0 |
| Germany | 2 | <0.01 | 2 | 24 | 0 | 0 | 0 | 0 | 0 | 0 |
| Italy | 3 | <0.01 | - | - | - | - | 3 | 7 | | |
| Latvia | 1 | 0.04 | - | - | - | - | 1 | 2 | 2 | 0 |
| Malta | 2 | 0.48 | - | - | - | - | 2 | 7 | 0 | 0 |
| Netherlands | 2 | 0.01 | - | - | - | - | 2 | 4 | - | - |
| Poland | 7 | 0.02 | 7 | 237 | 25 | 0 | 0 | 0 | 0 | 0 |
| Portugal | 2 | 0.02 | 2 | 16 | 0 | 0 | 0 | - | - | - |
| Romania | 6 | 0.03 | 6 | 90 | 32 | 0 | 0 | 0 | 0 | 0 |
| Slovakia | 1 | 0.02 | 1 | 6 | 2 | 0 | 0 | - | - | - |
| Slovenia | 1 | 0.05 | 1 | 84 | 0 | 0 | 0 | - | - | - |
| Spain | 24 | 0.05 | 9 | 55 | 0 | 0 | 15 | 111 | 0 | 0 |
| **EU Total** | **274** | **0.06** | **38** | **941** | **189** | **0** | **236** | **1,855** | **168** | **0** |
| Norway | 1 | 0.02 | - | - | - | - | 1 | 3 | 0 | 0 |
| Switzerland | 3 | 0.04 | 3 | 40 | 39 | 0 | 0 | - | - | - |

***Figure OUT21. Distribution of food vehicles in strong evidence outbreaks caused by staphylococcal toxins in the EU, 2010***




Note: Data from 38 outbreaks are included: Belgium (2), France (8), Germany (2), Poland (7), Portugal (2), Romania (6), Slovakia (1), Slovenia (1) and Spain (9).

### Detailed information from strong evidence outbreaks

The largest proportion of strong evidence outbreaks caused by staphylococcal toxins was attributed to mixed or buffet meals (28.9 %), followed by cheese (18.4 %) (Figure OUT21). All the outbreaks caused by cheese were from cheese of domestic origin. The most commonly reported setting in these outbreaks was restaurant, cafe, bar, pub or hotel, accounting for 26.3 % of strong evidence outbreaks caused by staphylococcal toxins, followed by household and school reported in 21.2 % and 18.4 % of the outbreaks, respectively. Several contributory factors were reported, including infected food handler and cross-contamination, reported in 13 outbreaks (34.2 %) and five outbreaks (13.2 %), respectively.

## 4.9 Viruses

Food-borne viral infections are usually of intermediate (one to three days) incubation period, causing illnesses that are self-limiting in otherwise healthy individuals. As most viruses are host specific, food-borne outbreaks caused by viruses are in most cases caused by foodstuffs contaminated by infected food handlers.

Caliciviruses (including norovirus) cause approximately 90 % of epidemic non-bacterial outbreaks of gastroenteritis around the world and are responsible for many food-borne outbreaks of gastroenteritis. The virus is transmitted by food or water contaminated with human faeces and by person-to-person contact. Outbreaks of norovirus disease often occur in closed or semi-closed communities, such as long-term care facilities, hospitals, prisons, dormitories and cruise ships, where, once the virus has been introduced, the infection spreads very rapidly by either person-to-person transmission or contaminated food. Many norovirus outbreaks have been traced to food that was handled by one infected person.

Rotavirus is the leading single cause of severe diarrhoea among infants and young children. Rotavirus is transmitted by the faecal-oral route. It infects cells that line the small intestine and produces an enterotoxin, which induces gastroenteritis, leading to severe diarrhoea and sometimes death through dehydration.

The hepatitis A virus is distinguished from other viral agents by its prolonged (two to six weeks) incubation period and its ability to spread beyond the stomach and intestines into the liver. It often induces jaundice, or yellowing of the skin, and in rare cases leads to chronic liver dysfunction. The virus has often been associated with the consumption of contaminated fresh-cut vegetables and fruit.

### Outbreaks caused by viruses in 2010

Twenty MSs reported a total of 790 food-borne outbreaks caused by viruses (Table OUT18), and 41.1 % of these outbreaks were reported by Latvia. The overall reporting rate in the EU was 0.16 outbreaks per 100,000 population, with Latvia having the highest reporting rate (14.37 per 100,000 population). Overall, the number of reported viral food-borne outbreaks decreased by approximately 25 % in 2010 compared with 2009. However, in 2009 the number of outbreaks increased by over 40 % in comparison with 2007 and 2008, and the number of viral food-borne outbreaks reported in 2010 remained higher than in these earlier years.

As in previous years, only a few (11.0 %) reported viral outbreaks were strong evidence outbreaks (Table OUT19). This could have led to the underestimation of the role of these agents in relation to different food products, as information on the food vehicle was not available for weak evidence outbreaks. However, the number of verified/ strong evidence outbreaks (outbreaks with a detailed dataset) has been increasing in recent years, from 38 outbreaks in 2008 through 70 in 2009 to 87 in 2010, which over the three years equates to a 129 % increase. In 2010, six of the nine MSs reporting strong evidence calicivirus outbreaks showed an increase in the number of outbreaks reported, which may have been related to the new reporting specifications. Denmark reported the largest increase in calicivirus outbreaks with a detailed dataset from one reported outbreak in 2009 to 29 outbreaks in 2010, which accounted for 33.3 % of strong evidence outbreaks caused by viruses.

***Table OUT18. Total and weak evidence food-borne outbreaks caused by viruses (excluding strong evidence waterborne outbreaks), 2010***

| Country | Total outbreaks | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | N | Human cases: Cases | Hospitalised | Deaths |
| Austria | 4 | 0.05 | 2 | 6 | 0 | 0 |
| Belgium | 9 | 0.09 | 2 | 80 | 0 | 0 |
| Czech Republic | 1 | 0.01 | 1 | 89 | 0 | 0 |
| Denmark | 48 | 0.87 | 19 | 674 | 0 | 0 |
| Finland | 14 | 0.28 | 7 | 189 | 1 | 0 |
| France | 110 | 0.17 | 106 | 1,304 | 18 | 0 |
| Germany | 38 | 0.05 | 33 | 461 | 37 | 0 |
| Greece | 1 | 0.01 | 1 | 166 | 37 | 0 |
| Hungary | 8 | 0.08 | 3 | 98 | 14 | 0 |
| Ireland | 1 | 0.04 | 1 | 15 | 0 | 0 |
| Italy | 23 | 0.04 | 23 | 106 | - | - |
| Latvia | 325 | 14.37 | 325 | 842 | - | 0 |
| Lithuania | 8 | 0.24 | 8 | 17 | 8 | 0 |
| Netherlands | 4 | 0.02 | 2 | 14 | 0 | 0 |
| Poland | 86 | 0.23 | 85 | 1,342 | 215 | 0 |
| Slovakia | 1 | 0.02 | 1 | 37 | 37 | 0 |
| Slovenia | 1 | 0.05 | 0 | - | - | - |
| Spain | 45 | 0.10 | 33 | 47 | 3 | 0 |
| Sweden | 50 | 0.58 | 45 | 872 | 4 | 0 |
| United Kingdom | 13 | 0.02 | 6 | 167 | 1 | 0 |
| **EU Total** | **790** | **0.16** | **703** | **6,526** | **375** | **0** |
| Norway | 25 | 0.52 | 21 | 351 | 0 | 0 |
| Switzerland | 2 | 0.03 | 2 | 25 | 0 | 1 |

*Table OUT19. Strong evidence food-borne outbreaks caused by viruses (excluding strong evidence waterborne outbreaks), 2010*

| Agent | Country | Strong evidence outbreaks | | | |
|---|---|---|---|---|---|
| | | N | Human cases | | |
| | | | Cases | Hospitalised | Deaths |
| Norovirus (Norwalk-like virus) | Austria | 2 | 75 | 1 | 0 |
| | Belgium | 7 | 538 | 0 | 0 |
| | Denmark | 29 | 596 | 2 | 0 |
| | Finland | 7 | 314 | 0 | 0 |
| | France | 4 | 49 | 0 | 0 |
| | Germany | 5 | 169 | 6 | 0 |
| | Hungary | 4 | 170 | 0 | 0 |
| | Netherlands | 1 | 7 | 0 | 0 |
| | Poland | 1 | 9 | 3 | 0 |
| | Slovenia | 1 | 31 | 0 | 0 |
| | Spain | 11 | 234 | 3 | 0 |
| | Sweden | 5 | 117 | 0 | 0 |
| | United Kingdom | 7 | 102 | 0 | 0 |
| | **EU Total** | **84** | **2,411** | **15** | **0** |
| | Norway | 4 | 242 | 0 | 0 |
| Hepatitis A virus | Netherlands | 1 | 13 | 0 | 0 |
| | **EU Total** | **1** | **13** | **0** | **0** |
| Rotavirus | Spain | 1 | 15 | 0 | 0 |
| | **EU Total** | **1** | **15** | **0** | **0** |
| Flavivirus | Hungary | 1 | 2 | 2 | 0 |
| | **EU Total** | **1** | **2** | **2** | **0** |

### Detailed information from strong evidence outbreaks

A total of 87 strong evidence food-borne virus outbreaks were reported by MSs. Of these, 82 were reported as general outbreaks, involving 98.2 % of human cases. Five outbreaks were characterised as household outbreaks, involving 1.8 % of cases.

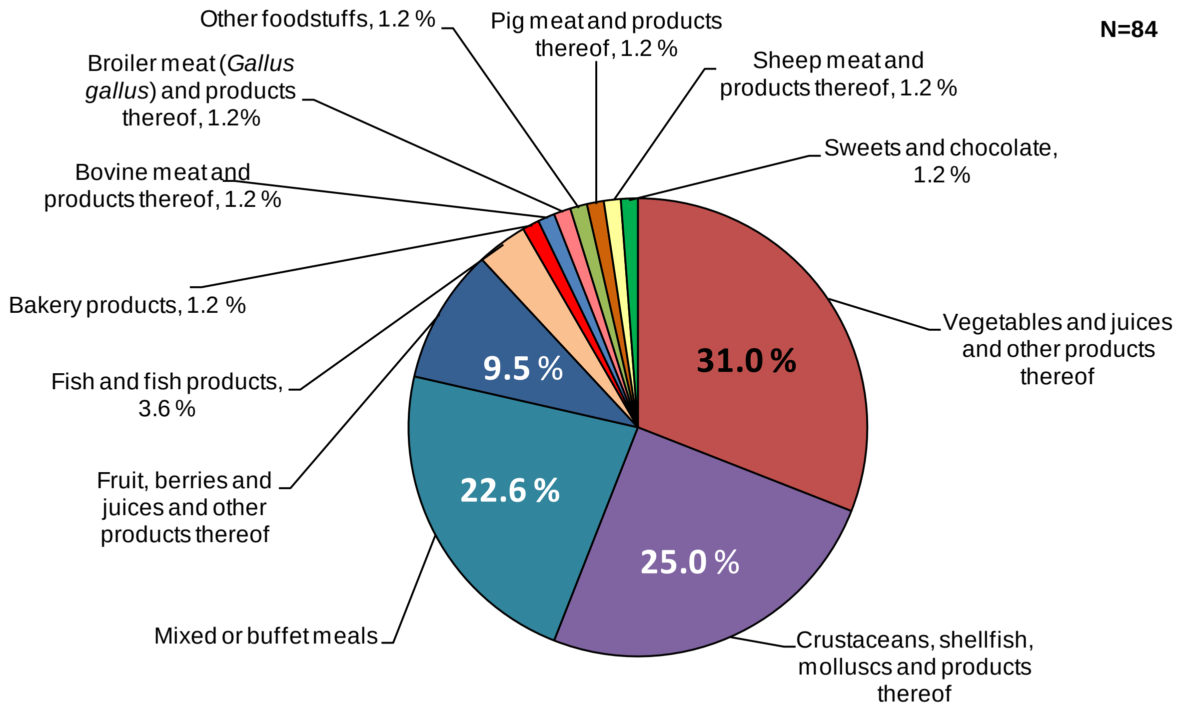
Although the origin of the food product was not given for the majority of outbreaks, 22 of 29 strong evidence outbreaks in Denmark (involving 423 human cases) were reported to derive from intra-EU traded Lollo Bionda lettuce. Other important food vehicles were mixed or buffet meals–implicated in 19 outbreaks and involving 805 cases (33.0 % of the cases of all strong outbreaks) and crustaceans, shellfish, molluscs and products thereof–implicated in 21 outbreaks and resulting in 348 cases (14.3 % of the cases of all strong evidence outbreaks).

For those outbreaks in which the source of origin was reported, 11 outbreaks were traced back to farm level and 19 outbreaks were traced back to catering services and restaurants. Several contributory factors were linked to virus outbreaks; among the most common were infected food-handlers and unprocessed contaminated ingredients.

### Caliciviruses (including norovirus)

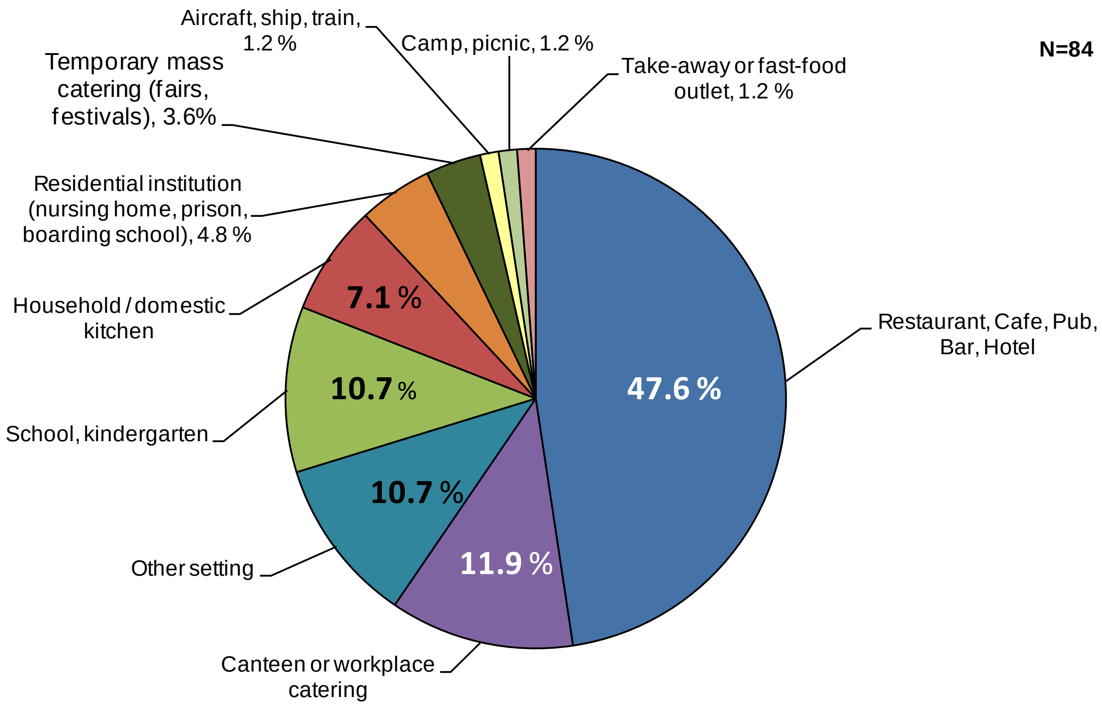
Information on the food vehicle was provided for all of the 84 strong evidence outbreaks caused by caliciviruses (including norovirus). Vegetables and juices and other products thereof were the main implicated food vehicles in 2010, relating to 26 outbreaks (31.0 %). In 2009 fruit, berries and juices and other products thereof were the most commonly implicated food items. Other frequently implicated food vehicles were crustaceans, shellfish, molluscs and products thereof (21 outbreaks, 348 cases) and mixed or buffet meals (19 outbreaks, 805 cases) (Figure OUT22). The most commonly reported settings were restaurant, cafe, pub, bar or hotel (47.6 %), canteen or work place catering (11.9 %), schools and kindergartens (10.7 %) and other settings (10.7 %) (Figure OUT23). Semi-closed communities, such as residential institutions, were reported as the sixth most frequent setting, in 2010. In addition, there was strong evidence to suggest that caliciviruses (including norovirus) caused seven waterborne outbreaks in 2010 (Table OUT24).

***Figure OUT22. Distribution of food vehicles in strong evidence outbreaks caused by caliciviruses (including norovirus) in the EU, 2010***




Note: Data from 84 outbreaks are included: Austria (2), Belgium (7), Denmark (29), Finland (7), France (4), Germany (5), Hungary (4), Netherlands (1), Poland (1), Slovenia (1), Spain (11), Sweden (5) and United Kingdom (7).

***Figure OUT23. Distribution of settings in strong evidence outbreaks caused by caliciviruses (including norovirus) in the EU, 2010***




Note: Data from 84 outbreaks are included: Austria (2), Belgium (7), Denmark (29), Finland (7), France (4), Germany (5), Hungary (4), Netherlands (1), Poland (1), Slovenia (1), Spain (11), Sweden (5) and United Kingdom (7).

| |
|---|
| In 2010 a large number of norovirus outbreaks occurred in Denmark with imported food products. There were 20 registered general outbreaks and one household outbreak associated with one batch of Lollo Bionda lettuce grown in France. The lettuce was primarily used in sandwiches prepared by catering companies and this was part of the reason for the many registered outbreaks. A total of 405 cases were registered in the outbreaks over a few days. Both norovirus and enterotoxigenic *E. coli* were detected in food samples. This one incident accounted for about a one-quarter of all registered outbreaks in 2010 in Denmark. More information can be found in: *Ethelberg S, Lisby M, Böttiger B, Schultz AC, Villif A, Jensen T, Olsen KE, Scheutz F, Kjelsø C and Müller L, 2010 Outbreaks of gastroenteritis linked to lettuce, Denmark, January 2010. Eurosurveillance, Volume 15, Issue 6, 11 February 2010*. |

In 2010, several simultaneous outbreaks of norovirus infection occurred linked to the consumption of raw oysters. From January to March 2010, the European Centre for Disease Prevention and Control (ECDC) was informed through its Food- and Waterborne Diseases and Zoonoses (FWD) surveillance network about norovirus outbreaks linked to consumption of oysters in five EU/EEA countries: the United Kingdom, Norway, France, Sweden and Denmark. In total 65 small clusters involving 334 cases were reported. Most affected people had eaten oysters in restaurants. This increase may be due to several factors. Firstly, it could partly be a surveillance artefact as the sharing of information regarding norovirus outbreaks through the FWD network is relatively recent and may have contributed to the reporting of these events. Secondly, as the contamination of the oyster harvesting areas is not restricted to a single location, it would indicate a broader environmental issue and not a localised contamination problem. It is possible that the unusually cold winter experienced in northern Europe during the first three months of 2010 favoured the contamination of the oysters as virus survival increases in cold water temperatures and under reduced exposure to ultraviolet light. More information can be found in: *Westrell T, Dusch V, Ethelberg S, Harris J, Hjertqvist M, Jourdan-da Silva N, Koller A, Lenglet A, Lisby M and Vold L 2010. Norovirus outbreaks linked to oyster consumption in the United Kingdom, Norway, France, Sweden and Denmark, 2010. Eurosurveillance, Volume 15, Issue 12, 25 March 2010.*

## 4.10 Parasites

### Outbreaks caused by parasites in 2010

A total of 30 food-borne outbreaks caused by parasites were reported by 11 MSs, accounting for 0.6 % of food-borne outbreaks reported in 2010. Lithuania reported 20.0 % of all parasite outbreaks (Table OUT20).

In total, 15 parasite outbreaks were strong evidence outbreaks: including 13 *Trichinella* outbreaks reported by three MSs, one *Anisakis* outbreak reported by Spain and one *Cryptosporidium* outbreak reported by Sweden (Table OUT21). Lithuania accounted for six of the *Trichinella* outbreaks with a total of 77 cases. For the *Trichinella* outbreaks, the hospital admission rate was lower in 2010 than 2009, with 27.5 % and 45.4 % of all cases being hospitalised in the strong evidence and verified outbreaks in 2010 and 2009, respectively. The numbers of outbreaks caused by parasites and *Trichinella* specifically decreased in 2010, mainly due to the decrease in outbreaks reported by Romania from 31 *Trichinella* outbreaks in 2009 to just three in 2010.

***Table OUT20. Total and weak evidence food-borne outbreaks caused by parasites (excluding strong evidence waterborne outbreaks), 2010***

| Country | Total outbreaks | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | N | Human cases | | |
| | | | | Cases | Hospitalised | Deaths |
| Austria | 1 | 0.01 | 1 | 3 | 2 | 0 |
| Belgium | 2 | 0.02 | 2 | 4 | - | 0 |
| France | 2 | <0.01 | 2 | 9 | 0 | 0 |
| Germany | 5 | 0.01 | 5 | 14 | 0 | 0 |
| Ireland | 1 | 0.02 | 1 | 2 | 0 | 0 |
| Italy | 1 | <0.01 | 1 | 2 | - | - |
| Lithuania | 6 | 0.18 | 0 | 0 | 0 | 0 |
| Poland | 4 | 0.01 | 0 | 0 | 0 | 0 |
| Romania | 3 | 0.01 | 0 | 0 | - | 0 |
| Spain | 4 | 0.01 | 3 | 18 | 3 | 0 |
| Sweden | 1 | 0.02 | 0 | - | - | - |
| **EU Total** | **30** | **<0.01** | **15** | **52** | **5** | **0** |

***Table OUT21. Strong evidence food-borne outbreaks caused by parasites (excluding strong evidence waterborne outbreaks), 2010***

| Agent | Country | Strong evidence outbreaks | | | |
|---|---|---|---|---|---|
| | | N | Human cases | | |
| | | | Cases | Hospitalised | Deaths |
| *Anisakis* spp., unspecified | Spain | 1 | 2 | 0 | 0 |
| | **EU Total** | **1** | **2** | **0** | **0** |
| *Cryptosporidium parvum* | Sweden | 1 | 89 | 0 | 0 |
| | **EU Total** | **1** | **89** | **0** | **0** |
| *Trichinella* spp., unspecified | Lithuania | 6 | 77 | 52 | 0 |
| | Poland | 4 | 47 | 19 | 0 |
| | Romania | 3 | 145 | 3 | 0 |
| | **EU Total** | **13** | **269** | **74** | **0** |

## Detailed information from strong evidence outbreaks

In the majority of outbreaks, the type of evidence reported was detection of the causative agent in the food vehicle or its components in combination with symptoms and onset of illness pathognomonic to the causative agent. Information on the type of outbreak was available for all 15 strong evidence outbreaks: six of them were general outbreaks, including five outbreaks caused by *Trichinella* and one outbreak caused by *Cryptosporidium parvum,* and nine were household outbreaks, of which eight were caused by *Trichinella* and one was caused by *Anisakis*. The nine household outbreaks involved 23.9 % of human cases, while the six general outbreaks involved 76.1 % of human cases.

Information concerning the food vehicle was provided in all 15 strong evidence parasite outbreaks. Eight of the household outbreaks and one of the general outbreaks, all caused by *Trichinella*, were linked to the consumption of pig meat and products thereof. The remaining four general *Trichinella* outbreaks were all attributed to wild boar meat. For six of the *Trichinella* outbreaks due to pig meat, the meat came from backyard pigs, while no information on the type of pigs was provided for the other *Trichinella* outbreaks and whether they were inspected. *Trichinella* outbreaks accounted for 74.7 % of human cases and 100 % of hospitalisations in outbreaks caused by parasites. The general outbreak caused by *C. parvum* was attributed to the consumption of mixed or buffet meals and the *Anisakis* outbreak to the consumption of fish and fish products. In addition, a waterborne outbreak attributable to *C. hominis* was reported in Sweden in 2010 (Table OUT24).

Information concerning the setting was reported for all but two outbreaks (86.7 %) of the strong evidence outbreaks. In 11 *Trichinella* outbreaks and in the *Anisakis* outbreak, the setting was reported to be household/domestic kitchen. Restaurants were reported as the setting in the *C. parvum* outbreak.

The origin of the foodstuff was reported in all but one strong evidence parasite outbreak and in all of these outbreaks the food vehicle had been produced domestically. The place of origin of the problem was reported in 11 strong evidence outbreaks caused by parasites (73.3 %). In seven outbreaks, the place of origin of the problem was reported to be the household and in four outbreaks the origin of the problem was reported to be the farm (primary production).

## 4.11 Other causative agents

In this report the category 'other causative agents' includes histamine, marine biotoxins, mushroom toxins, mycotoxins and wax esters from escolar fish as well as unspecified toxins.

Histamine is a biogenic amine involved in local immune responses as well as regulating physiological functions. It is found in virtually all animal body cells. Scombroid food poisoning results from eating spoiled (decayed) fish containing high amounts of histamine. Other chemicals have been found in decaying fish flesh, but their association with scombroid fish poisoning has not been clearly established. Symptoms include skin flushing, throbbing headache, burning mouth, abdominal cramps, nausea, diarrhoea, palpitations, a sense of unease and, rarely, prostration or loss of vision. It is most commonly reported with tuna, mahi-mahi, bonito, sardines, anchovies, and related species of fish that have been inadequately refrigerated or preserved after being caught.

### Outbreaks caused by other causative agents in 2010

Eleven MSs reported a total of 168 weak evidence food-borne outbreaks due to other causative agents which could include both chemical and bacterial agents if not specified (Table OUT22). Hungary and France together reported 86.3 % of outbreaks of this type.

Sixty-one strong evidence outbreaks caused by other causative agents were reported by MSs in 2010, in addition to two strong evidence outbreaks in Switzerland (Table OUT23). These included two outbreaks of scombroid poisoning in Spain and 10 marine biotoxin outbreaks in France.

*Table OUT22. Weak evidence food-borne outbreaks caused by other causative agents, 2010*

| Country | Total outbreaks | | Weak evidence outbreaks | | | |
|---|---|---|---|---|---|---|
| | N | Reporting rate per 100,000 | N | Human cases | | |
| | | | | Cases | Hospitalised | Deaths |
| Belgium | 1 | 0.01 | 0 | - | - | - |
| Denmark | 3 | 0.05 | 1 | 7 | 0 | 0 |
| Finland | 3 | 0.06 | 0 | 0 | 0 | 0 |
| France | 81 | 0.13 | 71 | 366 | 39 | 0 |
| Germany | 4 | <0.01 | 0 | 0 | 0 | 0 |
| Hungary | 74 | 0.74 | 74 | 228 | 219 | 2 |
| Malta | 2 | 0.48 | 2 | 4 | 0 | 0 |
| Poland | 11 | 0.03 | 6 | 14 | 14 | 0 |
| Slovakia | 2 | 0.04 | 2 | 29 | 0 | 0 |
| Spain | 37 | 0.08 | 9 | 47 | 7 | 1 |
| Sweden | 6 | 0.06 | 2 | 152 | 0 | 0 |
| United Kingdom | 5 | 0.01 | 1 | 20 | 0 | 0 |
| **EU Total** | **229** | **0.05** | **168** | **867** | **279** | **3** |
| Norway | 15 | 0.31 | 15 | 139 | 0 | 0 |
| Switzerland | 2 | 0.03 | 0 | - | - | - |

*Table OUT23. Strong evidence food-borne outbreaks caused by other causative agents, 2010*

| Agent | Country | Strong evidence outbreaks | | | |
|---|---|---|---|---|---|
| | | N | Human cases | | |
| | | | Cases | Hospitalised | Deaths |
| Escolar fish (wax esters) | Finland | 1 | 5 | 0 | 0 |
| | Spain | 1 | 6 | 0 | 0 |
| | **EU Total** | **2** | **11** | **0** | **0** |
| Histamine | Belgium | 1 | 5 | 0 | 0 |
| | Denmark | 2 | 38 | 0 | 0 |
| | Finland | 1 | 3 | 0 | 0 |
| | Germany | 4 | 6 | 3 | 0 |
| | Spain | 17 | 84 | 5 | 0 |
| | Sweden | 4 | 23 | 2 | 0 |
| | United Kingdom | 4 | 26 | 2 | 0 |
| | **EU Total** | **33** | **185** | **12** | **0** |
| | Switzerland | 2 | 4 | 2 | 0 |
| Marine biotoxins | France | 10 | 58 | 2 | 0 |
| | Spain | 2 | 9 | 0 | 0 |
| | **EU Total** | **12** | **67** | **2** | **0** |
| Mushroom toxins | Poland | 5 | 14 | 14 | 1 |
| | **EU Total** | **5** | **14** | **14** | **1** |
| Monosodium glutamate | Finland | 1 | 4 | 0 | 0 |
| | **EU Total** | **1** | **4** | **0** | **0** |
| Mycotoxins | Spain | 7 | 47 | 17 | 0 |
| | **EU Total** | **7** | **47** | **17** | **0** |
| Other causative agents | Spain | 1 | 6 | 4 | 0 |
| | **EU total** | **1** | **6** | **4** | **0** |

### Detailed information from strong evidence outbreaks

The majority (55.7 %) of strong evidence outbreaks due to other causative agents were general outbreaks, involving 64.4 % of human cases, and 39.3 % were household outbreaks, involving 29.3 % of human cases. In 4.9 % of outbreaks no information on the type of outbreak was provided.

Information on the food vehicle was provided for 54 of the 60 strong evidence outbreaks. The majority of outbreaks (30) was caused by histamine from fish and fish products. Eleven marine biotoxin outbreaks were caused by crustaceans, shellfish, molluscs and products thereof. Spain and Finland each reported one outbreak caused by escolar fish. Poland reported five outbreaks caused by mushroom toxins. Spain reported seven outbreaks caused by mycotoxins in vegetables and juices.

Information concerning the origin of the food vehicles was provided for 48 outbreaks, 34 of which implicated domestically produced foodstuffs: in 10 outbreaks the food vehicles were from intra-EU trade and in four outbreaks the food vehicles had been imported from outside the EU.

The histamine outbreak reported by Belgium involved five children who did not require hospitalisation. The 'histamine-like' symptoms appeared shortly after consuming a purée of aubergines at school. During the investigation of the outbreak, left-overs of the purée and the remainder of the aubergines from the freezer were analysed for the presence of histamine and *Enterobacteriaceae,* which can induce a histamine conversion in vegetables. The number of *Enterobacteriaceae* detected in the frozen aubergine was high ($1.6x10^4$ cfu/g), but the bacterial count was low in the purée samples, probably due to the cooking process that the purée had undergone. Histamines were detected both in the purée and in the frozen aubergines at a level of 19.3 µg/g and 35.8 µg/g, respectively.

## 4.12 Unknown agents

Seventeen MSs reported 1,583 outbreaks in 2010 (30.1 % of all outbreaks) in which the causative agent was unknown (Table OUT4), including 59 strong evidence outbreaks (8.4 % of all strong evidence outbreaks) involving 836 cases. The most commonly implicated food vehicle in unknown outbreaks was crustaceans, molluscs and shellfish, contributing to 33.9 % of strong evidence outbreaks from an unknown causative agent, followed by vegetables and mixed or buffet meals, involved in 13.6 % of strong evidence outbreaks.

## 4.13 Waterborne outbreaks

Waterborne outbreaks may potentially be large, especially if the public drinking water supply is contaminated. Hospitals and institutions hosting young children or elderly people are often the most severely affected settings in such situations. Laboratory detection of pathogens from water can be complicated, especially if the level of contamination is low. In waterborne outbreaks, several zoonotic agents are often detected in the water as well as in human samples as a result of unspecific contamination, e.g. with sewage water. Contaminated water can spread pathogenic agents further to other food vehicles (e.g. vegetables), either in primary production or during food preparation. The most common source of contamination of raw water sources is human sewage, with human faecal pathogens and parasites. Public water sources are used in urban areas, whereas private water supplies are more frequently used in remote rural areas.

In 2010, seven MSs reported 14 waterborne outbreaks involving 17,733 human cases, of which 0.02 % were hospitalised (Table OUT24). No deaths were recorded. Four different pathogens were isolated from these 14 outbreaks: *Campylobacter,* calicivirus, *S.* Enteritidis and *C. hominis*. There was one waterborne outbreak in which the causative agent was unknown.

***Table OUT24. List of reported strong evidence waterborne outbreaks in 2010***

| Isolated agents | Country | Strong evidence outbreaks | | | | Additional information |
|---|---|---|---|---|---|---|
| | | N | Cases | Hospitalised | Deaths | |
| Calicivirus (including norovirus) | Belgium | 1 | 3,000 | - | - | Disseminated cases |
| | Finland | 1 | 17 | 0 | 0 | Well water |
| | Ireland | 1 | 50 | 0 | 0 | Restaurant, cafe, pub, bar, hotel |
| | Sweden | 3 | 1,015 | 0 | 0 | Disseminated cases |
| | | 1 | 40 | 0 | 0 | Restaurant, cafe, pub, bar, hotel |
| *Campylobacter* spp., unspecified | Denmark | 1 | 400 | 0 | 0 | tap water including well water |
| | Denmark[1] | 1 | 400 | 0 | 0 | Seawater swallowed during swimming at triathlon event |
| | United Kingdom | 1 | 44 | 0 | 0 | Private drinking water supply |
| *S.* Enteritidis | Poland | 1 | 11 | 4 | 0 | Household / domestic kitchen |
| Other bacterial agents | Poland | 2 | 56 | 0 | 0 | Restaurant, cafe, pub, bar, hotel |
| *Cryptosporidium hominis* | Sweden | 1 | 12,700 | 0 | 0 | Disseminated cases |
| **Total** | | **14** | **17,733** | **4** | **0** | |

1. Other agents detected: ETEC, *Giardia*

The outbreak of *C. hominis* occurred in Sweden and caused 12,700 human cases, no hospitalisations and no deaths. There was no recorded contributory factor. The suspected source was raw sewage being discharged directly into a stream, which ran into a lake from which drinking water was taken.

Belgium recorded a large waterborne outbreak of norovirus, affecting 3,000 cases, it is unknown whether there were any hospitalisations or deaths. The contributing factor in this outbreak was water treatment failure.

In 2010 in Denmark, an unusual outbreak occurred in August when a number of participants in a Triathlon competition fell ill after competing in contaminated sea water outside Copenhagen. The swimming leg of the competition was held on the morning following unusually heavy rainfall that flooded the Copenhagen sewer system and lead to a sudden, transient microbial pollution of coastal waters. In a questionnaire investigation conducted among all participants (of which about half were foreign), close to 800 (about 60 %) answered the questionnaire and of these 55 % indicated that they had had symptoms of acute gastroenteritis. There was an association between illness and the amount of sea water that the participants indicated they had accidentally swallowed. Some participants had stool samples examined after the competition, and the results thereof indicated an outbreak of mixed aetiology including *Campylobacter* and enterotoxigenic *E. coli*. More details can be found at www.ssi.dk/English/News/News/2010/2010_10_triathlon_result_081010.aspx

## 4.14 Discussion

In 2010, a total of 5,262 food-borne outbreaks were reported by MSs, which is approximately at the same level as in the two previous years. The main causative agents in these outbreaks were *Salmonella,* viruses, *Campylobacter* and bacterial toxins, also similar to the previous years. Food-borne *Salmonella* outbreaks continued to decline in 2010 in line with the notified salmonellosis cases in humans, as described earlier in this report. Once again the decrease was particularly related to outbreaks caused by eggs, which supports the notion that the successful controls of *Salmonella* in laying hens have importantly contributed to the reduction of human cases.

The number of reported food-borne outbreaks caused by bacterial toxins also decreased compared with the two previous years; however, this decrease seems mainly to be related to one MS and may be influenced by the new reporting specifications introduced in 2010. The number of waterborne outbreaks remained low in 2010 (14 outbreaks), but some of them included high numbers of human cases due to problems in water distribution systems.

The most important food vehicle categories in the outbreaks in 2010 were eggs and egg products, mixed or buffet meals and vegetables and products thereof. The increase in the number of reported outbreaks caused by vegetables is of interest and seems to be mainly related to the substantial number of virus outbreaks attributed to vegetables that were reported in 2010.

The new revised food-borne outbreak reporting specifications were implemented for the first time in the 2010 data reporting. However, as the specifications were published only in March 2011, it might be that not all MSs were able to fully implement them in time for 2010 data reporting. The main change in the reporting specifications was that all types of evidence could be regarded as weak or strong in nature when implicating the suspected food vehicle. The two new evidence categories that could support the reporting of a detailed dataset (i.e. a strong evidence outbreak) were descriptive epidemiological evidence and the detection of the causative agent in the food chain or its environment. Indeed, approximately one third of the strong evidence outbreaks in 2010 were supported only by these new evidence categories, mainly by descriptive epidemiological evidence only. Another difference observed was that, compared with 2009, the number of outbreaks in which a detailed dataset was provided decreased by one-third in 2010 (verified vs strong evidence outbreaks). This appears to be mainly due to three MSs which reported fewer such outbreaks, while two MSs actually reported more such outbreaks in 2010. Both of these findings indicate that the new reporting specifications had an impact on the type of outbreaks reported in 2010 and that MSs were in fact implementing the new reporting specifications. However, more experience of the implementation of the new reporting specifications is needed before final conclusions can be drawn on their influence on the outbreak data received at EU level.

# 5. ANIMAL POPULATIONS

## 5.1 Distribution of farm animals within the EU

In 2010, the majority of MSs reported data on farm animal populations (Table PO1). The distributions of the most important farm animal species (cattle, pigs, sheep, goats and fowl-*Gallus gallus*) are presented in this chapter. Most countries reported total populations; however, not all countries reported population data on animal categories within the species. Therefore, the EU total figures calculated in this chapter do not always represent the exact number of animals in the EU. MSs also reported data on minor farm animal species including other poultry and solipeds. For information regarding animal species that are not covered in this chapter, refer to Appendix Tables PO2, PO3 and PO4, and the level 3 tables.

***Table PO1. Overview of countries reporting data on total animal populations for 2010*[1]**

| Animals | Total number of MSs reporting | Countries |
|---|---|---|
| Animals in general | 27 | **All MSs**<br>**Non-MSs:** NO, CH |
| *Gallus gallus* | 15 | **MSs:** All MSs except BE, BG, DE, DK, EE, FR, HU, IT, MT, PT, SK, UK |
| Cattle | 27 | **All MSs**<br>**Non-MSs:** NO, CH |
| Pigs | 23 | A**ll MSs** except BG, CY, DK, RO<br>**Non-MSs:** NO,CH |
| Sheep | 23 | **All MSs** except DE, IE, MT, PT<br>**Non-MSs:** NO, CH |
| Goats | 23 | **All MSs** except DE, FR, MT, PT<br>**Non-MSs:** NO, CH |

1. Includes countries reporting data on total populations as livestock numbers and/or numbers of herds and flocks.

## 5.2 *Gallus gallus* (fowl)

The total *Gallus gallus* livestock populations in 2010 were reported by 15 MSs (Table PO2). Nineteen countries reported data for broilers and 21 for laying hens. Furthermore, some countries also reported data on breeding hens, elite breeding hens and grandparent breeding hens for both broiler and egg production lines, and data on mixed flocks (refer to the level 3 tables). As in 2009, Poland reported the largest population of *Gallus gallus* accounting for over 40 % of the reported population. In addition to Poland, the Czech Republic, Spain and Romania also reported high numbers of *Gallus gallus*, altogether accounting for nearly 80 % of the total EU population. In six out of 14 countries reporting both total *Gallus gallus* and broiler populations, broilers were reported as making up nearly 90 % of the total *Gallus gallus* population. In the remaining eight countries, broilers accounted for roughly 50 % of the *Gallus gallus* population, with the exception of Luxembourg, which reported 20 % broilers and 80 % laying hens, and Ireland, which reported 75% broilers. In seven of the 15 countries reporting both total *Gallus gallus* and laying hen populations, laying hens made up roughly 40 % of the population, with the remaining eight countries having roughly 10 % of the population made up of laying hens. For information on the number of flocks within specific countries, refer to Appendix Table PO4.

At the EU level, broilers accounted for approximately 82 % of the total *Gallus gallus* population, while laying hens accounted for approximately 12 % (percentages based only on data from MSs reporting in the subgroups in question where total population figures were available).

***Table PO2.* Gallus gallus *populations (livestock numbers), 2010***

| Country | *Gallus gallus*, in total | Broiler | | Laying Hens | |
|---|---|---|---|---|---|
| | N | N | % of total | N | % of total |
| Austria | 65,392,095 | 56,336,493 | 86.2 | 8,034,315 | 12.3 |
| Bulgaria | - | 8,967,890 | - | 4,235,891 | - |
| Cyprus | 881,000 | - | - | 511,000 | 58.0 |
| Czech Republic | 153,158,799 | 140,701,992 | 91.9 | 8,382,000 | 5.5 |
| Denmark | - | 22,065,410 | - | 3,270,000 | - |
| Finland | 9,295,920 | 4,616,206 | 49.7 | 4,231,623 | 45.5 |
| France[1] | - | - | - | 55,065,949 | - |
| Greece | 112,183,383 | 101,388,532 | 90.4 | 8,421,970 | 7.5 |
| Hungary | - | 128,839,070 | - | 10,656,597 | - |
| Ireland | 14,084,215 | 10,552,036 | 74.9 | 2,212,257 | 15.7 |
| Latvia | 3,977,678 | 1,688,339 | 42.4 | 2,188,686 | 55.0 |
| Lithuania | 29,428,900 | 25,944,000 | 88.2 | 3,100,700 | 10.5 |
| Luxembourg | 89,581 | 17,172 | 19.2 | 72,409 | 80.8 |
| Malta | - | 2,932,479 | - | 382,897 | - |
| Netherlands | 87,228,820 | 44,137,369 | 50.6 | 34,215,038 | 39.2 |
| Poland | 699,364,936 | 616,114,230 | 88.1 | 65,172,710 | 9.3 |
| Romania | 149,270,528 | 133,875,041 | 89.7 | 13,161,078 | 8.8 |
| Slovenia | 4,512,938 | 2,528,825 | 56.0 | 1,503,972 | 33.3 |
| Spain | 280,449,081 | 185,790,438 | 66.2 | 44,096,454 | 15.7 |
| Sweden | 14,153,385 | 6,445,157 | 45.5 | 6,061,498 | 42.8 |
| United Kingdom | - | 105,309,284 | - | 47,106,637 | - |
| **Total (15 MSs for *Gallus gallus* in total)** | **1,623,471,259** | **1,598,249,963** | **81.9** | **322,083,681** | **12.4** |
| Norway | - | - | - | 3,808,900 | - |
| Switzerland | - | 5,567,269 | - | 3,229,448 | - |

1. Figures for France include animal populations in overseas departments.

The reported densities of broiler populations in the EU in 2010 (per hectare of utilised agricultural area) were highest in Malta, followed by the Czech Republic and Poland, while for laying hens densities were highest in Malta and the Netherlands (Figures PO1 and PO2).

***Figure PO1.*** **Gallus gallus *broiler population density in the EU, 2010*[1]**


1. The colour scale indicates the population size per hectare of utilised agricultural area (UAA). UAA data obtained from EUROSTAT.

***Figure PO2.*** ***Gallus gallus* laying hen population density in the EU, 2010**[1]


1. The colour scale indicates the population size per hectare of utilised agricultural area (UAA). UAA data obtained from EUROSTAT.

## 5.3 Cattle

In 2010, 27 MSs and two non-MSs reported data on their total population of cattle livestock. The total number of livestock animals and numbers of specific categories (calves <1 year of age, beef cattle and dairy cows and heifers) are summarised in Table PO3. France, Germany and the United Kingdom reported the largest populations of cattle, accounting for 49 % of the total EU population. Two thirds of MSs reported data on cattle subcategories, calves <1 year old, meat production animals and dairy cows and heifers. Calves <1 year old accounted for approximately one third of the total populations except in Bulgaria, Romania and Italy where the population of calves <1 year old was approximately 9.7 %, 7.9 % and 1.5 % respectively. The percentage of meat production cattle varied widely, ranging from 0.8 % in Slovenia to 64.7 % in Greece. It could be that different criteria for the categorisation of cattle are used by MSs and this is reflected in the reporting. Dairy cows and heifers accounted for from 14.8 % up to 68.8 % of the total population in the reporting MSs. The Netherlands reported more data on the subcategories than on the total cattle population. For information on the number of herds and/or cattle holdings within the different countries, refer to Appendix Table PO4.

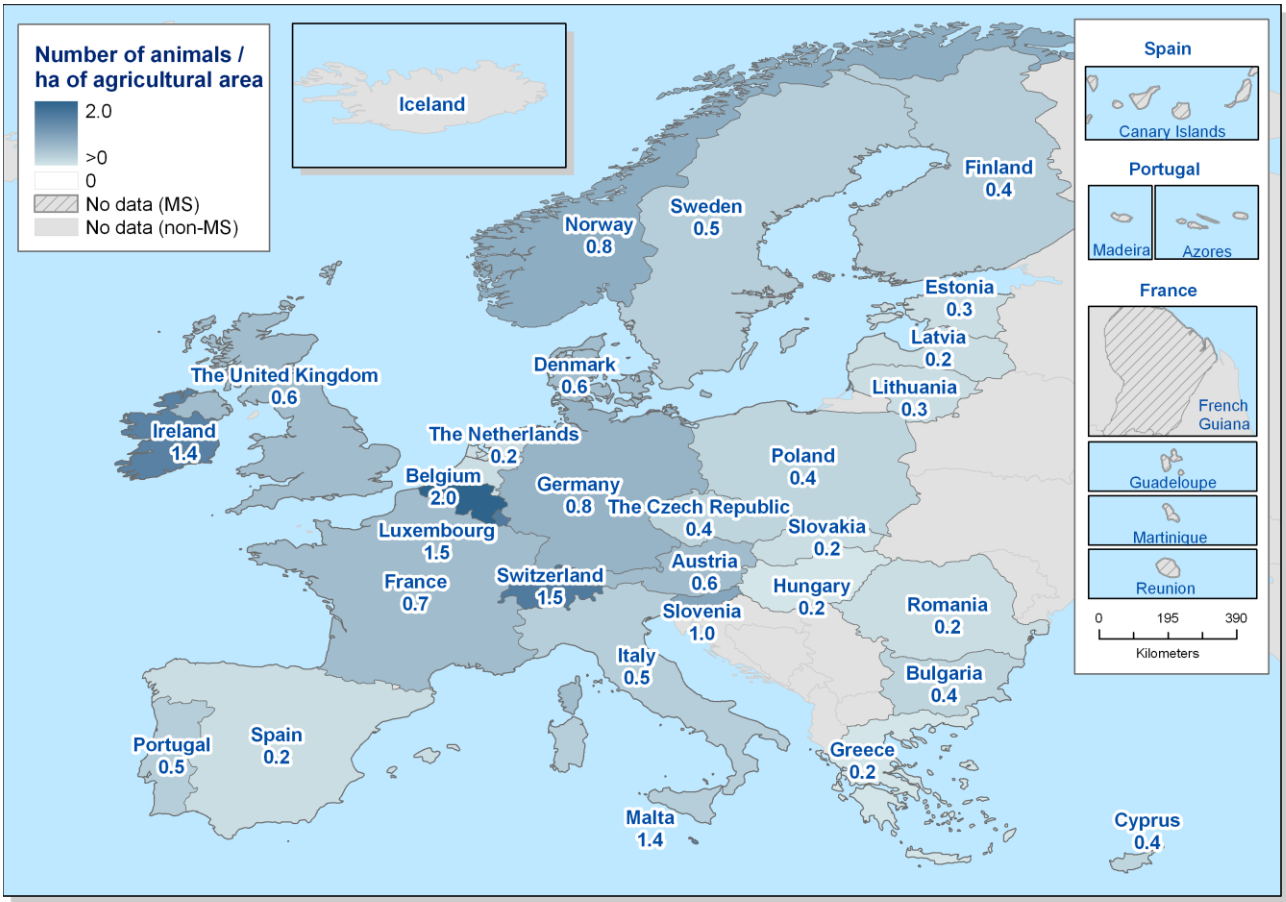
*Table PO3. Cattle populations (livestock numbers) 2010*

| Country | Cattle, in total | Calves < 1 year | | Meat production animals | | Dairy cows and heifers | |
|---|---|---|---|---|---|---|---|
| | N | N | % of total | N | % of total | N | % of total |
| Austria | 2,013,281 | 634,052 | 31.5 | 295,510 | 14.7 | 1,083,719 | 53.8 |
| Belgium | 2,721,130 | - | - | - | - | - | - |
| Bulgaria | 1,164,920 | 112,876 | 9.7 | 253,211 | 21.7 | 798,032 | 68.5 |
| Cyprus | 56,180 | 17,544 | 31.2 | - | - | 38,636 | 68.8 |
| Czech Republic | 1,376,311 | 331,396 | 24.1 | 306,111 | 22.2 | 738,804 | 53.7 |
| Denmark | 1,631,863 | - | - | - | - | - | - |
| Estonia | 234,442 | 62,777 | 26.8 | 25,454 | 10.9 | 140,656 | 60.0 |
| Finland | 925,791 | 303,095 | 32.7 | 124,675 | 13.5 | 420,861 | 45.5 |
| France[1] | 18,991,613 | 4,850,371 | 25.5 | - | - | 5,749,856 | 30.3 |
| Germany | 12,761,126 | - | - | - | - | - | - |
| Greece | 726,221 | - | - | 470,141 | 64.7 | 214,982 | 29.6 |
| Hungary | 760,081 | - | - | - | - | - | - |
| Ireland | 5,825,851 | 1,694,826 | 29.1 | - | - | - | - |
| Italy | 5,832,405 | 88,144 | 1.5 | 2,415,598 | 41.4 | 2,744,895 | 47.1 |
| Latvia | 379,494 | - | - | - | - | - | - |
| Lithuania | 685,047 | - | - | - | - | 345,347 | 50.4 |
| Luxembourg | 198,892 | 52,253 | 26.3 | 24,700 | 12.4 | 61,526 | 30.9 |
| Malta | 14,810 | 4,241 | 28.6 | 3,397 | 22.9 | 9,109 | 61.5 |
| Netherlands | - | 2,758,000 | - | 1,202,000 | - | 1,518,000 | - |
| Poland | 6,067,488 | - | - | - | - | - | - |
| Portugal | 1,580,895 | - | - | - | - | - | - |
| Romania | 2,946,181 | 231,645 | 7.9 | - | - | - | - |
| Slovakia | 478,442 | - | - | - | - | - | - |
| Slovenia | 470,151 | 146,770 | 31.2 | 3,967 | 0.8 | - | - |
| Spain | 5,833,546 | 2,025,571 | 34.7 | 2,070,902 | 35.5 | 862,210 | 14.8 |
| Sweden | 1,536,658 | 478,944 | 31.2 | 197,053 | 12.8 | 348,095 | 22.7 |
| United Kingdom | 10,111,687 | 2,860,378 | 28.3 | - | - | - | - |
| **EU Total** | **85,324,506** | **13,894,883** | **16.3** | **6,190,719** | **7.3** | **13,556,728** | **15.9** |
| Norway | 872,100 | - | - | 61,500 | 7.1 | 213,800 | 24.5 |
| Switzerland | 1,600,563 | - | - | - | - | - | - |

1. Figures for France include animal populations in overseas departments.

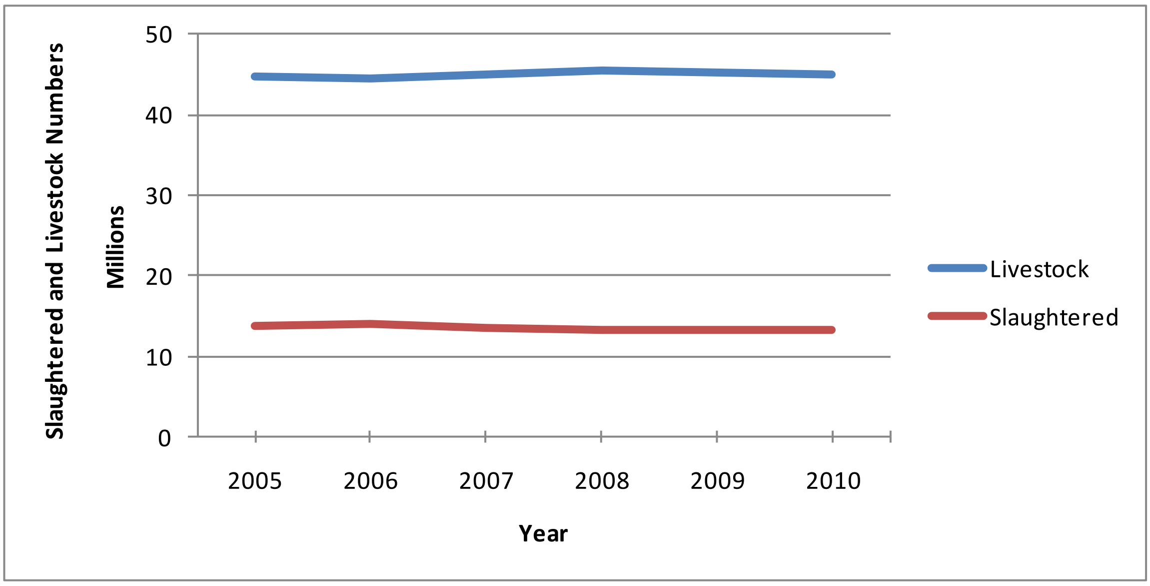
In Figure PO3 the density of the cattle population in the reporting countries is shown. Among MSs, the population density was highest in Belgium, Luxembourg, Malta, and Ireland.

*Figure PO3. Cattle population density in the EU, 2010[1]*




1. The colour scale indicates the population size per hectare of utilised agricultural area (UAA). UAA data obtained from EUROSTAT.

*Figure PO4. Trend for slaughtered and livestock numbers of cattle in reporting Member States, 2005-2010[1]*




1. Only MSs reporting data for both livestock and slaughtered animals in all the years are included (15 MSs).

## 5.4 Pigs

In 2010, a total of 23 MSs and two non-MSs reported data on their total pig population (livestock numbers). The total number of livestock animals and numbers in the categories fattening and breeding pigs are summarised in Table PO4. Five MSs (Germany, France, the Netherlands, Poland and Spain) reported markedly larger populations of pigs than the other MSs, accounting for 73 % of the reported EU total. Among MSs that reported data on pig categories, fattening pigs generally accounted for a large part of the total population, and breeding pigs accounted for less than 12 % of the total population in most of the reporting MSs with the exception of Spain (51.2 %) and Italy (44.5 %). For information on the number of herds and/or holdings of pigs within specific countries, refer to Appendix Table PO4.

At the EU level, fattening pigs accounted for approximately one third of the reported total population, while breeding animals accounted for just over 17 % (percentages based only on data from MSs reporting in the subgroups in question where total population figures are available).

***Table PO4. Pig populations (livestock numbers), 2010***

| Country | Pigs, in total | Fattening Pigs | | Breeding Animals | |
|---|---|---|---|---|---|
| | N | N | % of total | N | % of total |
| Austria | 3,164,898 | 1,149,279 | 36.3 | 285,908 | 9.0 |
| Belgium | 5,875,878 | 5,286,829 | 90.0 | 589,049 | 10.0 |
| Bulgaria | - | - | - | 215,439 | - |
| Czech Republic | 2,018,943 | - | - | - | - |
| Denmark | - | 6,422,624 | - | - | - |
| Estonia | 315,245 | 146,331 | 46.4 | 33,330 | 10.6 |
| Finland | 1,366,932 | 1,213,274 | 88.8 | 153,658 | 11.2 |
| France1 | 14,063,310 | 7,583,291 | 53.9 | 1,129,263 | 8.0 |
| Germany | 26,900,800 | - | - | - | - |
| Greece | 2,223,552 | 1,997,995 | 89.9 | 119,948 | 5.4 |
| Hungary | 2,455,172 | - | - | - | - |
| Ireland | 1,296,166 | 145,708 | 11.2 | 6,663 | 0.5 |
| Italy | 9,118,428 | 4,910,948 | 53.9 | 4,057,609 | 44.5 |
| Latvia | 323,087 | - | - | - | - |
| Lithuania | 656,309 | - | - | - | - |
| Luxembourg | 83,774 | 45,157 | 53.9 | 7,589 | 9.1 |
| Malta | 53,872 | 48,586 | 90.2 | 5,286 | 9.8 |
| Netherlands | 12,254,072 | 5,904,172 | 48.2 | 1,226,993 | 10.0 |
| Poland | 19,220,811 | - | - | - | - |
| Portugal | 2,812,000 | - | - | - | - |
| Romania | - | 5,225,487 | - | 241,453 | - |
| Slovakia | 565,927 | - | - | - | - |
| Slovenia | 395,593 | 360,597 | 91.2 | 34,996 | 8.8 |
| Spain | 33,682,252 | 15,750,808 | 46.8 | 17,251,124 | 51.2 |
| Sweden | 1,519,874 | 936,910 | 61.6 | 155,962 | 10.3 |
| United Kingdom | 4,460,317 | - | - | - | - |
| **EU Total** | **144,827,212** | **45,479,885** | **31.4** | **25,057,378** | **17.3** |
| Norway | 846,700 | 461,400 | 54.5 | 57,800 | 6.8 |
| Switzerland | 1,580,215 | - | - | - | - |

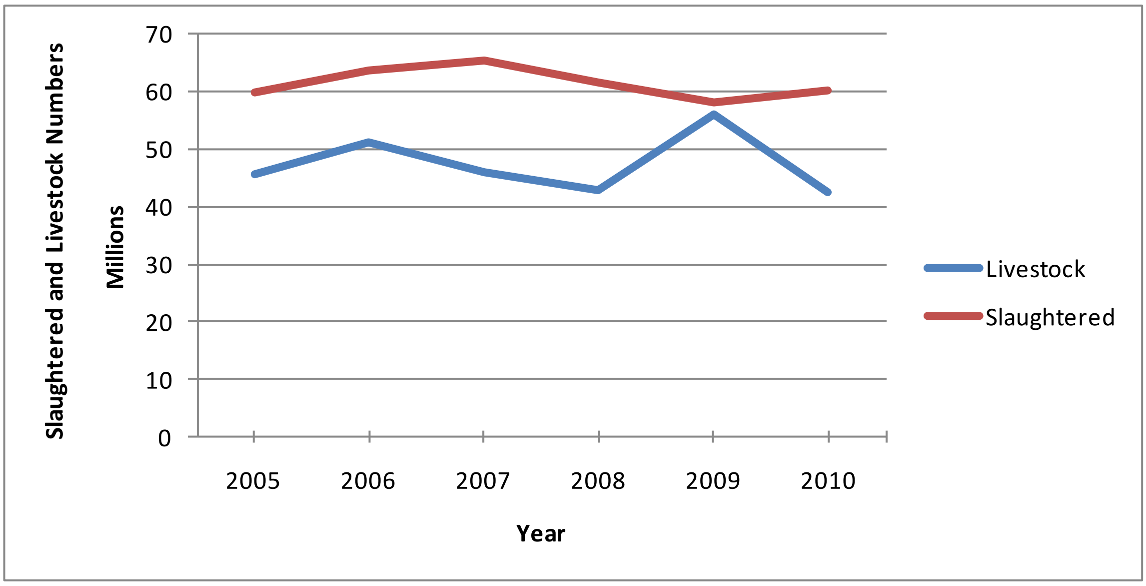
1. Figures for France include animal populations in overseas departments.

In Figure PO5 the density of pig populations in reporting countries in the EU is shown. The population size of pigs per hectare of utilised agricultural area was highest in the Netherlands followed by Malta and Belgium.

**Figure PO5. Pig population density in the EU, 2010**


1. The colour scale indicates the population size per hectare of utilised agricultural area (UAA). UAA data obtained from EUROSTAT.

**Figure PO6. Trend for slaughtered and livestock numbers of pigs in reporting Member States, 2005-2010[1]**




1. Only MSs reporting data for both livestock and slaughtered animals in all the years are included (9 MSs).

## 5.5 Sheep

Data reported on sheep populations in 2010 are shown in Table PO5. A total of 23 MSs and two non-MSs reported data on total sheep population. The largest sheep population was reported by the United Kingdom and Spain. These two MSs alone accounted for 50 % of the entire reported EU population. In 2010, 12 MSs and one non-MS reported subgroup data. The data reported indicate that the majority of sheep were older than one year (percentages based only on data from MSs reporting in the subgroups in question where total population figures are available). For information on the number of herds and/or holdings of sheep within countries, refer to Appendix Table PO4.

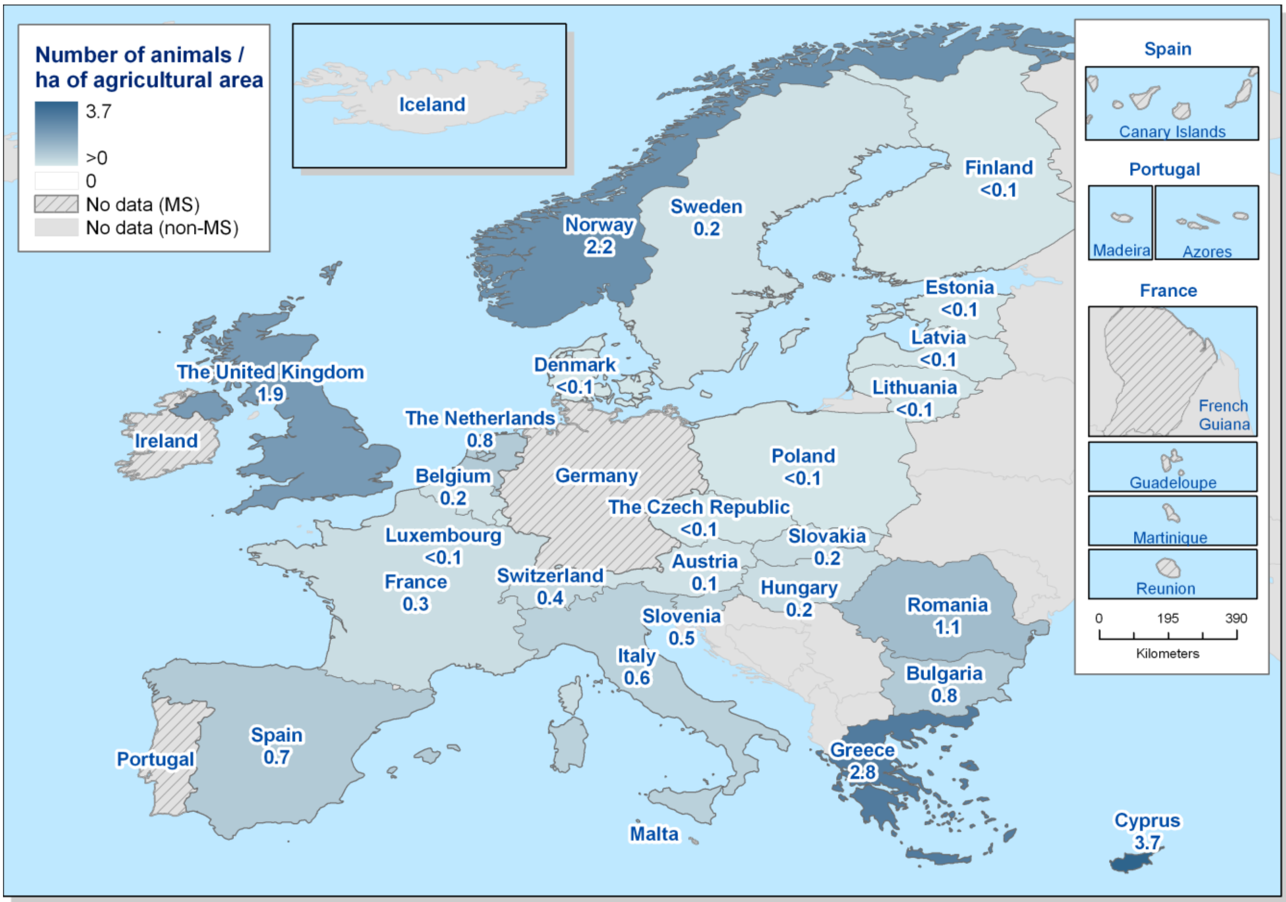
*Table PO5. Sheep populations (livestock numbers), 2010*

| Country | Sheep, in total | Animals < 1 year | | Animals > 1 year | |
|---|---|---|---|---|---|
| | N | N | % of total | N | % of total |
| Austria | 414,876 | 172,903 | 41.7 | 241,973 | 58.3 |
| Belgium | 209,263 | - | - | - | - |
| Bulgaria | 2,429,652 | 241,267 | 9.9 | - | - |
| Cyprus | 538,823 | - | - | 444,220 | 82.4 |
| Czech Republic | 214,214 | - | - | - | - |
| Denmark | 172,580 | - | - | - | - |
| Estonia | 75,036 | 19,502 | 26.0 | 55,534 | 74.0 |
| Finland | 125,673 | - | - | - | - |
| France[1] | 6,903,658 | 831,785 | 12.0 | - | - |
| Greece | 11,556,152 | 1,698,275 | 14.7 | 434,600 | 3.8 |
| Hungary | 988,243 | - | - | - | - |
| Ireland | - | 843,611 | - | 2,268,008 | - |
| Italy | 7,452,934 | - | - | - | - |
| Latvia | 76,810 | - | - | - | - |
| Lithuania | 55,249 | - | - | - | - |
| Luxembourg | 9,084 | 3,968 | 43.7 | 562 | 6.2 |
| Malta | - | 2,153 | - | - | - |
| Netherlands | 1,511,850 | - | - | - | - |
| Poland | 232,459 | - | - | - | - |
| Romania | 14,929,483 | 797,547 | 5.3 | 14,131,936 | 94.7 |
| Slovakia | 408,299 | - | - | - | - |
| Slovenia | 129,788 | 32,535 | 25.1 | - | - |
| Spain | 18,375,464 | 3,434,907 | 18.7 | 14,940,557 | 81.3 |
| Sweden | 564,922 | 291,796 | 51.7 | 273,126 | 48.3 |
| United Kingdom | 31,084,338 | - | - | - | - |
| **EU Total** | **98,458,850** | **7,524,485** | **7.6** | **30,522,508** | **31.0** |
| Norway | 2,296,900 | - | - | 887,600 | 38.6 |
| Switzerland | 423,800 | - | - | - | - |

1. Figures for France include, animal populations in overseas departments.

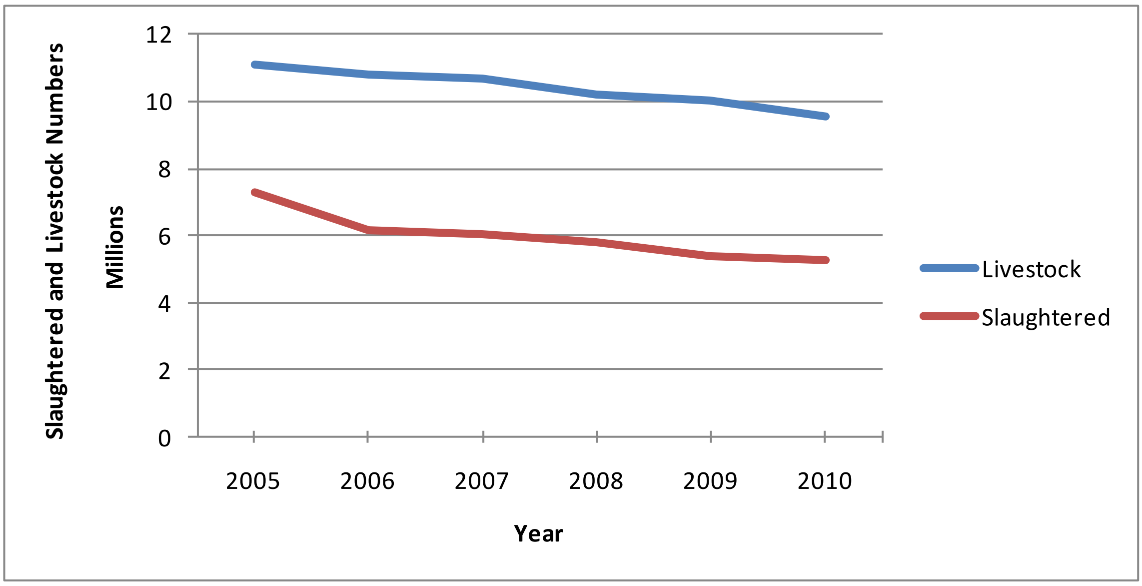
In Figure PO7 the density of sheep populations in the reporting countries is shown. Sheep population per hectare of utilised agricultural area were highest in Cyprus and Greece and the non-MS Norway.

## *Figure PO7. Sheep population density in the EU, 2010[1]*




1. The colour scale indicates the population size per hectare of utilised agricultural area (UAA). UAA data obtained from EUROSTAT.

## *Figure PO8. Trend for slaughtered and livestock numbers of sheep in reporting Member States, 2005-2010[1]*




1. Only MSs reporting data for both livestock and slaughtered animals in all the years are included (11 MSs).

### 5.6 Goats

Data reported on goat populations in 2010 are shown in Table PO6. A total of 23 MSs and two non-MSs reported data on goat populations. The largest goat population was reported by Greece, Romania and Spain. These three MSs alone accounted for over 74 % of the entire reported EU population. In 2010, only a few MSs reported data in specific categories such as goats over year of age or on animals raised for meat production. In general the majority of goats were older than one year. For information on the number of herds and/or holdings of goats within countries, please refer to Appendix Table PO4.

In Figure PO9 the density of goat population in the reporting countries is shown. The goat population per hectare of utilised agricultural area was highest in Cyprus and Greece.

***Table PO6. Goat populations (livestock numbers), 2010***

| Country | Goats, in total | Goats > 1 year | | Meat production animals | |
|---|---|---|---|---|---|
| | N | N | % of total | N | % of total |
| Austria | 88,798 | 61,463 | 69.2 | - | - |
| Belgium | 60,753 | - | - | - | - |
| Bulgaria | 1,074,379 | 487,345 | 45.4 | 121,098 | 11.3 |
| Cyprus | 538,823 | 444,220 | 82.4 | - | - |
| Czech Republic | 23,626 | - | - | - | - |
| Denmark | 25,368 | - | - | - | - |
| Estonia | 3,117 | 2,606 | 83.6 | - | - |
| Finland | 6,442 | - | - | - | - |
| France[1] | - | 1,327,079 | - | - | - |
| Greece | 5,073,721 | 303,465 | 6.0 | - | - |
| Hungary | 16,840 | - | - | - | - |
| Ireland | 8,565 | - | - | - | - |
| Italy | 980,390 | - | - | 277,020 | 28.3 |
| Latvia | 13,492 | - | - | - | - |
| Lithuania | 7,343 | - | - | - | - |
| Luxembourg | 5,084 | 293 | 5.8 | 244 | 4.8 |
| Netherlands | 352,828 | - | - | - | - |
| Poland | 41,851 | - | - | - | - |
| Romania | 2,109,782 | - | - | - | - |
| Slovakia | 9,305 | - | - | - | - |
| Slovenia | 26,197 | - | - | - | - |
| Spain | 2,798,851 | 2,193,124 | 78.4 | 1,429,426 | 51.1 |
| Sweden | 11,135 | - | - | - | - |
| United Kingdom | 92,951 | - | - | - | - |
| **EU Total** | **13,369,641** | **3,492,516** | **26.1** | **1,827,788** | **13.7** |
| Norway | 67,600 | - | - | - | - |
| Switzerland | 81,232 | - | - | - | - |

1. Figures for France include, animal populations in overseas departments.

*Figure PO9. Goat population density in the EU, 2010[1]*


1. The colour scale indicates the population size per hectare of utilised agricultural area (UAA). UAA data obtained from EUROSTAT.

# 6. MATERIALS AND METHODS

## 6.1 Data received in 2010

### Human data

The human data analyses in the EU Summary Report for 2010 were prepared by the Food- and Waterborne Diseases and Zoonoses programme at ECDC and were based on the data submitted to the European Surveillance System (TESSy), hosted at ECDC.

TESSy is a software platform that has been operational to collect data on 49 infectious diseases since April 2008. Both aggregated and case-based data were reported to TESSy. Although aggregated data did not include individual case-based information, both reporting formats have been used to calculate country-specific notification rates and trends in diseases.

Data on human zoonoses cases were received from all 27 MSs and additionally from two non-MSs: Iceland and Norway. Switzerland sent its data on human cases directly to EFSA.

### Data on foodstuffs, animals and feedingstuffs

All MSs submitted national zoonoses reports for 2010. In addition, reports were submitted by the two non-MSs, Norway and Switzerland. For the sixth consecutive year, countries submitted data on animals, food, feed and food-borne outbreaks using a web-based zoonoses reporting system maintained by EFSA.

In 2010, data were collected on a mandatory basis for the following eight zoonotic agents: *Salmonella*, thermotolerant *Campylobacter*, *Listeria monocytogenes*, verotoxigenic *Escherichia coli*, *Mycobacterium bovis*, *Brucella*, *Trichinella* and *Echinococcus.* Mandatory reported data also included antimicrobial resistance in isolates of *Salmonella* and *Campylobacter*, food-borne outbreaks and susceptible animal populations. Furthermore, based on epidemiological situations in each MS, data were reported on the following agents and zoonoses: *Yersinia*, *Lyssavirus (*rabies), *Toxoplasma*, *Cysticerci*, *Coxiella* (Q fever), *Francisella, Staphylococcus* and antimicrobial resistance in indicator *E. coli* and enterococci isolates. Finally, data concerning compliance with microbiological criteria were also reported for the staphylococcal enterotoxin, *Enterobacter sakazakii* and histamine.

In this report, data are presented concerning the eight mandatory zoonotic agents and *Yersinia,* Q fever, rabies, *Toxoplasma, Cysticerci,* mycobacteria other than *M. bovis* and *Francisella*.

For each pathogen, an overview table presenting all MSs reporting data is included at the beginning of each chapter. However, for the detailed tables, data reported as HACCP, own control or imports and, unless stated otherwise, data from suspect sampling and outbreak or clinical investigations are also excluded. The general rule is to not include data from samplings with less than 25 sampled units. Exceptions to this rule were the following tables: *Salmonella* in poultry species in countries running control programmes, distribution of the 10 most common *Salmonella* serovars in some foods and animals species, number of tested animals and positive cases of rabies in domestic animals and wildlife and from countries providing continuous data from foxes, and tables for *Trichinella*, *Echinococcus*, and *Toxoplasma* as well as all food-borne outbreak data.

## 6.2 Statistical analysis of trends over time

### Human data

Five-year trends for the EU and for MSs were analysed with Poisson regression. Incidence rate ratios (IRR) were calculated adjusting for clustering within countries and taking into account the size of the underlying population. The EU trend and the trends in MSs were reported as significant if the 99 % confidence interval for IRRs did not include the null hypothesis value for IRR, which is the value ‘one’. An average annual change in percentages during the five-year period was estimated based on Poisson regression (a log-linear model). Data (number of confirmed cases and total population) at MS level were only included in the trend analysis when the MS had reported human cases throughout the five-year period 2006-2010.

Any comparisons among notification rates in MSs should be made with caution. When making comparisons among MSs, one should take into account such factors as the transition time to implement EU case definitions and different types of surveillance systems and population coverage, as well as microbiological methods employed by reporting countries.

The notification rate for each year is defined as the number of new confirmed cases per 100,000 inhabitants per year in the population as of 1 January in the respective year. The rates for specific age groups are calculated using the relative age population. Population data were extracted from the Eurostat database and analyses were conducted using Stata/IC 11.0.

Changes in notification rates were visually explored for campylobacteriosis, yersiniosis, listeriosis, and Q-fever, for each MS, by *trellis* graphs, using the *lattice* package in the R software (www.r-project.org). MS-specific notification rate trend graphs for campylobacteriosis use a unique scale for countries shown in the same row, but scales differ among rows. MSs were ordered according to the maximum value of the notification rate. Moreover, in each row, countries are shown in alphabetical order. Owing to the more similar disease-specific notification rates across MSs, the same scale is used in the trend graphs for listeriosis, yersiniosis and Q fever for all reporting MSs.

### Data on animals

In the current report, temporal trends have been analysed for bovine tuberculosis, as well as for brucellosis in cattle and small ruminants (for a period of six years) in the group of MSs with a co-financed control and eradication programme.

MS-group weighted prevalences were estimated by weighting the MS-specific proportion of positive units with the reciprocal of the sampling fraction. The reciprocal is the ratio between 'the total number of units per MS per year' and the 'number of tested units in the MS per year'. For cattle and small ruminants, the annually reported population data were used. The source of data for weighting was indicated in the footnotes of all figures that illustrate weighted prevalence estimates.

In order to obtain yearly estimates of the weighted prevalence for groups of examined MSs, the SURVEYLOGISTIC procedure in the SAS System was used. The weight was applied in order to take into account disproportionate sampling at MS level. The statistical significance of trends was tested by a weighted logistic regression for binomial data using the GENMOD procedure in SAS, at a 5 % significance level. As non-independence of observations within each MS could not be excluded, for example due to the possibility of sampling animals belonging to the same holdings, the REPEATED statement was used. This yielded inflated standard errors for the effect of the year of sampling, reducing the probability of detecting significant time trends, and corresponding to a conservative approach to statistical analyses.

Changes in the proportions of positive units for zoonotic agents in animals during the time period from 2004 to 2010 were visually explored for each MS by *trellis* graphs using the *lattice* package in the R software (www.r-project.org).

## 6.3 Data sources

In the following sections, the types of data submitted by the reporting countries are briefly described. Information on human surveillance systems is based on the countries reporting to ECDC the data for 2010.

### 6.3.1 *Salmonella* data

#### Humans

The notification of salmonellosis in humans is mandatory in most MSs, Switzerland, Iceland, Liechtenstein, and Norway, except for four MSs, where reporting is based on a voluntary system (Belgium, France, the Netherlands, and Spain) or other system (the United Kingdom) (Appendix Table SA19). In the United Kingdom, although the reporting of food poisoning is mandatory, isolation and specification of the organism is voluntary. In the Netherlands, the surveillance for non-typhoidal salmonellosis is voluntary. The coverage of the surveillance system for salmonellosis is estimated to be 25 % in Spain and 64 % in the Netherlands. These proportions of populations were used in the calculation of notification rates for Spain and the Netherlands. Diagnosis of human infections is generally done by culture from human stool samples. The majority of countries perform serotyping of strains.

### Foodstuffs

In food, *Salmonella* is notifiable in 14 MSs (Austria, Belgium, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Romania, Slovakia, Slovenia, Spain and Sweden) and Norway (Appendix Table SA19, information is missing from Bulgaria, Cyprus, the Czech Republic, Denmark, Greece, Lithuania, Luxembourg, Malta, the Netherlands, Poland and Portugal).

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. For a full description of monitoring schemes and diagnostic methods in individual MSs, refer to Appendix Tables SA7a, SA10, SA13, SA16 and SA17. The monitoring schemes are based on various types of samples, such as neck skin samples, carcass swabs and meat cuttings; these were collected at slaughter, processing, meat cutting plants and at retail. Several MSs reported data collected as part of HACCP programmes based on sampling at critical control points. These targeted samples could not be directly compared with those that were randomly collected for monitoring/surveillance purposes and were not included in data analysis and tables. Information on serotype distribution was not consistently provided by all MSs.

### Animals

*Salmonella* in *Gallus gallus* (fowl) and/or other animal species is notifiable in most MSs, Switzerland and Norway, except in Hungary (Appendix Table SA19, information is missing from Malta). In Denmark, clinical cases are not notifiable for poultry, but only in other animals, while in Romania only findings of *S*. Enteritidis and *S.* Typhimurium in poultry are notifiable. The monitoring of *Salmonella* in animals is mainly conducted through passive, laboratory-based surveillance of clinical samples, active routine monitoring of flocks of breeding and production animals in different age groups, and tests on organs during meat inspection. Community Regulation (EC) No 2160/2003 prescribes a sample plan for the control of *S.* Enteritidis, *S.* Typhimurium, *S.* Infantis, *S.* Virchow and *S.* Hadar in breeding flocks of *Gallus gallus* and for the control of *S* Enteritidis and *S.* Typhimurium in laying hen flocks and broiler flocks of *Gallus gallus* and for turkey flocks to ensure comparability of data among MSs. Non-MSs (European Free Trade Association members) must apply the regulation as well according to the Decision of the European Economic Area Joint Committee No 101/2006.

In Appendix Tables SA2-SA4, monitoring programmes and control strategies in breeding flocks of *Gallus gallus* that are applied in different MSs are shown, in Appendix Tables SA5a-SA5b and SA6, monitoring programmes and control strategies in laying hen flocks are shown, in Appendix Tables SA7a, SA7b and SA8 monitoring programmes and control strategies for broiler flocks are shown, and in Appendix Tables SA9-SA10 and SA10a monitoring programmes and control strategies for breeding and production turkey flocks are shown. No requirements for the monitoring and control of other commercial poultry production systems were applicable in 2010, but most MSs have national programmes for ducks (Appendix Tables SA11 and SA13) and geese (Appendix Tables SA12 and SA13). Some MSs also monitor *Salmonella* in pigs (Appendix Tables SA14-SA16), cattle (Appendix Tables SA17 and SA18) and other animals.

### Feedingstuffs

There is no common sampling scheme for feed materials in the EU. Results from compulsory and voluntary monitoring programmes, follow-up investigations and industry quality assurance programmes, as well as surveys, are reported (Appendix Table SA1). The MS monitoring programmes often include both random and targeted sampling of feedstuffs that are considered at risk. Samples of raw material, materials during processing and final products are collected from batches of feedstuffs of domestic and imported origin. The reported epidemiological units were either ‘batch’ (usually based on pooled samples) or ‘single’ (often several samples from the same batch). As in previous years, most MSs did not report separately data from the different types of monitoring programmes or data from domestic and imported feed. Therefore, it must be emphasised that the data related to *Salmonella* in feedstuffs cannot be considered national prevalence estimates. Moreover, due to the lack of a harmonised surveillance approach, information is not usually comparable among countries. Nevertheless, data are presented in the same tables. Information was requested on feed materials of animal and vegetable origin and on compound feedstuffs (mixture of feed materials intended for feeding specific animal groups). Data on the detection of *Salmonella* in fish meal, meat and bone meal, cereals, oil seeds and products and compound feed for cattle, pigs and poultry in 2008 to 2010 are presented. Single sample and batch-based data from the different monitoring systems were summarised.

### Serovars

The serovar data for food, animals and feed originate from the *Salmonella* serovar tables (not from prevalence tables reporting the number of samples tested and the number of positive samples). In this table, MSs included isolates reported from monitoring, industry own checks/HACCP and clinical investigations, also data from investigations where the framework of sampling was not stated. In the case of turkeys the target Regulation (EC) No 584/2008 requests all serovars to be reported. Information on the serovars covered by the EU reduction target for the specific animal populations should always be reported in the relative prevalence tables for the purpose of verifying the achievement of the reduction target[72], therefore data from the prevalence tables were used. The ranking of serovars was done within each group by summing the number of each serotype across all countries. The distributions were based on the number of typed isolates, and non-typeable isolates were also taken account of. Most MSs reported a subset designated 'other serotypes'. For some MSs this may include isolates belonging to the 10 most common serovars in the EU and the relative EU occurrence of some serovars may therefore be underestimated.

## 6.3.2 *Campylobacter* data

### Humans

The notification of campylobacteriosis is mandatory in most MSs, Iceland, Norway and Switzerland, except for five MSs, where notification is based on a voluntary system (Belgium, France, Italy, the Netherlands and Spain) or other system (the United Kingdom) (Appendix Table CA2, information is missing from Greece and Portugal). The coverage of the surveillance system for campylobacteriosis is estimated to be 25 % in Spain and 52 % in the Netherlands. These proportions of populations were used in the calculation of notification rates for these two MSs. Diagnosis of human infection is generally done by culture from human stool samples (Appendix Table CA1). In some countries, isolation of the organism is followed by biochemical tests for speciation.

### Foodstuffs

In food, *Campylobacter* is notifiable in 11 MSs (Austria, Belgium, the Czech Republic, Estonia, Germany, Italy, Latvia, the Netherlands, Slovakia, Slovenia and Spain) and Norway (Appendix Table CA2, information is missing from Bulgaria, Cyprus, France, Lithuania, Luxembourg, Malta, Poland, Portugal and Romania). At processing, cutting and retail, sampling was predominantly carried out on fresh meat. Food samples were collected in several different contexts, i.e. continuous monitoring or control programmes, clinical investigation, surveys and as part of HACCP programmes implemented within the food industry (Appendix Table CA1). HACCP and clinical investigation data are not included in the report.

### Animals

Campylobacteriosis is notifiable in *Gallus gallus* in Finland and Norway, in cattle in Germany and in all animals in Belgium, Estonia, Ireland, Latvia, Lithuania, the Netherlands, Spain and Switzerland (Appendix Table CA2, information is missing from Bulgaria, Cyprus, France, Malta and Poland). The most frequently used methods for detecting *Campylobacter* in animals at farm, slaughter and in foodstuffs were bacteriological methods ISO 10272[73] and NMKL 119[74] as well as PCR methods (Appendix Table CA1). In some countries, isolation of the organism is followed by biochemical tests for speciation. For poultry sampled prior to slaughter, faecal material was collected either as cloacal swabs or sock samples (faecal material collected from the floor of poultry houses by pulling gauze over footwear and walking through the poultry house). At slaughter, several types of samples were collected, including cloacal swabs, caecal contents, and/or neck skin.

72 EFSA (European Food Safety Authority), 2011. Manual for Reporting on Zoonoses, Zoonotic Agents and Antimicrobial Resistance in the framework of Directive 2003/99/EC and of some other pathogenic microbiological agents for information derived from the year 2010. Supporting publication 2011:135, 119 pp.

73 ISO (International Organization for Standardization), 2006. ISO 10272 Microbiology of food and animal feeding stuffs -- Horizontal method for detection and enumeration of *Campylobacter* spp.

74 NMKL (Nordisk Metodikkomité for Næringsmidler- Nordic Committee on Food Analysis), 2007. NMKL 119. Thermotolerant *Campylobacter*. Detection, semi-quantitative and quantitative determination in foods and drinking water.

### 6.3.3 *Listeria* data

#### Humans

The notification of listeriosis in humans is mandatory in most MSs, Iceland, Liechtenstein, Norway and Switzerland, except for four MSs, where notification is based on a voluntary system (Belgium, the Netherlands, Spain, and the United Kingdom) (Appendix Table LI2, information is missing from Portugal). The estimated coverage of the national surveillance system for listeriosis is 25 % in Spain, and this population proportion was used in the calculation of notification rates. Diagnosis of human infections is generally done by culture from blood, cerebral spinal fluid and vaginal swabs.

#### Foodstuffs

Notification of *Listeria* in food was required in 12 MSs (Austria, Belgium, Estonia, France, Germany, Hungary, Italy, Latvia, the Netherlands, Slovakia, Slovenia and Spain); however, several other MSs report data (Appendix Table LI2, information is missing from Bulgaria, Cyprus, the Czech Republic, Denmark, Greece, Lithuania, Malta, Poland, Portugal, Romania and Switzerland). Commission Regulation (EC) No 2073/2005 on microbiological criteria for foodstuffs lays down food safety criteria for *Listeria monocytogenes* in ready-to-eat (RTE) foods. This regulation came into force in January 2006. National monitoring programmes and diagnostic methods for testing samples for *Listeria monocytogenes* are summarised in Appendix Table LI1. Surveillance in RTE foods was performed in most MSs. However, due to differences in sampling and analytical methods, comparisons from year-to-year and between countries were difficult.

#### Animals

Listeriosis in animals was notifiable in 13 MSs (Belgium, the Czech Republic, Estonia, Finland, Germany, Greece, Latvia, Lithuania, the Netherlands, Slovakia, Slovenia, Spain and Sweden), Switzerland and Norway (Appendix Table LI2, information is missing from Bulgaria, Cyprus, Ireland, Malta and Poland). The monitoring of *Listeria* in animals is mainly conducted through passive, laboratory-based surveillance of clinical samples, active routine monitoring or random national surveys.

### 6.3.4 VTEC data

#### Humans

In humans, the notification of verotoxigenic *E. coli* (VTEC) infections is mandatory in most MSs, Iceland, Norway and Switzerland, except for the United Kingdom, where there is another system (Appendix Table VT1, information is missing from the Czech Republic, Portugal and Liechtenstein). In France, only cases with haemolytic-uraemic syndrome (HUS) are notified. In five countries the surveillance is voluntary (Belgium, France, Italy, Luxembourg, and Spain). Diagnosis of human gastrointestinal infections is generally done by culture from human stool samples.

#### Foodstuffs and animals

VTEC is notifiable in food in 11 MSs (Austria, Belgium, Estonia, Germany, Italy, Latvia, the Netherlands, Romania, Slovakia, Slovenia and Spain) and in animals in eight MSs (Belgium, the Czech Republic, Estonia, Finland, Latvia, Lithuania, Spain and Sweden) (Appendix Table VT1, information is missing from Bulgaria, Cyprus, the Czech Republic, Denmark, Greece, Hungary, Lithuania, Malta, Poland, Portugal and Switzerland for food, and from Bulgaria, Cyprus, France, Germany, Greece, Ireland, Malta, Poland, Portugal and Romania for animals).

Samples were collected in a variety of settings, such as slaughterhouses, cutting plants, dairies, wholesalers and at retail level, and included different types of samples such as carcass surface swabs, cuts of meats, minced meat, milk, cheese, and other products. The majority of investigated products were raw but intended to undergo preparation before consumption. The samples were taken as part of official control and monitoring programmes as well as random national surveys. The number of samples collected and types of food sampled varied among individual MSs. Most of the animal samples were collected at the slaughterhouse or at the farm.

### 6.3.5. *Yersinia* data

#### Humans

Notification of yersiniosis in humans is mandatory in most MSs, Liechtenstein, Norway and Switzerland, (Appendix Table YE1, information is missing from Greece, the Netherlands, Portugal and Iceland). Four MSs (Belgium, France, Italy and Spain,) have a voluntary notification system and the United Kingdom has another system. The estimated coverage of the national surveillance for yersiniosis is 25 % in Spain and this population proportion was used in the calculation of notification rates. Diagnosis of human gastrointestinal infections is generally done by culture from human stool samples.

#### Foodstuffs and animals

*Yersinia* is notifiable in food in 10 MSs (Austria, Belgium, Estonia, Germany, Italy, Latvia, the Netherlands, Slovakia, Slovenia and Spain), and in animals in six MSs (Belgium, Ireland, Latvia, Lithuania, the Netherlands and Spain) and Switzerland (Appendix Table YE1, information is missing from Bulgaria, Cyprus, the Czech Republic, Denmark, France, Greece, Hungary, Lithuania, Malta, Portugal, Romania and Switzerland for food, and from Bulgaria, Cyprus, France, Germany, Greece, Malta and Poland for animals). Primarily, domestic animals were tested. Data from 2007 to 2010 are presented in the report. The reporting of specific human pathogenic serotypes/biotypes found in food and animals is often missing and differences in sampling and analytical methods make comparison between countries difficult.

### 6.3.6 Tuberculosis data

#### Humans

The notification of tuberculosis in humans is mandatory in almost all MSs, Iceland, Liechtenstein, Norway and Switzerland, (Appendix Table TB1). Unlike other diseases, the data for tuberculosis represent the year 2009. In several of the reporting MSs, the notification system for human tuberculosis does not distinguish the tuberculosis cases caused by different species of *Mycobacterium*.

#### Animals

Tuberculosis in animals is notifiable in 25 MSs, Norway and Switzerland (Appendix Table TB1, information is missing from Bulgaria and Malta). In Cyprus, Greece, Hungary, Poland and Romania only bovine tuberculosis is notifiable, and in Ireland only in ruminant animals. Rules for intra-EU bovine trade, including requirements for cattle herds and country qualification as officially free from tuberculosis are laid down in Council Directive 64/432/EC, as last amended by Commission Decision 2007/729/EC[75]. By the end of 2010, 14 MSs (Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Luxembourg, the Netherlands, Poland, Slovakia, Slovenia and Sweden), Switzerland and Norway were officially bovine tuberculosis-free (OTF). In the United Kingdom, Scotland is OTF and in Italy, 10 provinces and six regions have now been declared OTF. An overview of the OTF status is presented in Appendix Table TB-BR1. In 2010, eradication programmes in cattle herds in Ireland, Italy, Portugal, Spain and the United Kingdom received co-financing (Commission Decision 2009/883/EC).

### 6.3.7 *Brucella* data

#### Humans

The notification of brucellosis in humans is mandatory in almost all MSs, Iceland, Liechtenstein, Norway and Switzerland (Appendix Table BR1, information is missing from Greece). Belgium, France, Italy and the Netherlands have a voluntary system, and the United Kingdom has a different surveillance system.

75 Commission Decision 2007/729/EC of 7 November 2007 amending Council Directives 64/432/EEC, 90/539/EEC, 92/35/EEC, 92/119/EEC, 93/53/EEC, 95/70/EC, 2000/75/EC, 2001/89/EC, 2002/60/EC, and Decisions 2001/618/EC and 2004/233/EC as regards lists of national reference laboratories and State institutes. OJ L 294, 13.11.2007, p. 26–35.

### Foodstuffs

The notification of presence of *Brucella* in food is mandatory in 10 MSs (Austria, Belgium, Finland, Germany, Italy, Latvia, the Netherlands, Slovenia, Spain and the United Kingdom) (Appendix Table BR1, information is missing from Bulgaria, Cyprus, the Czech Republic, Denmark, France, Greece, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia and Switzerland).

### Animals

Brucellosis in animals is notifiable in 24 MSs, Norway and Switzerland (Appendix Table BR1, information is missing from Bulgaria, Cyprus and Malta). In Ireland, only tuberculosis in ruminant animals is notifiable.

*Cattle:* Rules for intra-EU bovine trade, including requirements for cattle herds and country qualification as officially free from brucellosis are laid down in Council Directive 64/432/EC, as last amended by Commission Decision 2007/729/EC. By the end of 2010, 15 MSs (Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Ireland, Luxembourg, the Netherlands, Poland, Slovakia, Slovenia and Sweden), Norway and Switzerland, were officially free from brucellosis in cattle (OBF). OBF regions have been declared in Italy (10 regions and six provinces), Portugal (six islands of the Azores), Spain (two provinces of the Canary Islands) and in the United Kingdom (Great Britain) (Appendix Table TB-BR1). In 2010, eradication programmes in cattle herds in Cyprus, Italy, Malta, Portugal, Spain and The United Kingdom (Northern Ireland) received co-financing (Commission Decision 2009/883/EC).

*Sheep and goats:* Rules for intra-EU trade of ovine and caprine animals and country qualification as officially free from ovine and caprine brucellosis caused by *B. melitensis* (ObmF) are laid down in Council Directive 91/68/EC[76], as last amended by Council Directive 2008/73/EC[77]. By the end of 2010, 19 MSs (Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, Germany, Hungary, Ireland, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Romania, Slovakia, Slovenia, Sweden and the United Kingdom), Norway and Switzerland, were officially free from ovine and caprine brucellosis caused by *B. melitensis* (ObmF). ObmF regions have been declared in France (64 departments), Italy (10 regions and six provinces), Portugal (the Azores) and Spain (the Canary Islands) (Appendix Table TB-BR1). In 2010, eradication programmes for ovine and caprine brucellosis in Cyprus, Italy, Portugal and Spain, received co-financing (Commission Decision 2009/883/EC).

## 6.3.8 *Trichinella* data

### Humans

The notification of *Trichinella* infections in humans is mandatory in most MSs, Norway and Switzerland (Appendix Table TR2, information is missing from Denmark and Iceland). Three MSs (Belgium, France and the United Kingdom) have a voluntary surveillance system for trichinellosis. In humans, diagnosis of *Trichinella* infections is primarily based on clinical symptoms and serology (ELISA and Western Blot). Comparatively, histopathology on muscle biopsies is rarely performed.

### Foodstuffs and animals

*Trichinella* in foodstuffs is notifiable in 16 MSs and Norway, only Ireland and Switzerland report that *Trichinella* is not notifiable (Appendix Table TR2, information is missing from Bulgaria, Cyprus, the Czech Republic, Denmark, Latvia, Lithuania, Luxembourg, Malta, the Netherlands and Poland). Trichinellosis in animals is notifiable in most MSs except for Hungary (Appendix Table TR2, information is missing from Bulgaria and Malta).

Rules for testing for *Trichinella* in slaughtered animals are laid down by Commission Regulation (EC) No 2075/2005. In accordance with this regulation, all finisher pigs, sows, boar, horses, wild boar and some other wild species must be tested for *Trichinella* at slaughter. The regulation allows for the possibility that

76 Council Directive 91/68/EEC of 28 January 1991 on animal health conditions governing intra-Community trade in ovine and caprine animals. OJ L 46, 19.2.1991, p. 19–36.

77 Council Directive 2008/73/EC of 15 July 2008 simplifying procedures of listing and publishing information in the veterinary and zootechnical fields and amending Directives 64/432/EEC, 77/504/EEC, 88/407/EEC, 88/661/EEC, 89/361/EEC, 89/556/EEC, 90/426/EEC, 90/427/EEC, 90/428/EEC, 90/429/EEC, 90/539/EEC, 91/68/EEC, 91/496/EEC, 92/35/EEC, 92/65/EEC, 92/66/EEC, 92/119/EEC, 94/28/EC, 2000/75/EC, Decision 2000/258/EC and Directives 2001/89/EC, 2002/60/EC and 2005/94/EC. OJ L 219, 14.8.2008, p. 40–54 .

MSs can apply for status as a region with negligible risk of trichinellosis, and Denmark is the only MS to have been assigned this status. Some MSs reported using digestion and compression methods as described in Directive 77/96/EC[78] (see Appendix Table TR1 for more information).

### 6.3.9 *Echinococcus* data

#### Humans

The notification of echinococcosis in humans is mandatory in most MSs and Norway (Appendix Table EH2, information is missing from Italy and Iceland). Denmark and the Netherlands have no surveillance system for echinococcosis. Three MSs (Belgium, France and the United Kingdom) have a voluntary surveillance system for echinococcosis.

#### Foodstuffs and animals

*Echinococcus* is notifiable in food in 11 MSs (Austria, Belgium, Estonia, Finland, Hungary, Italy, Latvia, the Netherlands, Slovenia, Spain and Sweden) and Norway and not notifiable in food In Ireland, Slovakia and the United Kingdom (Appendix Table EH2, information is missing from Bulgaria, Cyprus, the Czech Republic, Denmark, France, Greece, Germany Lithuania, Luxembourg, Malta, Poland, Portugal, Romania and Switzerland). *Echinococcus* is notifiable in animals in 18 MSs (Austria, Belgium, Denmark, Estonia, Finland, Germany, Greece, Italia, Latvia, Lithuania, the Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom), Norway and Switzerland and not notifiable in animals in the Czech Republic, France, Hungary and Luxembourg, (Appendix Table EH2, information is missing from Bulgaria, Cyprus, Ireland, Malta and Poland).

Guidelines for the control of *E. granulosus* through meat inspection of animal carcasses for human consumption are provided through Council Directive 64/433/EC[79], whereby visual inspection of all slaughtered animals is carried out by official veterinarians examining organs and muscles intended for human consumption. Whole carcasses or organs are destroyed in cases where *Echinococcus* cysts are found. An overview of the monitoring and diagnostic methods is set out in Appendix Table EH1.

### 6.3.10 *Toxoplasma* data

#### Humans

Toxoplasmosis surveillance is compulsory in 17 MSs and voluntary in Spain, and the United Kingdom (Appendix Table TO1). The national surveillance systems cover all age groups whereas the EU level surveillance is targeted to congenital toxoplasmosis. The analysis of toxoplasmosis cases was adjusted to the EU case definition although most of the countries have reported all cases from their systems. In the United Kingdom, data for 2010 were derived directly from the *Toxoplasma* Reference Unit. In Spain, the population coverage was estimated to be 25 % and this proportion of population was used to calculate the notification rates.

#### Animals

Toxoplasmosis is a notifiable disease in Latvia, Poland and Switzerland in all animals and in Finland in all animals except hares, rabbits and rodents; no monitoring programmes are in place in these countries. In Germany, toxoplasmosis is notifiable in pigs, dogs and cats. In Austria, Denmark, and Sweden toxoplasmosis is not notifiable (Appendix Table TO1, information is missing from Belgium, Bulgaria, Cyprus, the Czech Republic, Estonia, France, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Romania, Slovakia, Slovenia, Spain and the United Kingdom).

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78 Council Directive 77/96/EEC of 21 December 1976 on the examination for trichinae (*Trichinella spiralis*) upon importation from third countries of fresh meat derived from domestic swine. OJ L 26, 31.1.1977, p. 67–77.

79 Council Directive 64/433/EC of 26 June 1964 on health problems affecting intra-Community trade in fresh meat. OJ 121, 29.7.1964, p. 2012–2032.

### 6.3.11 Rabies data

#### Humans

The notification of rabies in humans is mandatory in all MSs, Iceland Liechtenstein, Norway and Switzerland, (Appendix Table RA3). Most countries examine human cases based on blood samples or cerebrospinal fluid. However, in the case of post mortem examinations, the central nervous system is sampled. Identification is mostly based on antigen detection, isolation of virus and the mouse inoculation test (Appendix Table RA2).

#### Animals

In accordance with Council Directive 64/432/EC, rabies must be notifiable in animals in 23 MSs and Norway and Switzerland (Appendix Table RA3, information is missing from Bulgaria, Ireland, Luxembourg and Malta). In animals, most countries test samples from the central nervous system. Identification is mostly carried out using the fluorescent antibody test (FAT), which is recommended by both WHO[80] and OIE[81], and the mouse inoculation test. However, Enzyme Linked Immunosorbent Assay (ELISA), Polymerase Chain Reaction (PCR), and histology are also used (Appendix, Table RA2). Information on vaccination programmes for rabies in animals is included in Appendix Table RA1.

Austria, Belgium, the Czech Republic, Finland, France, Ireland Luxembourg and the United Kingdom, Norway (mainland) and Switzerland have declared themselves free from rabies. Cyprus, Germany, Greece, Italy, Malta, Spain (mainland and islands) and Sweden consider themselves free from rabies. See Appendix Table RA3 for more information.

### 6.3.12 Q fever data

#### Humans

The notification of Q fever in humans is mandatory in most MSs and Iceland (information is missing from Italy, Liechtenstein, and Switzerland). Four MSs (Belgium, France, Spain and the United Kingdom) have a voluntary surveillance system for Q fever in humans. Austria and Denmark have no surveillance system for Q fever.

#### Animals

*Coxiella burnetii* in animals is notifiable in 15 MSs (Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Italy, Latvia, Lithuania, the Netherlands, Poland, Slovenia, Spain and Sweden) and Switzerland. In Austria, *Coxiella burnetii* in animals is not notifiable (Appendix Table QF2, information is missing from the remaining 11 MSs and Norway).

Data reported are mostly based on suspect sampling due to an increase in abortions in the herd and identification is mostly carried out using serological testing methods as ELISA or immunofluorescence assay tests or direct identification methods as real-time PCR (Appendix Table QF1).

### 6.3.13 Tularaemia data

#### Humans

The notification of tularaemia in humans is mandatory in most MSs and Norway (information is missing from Denmark, Iceland and Liechtenstein). Two MSs (Belgium and the United Kingdom) have a voluntary surveillance system for tularaemia in humans (Appendix Table TU1).

#### Animals

Only one MS and one non-MS reported data on tularaemia in animals in 2010.

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80 WHO (World Health Organization), 1996. Laboratory Techniques in Rabies, 493 pp.

81 OIE (Organisation Mondiale de la Santé Animale - World Organisation for Animal Health), 2009. Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.

### 6.3.14 Data on other zoonoses and zoonotic agents

#### *Cysticercus* in foodstuffs and animals

Monitoring is carried out as a visual inspection (macroscopic examination) of carcasses at the slaughterhouse by meat inspection according to Regulation (EC) No 854/2004[82], or by specific serological tests.

#### Tuberculosis due to mycobacteria other than *M. bovis*

Monitoring is carried out as a visual inspection (macroscopic examination) of carcasses at the slaughterhouse by meat inspection according to Regulation (EC) No 854/2004.

### 6.3.15 Data on food-borne outbreaks

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

Information on the total number of food-borne outbreaks (including both ‘weak evidence’ and ‘strong evidence’ food-borne outbreaks) and the total number of strong food-borne outbreaks that occurred during the reporting year was provided by 24 MSs and two non-MSs. Bulgaria, Cyprus and Luxembourg did not report any outbreaks. For ‘weak evidence’ food-borne outbreaks, the causative agent, as well as the number of human cases, hospitalisations, and deaths should be reported. For the ‘strong evidence’ food-borne outbreaks, an additional table is available to collect more detailed information. Aggregated data are presented in overview tables only, as such data do not allow more detailed analysis.

## 6.4 Terms used to describe prevalence or proportion-positive values

In the report a set of standardised terms are used to characterise the proportion of positive sample units or the prevalence of zoonotic agents in animals and foodstuffs:

- Rare: <0.1 %
- Very low: 0.1 % to 1 %
- Low: >1 % to 10 %
- Moderate: >10 % to 20 %
- High: >20 % to 50 %
- Very high: >50 % to 70 %
- Extremely high: >70 %

- Majority of MSs: 60 % (in 2010 this was 16 MSs)
- Most MSs: 75 % (in 2010 this was 20 MSs)

82 Regulation (EC) No 854/2004 of the European Parliament and of the Council laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption. OJ L 139, 30.4.2004, p. 206-320.

## APPENDIX 1.

### List of Abbreviations

| Abbreviation | Definition |
|---|---|
| AFLP | Amplified Fragment Length Polymorphism |
| AHAW | EFSA'S Scientific panel dealing with Animal Health and Welfare |
| AHVLA | Animal Health and Veterinary Laboratories Agency |
| BIOHAZ | EFSA'S Scientific panel dealing with Biological Hazards |
| CFT | Complement Fixation Test |
| CFU | Colonies Forming Unit |
| CI | Confidence Interval |
| CONTAM | EFSA'S Scientific panel dealing with Contaminants in the Food Chain |
| DT | Definitive Phage Type |
| EBLV | European Bat *Lyssavirus* |
| EC | European Commission |
| ECDC | European Centre for Disease Prevention and Control |
| EEA | European Economic Area |
| EEC | European Economic Community |
| EFSA | European Food Safety Authority |
| EFTA | European Free Trade Association |
| EHEC | Enterohaemorragic *Escherichia coli* |
| ELISA | Enzyme Linked Immunosorbent Assay |
| EU | European Union |
| EUROSTAT | Statistical Office of the European Communities |
| FAT | Fluorescent Antibody Test |
| FISH | Fluorescence In Situ Hybridization |
| g | Gram |
| HACCP | Hazard Analysis and Critical Control Point |
| HUS | Haemolytic Uraemic Syndrome |
| IFAT | Indirect Fluorescent Antibody Test |
| IHC | Immunohistochemistry |
| ISO | International Organization for Standardization |
| LHT | Low Heat-Treated |
| MLST | Multi-Locus Sequence Typing |
| MLVA | Multiple-Locus Variable number tandem repeat Analysis |
| MS | Member State |
| MST | Monophasic *S*. Typhimurium |
| NRL | National Reference Laboratory |
| NT | not typeable |
| OBF | Officially Brucellosis Free specification e.g. 'as regards bovine herd' |
| ObmF | Officially *Brucella melitensis* Free specification e.g. 'as regards ovine and caprine' herds |
| OIE | World Organisation for Animal Health |
| OTF | Officially Tuberculosis Free specification e.g. 'as regards bovine herd' |
| PCR | Polymerase Chain Reaction |
| PFGE | Pulsed Field Gel Electrophoresis |
| RDNC | Reacts But Does Not Conform |
| RTE | Ready-to-eat |
| spp. | Subspecies |
| TESSy | The European Surveillance System |
| UAA | Utilised Agricultural Area |
| UHT | Ultra-High Temperature |
| VT | Verocytotoxin |
| VTEC | Verotoxigenic *Escherichia coli* |
| WHO | World Health Organization |
| ZCC | Zoonoses Collaboration Centre |

## Member States of the European Union and other reporting countries in 2010

### Member States of the European Union, 2010

| Member State | ISO Country Abbreviations |
|---|---|
| Austria | AT |
| Belgium | BE |
| Bulgaria | BG |
| Cyprus | CY |
| Czech Republic | CZ* |
| Denmark | DK |
| Estonia | EE |
| Finland | FI |
| France | FR |
| Germany | DE |
| Greece | GR |
| Hungary | HU |
| Ireland | IE |
| Italy | IT |
| Latvia | LV |
| Lithuania | LT |
| Luxembourg | LU |
| Malta | MT |
| Netherlands | NL* |
| Poland | PL |
| Portugal | PT |
| Romania | RO |
| Slovakia | SK |
| Slovenia | SI |
| Spain | ES |
| Sweden | SE |
| United Kingdom | UK* |

* In text, referred to as the Czech Republic, the Netherlands and the United Kingdom.

### Non Member States reporting in 2010

| Country | ISO Country Abbreviations |
|---|---|
| Iceland | IS |
| Liechtenstein | LI |
| Norway | NO |
| Switzerland | CH |

## APPENDIX 2.

## Tables

### *Appendix Table PO1. Human population (x100), 2007-2010*

| Country | 2010 | 2009 | 2008 | 2007 |
|---|---|---|---|---|
| Austria | 83,753 | 83,553 | 83,319 | 82,989 |
| Belgium | 108,399 | 107,500 | 106,669 | 105,845 |
| Bulgaria | 75,637 | 76,066 | 76,402 | 76,793 |
| Cyprus | 8,031 | 7,969 | 7,893 | 7,787 |
| Czech Republic | 105,068 | 104,675 | 103,811 | 102,872 |
| Denmark | 55,347 | 55,055 | 54,758 | 54,471 |
| Estonia | 13,401 | 13,404 | 13,409 | 13,424 |
| Finland | 53,514 | 53,263 | 53,005 | 52,770 |
| France | 647,163 | 643,670 | 639,829 | 633,921 |
| Germany | 818,023 | 820,024 | 822,178 | 823,149 |
| Greece | 113,051 | 112,604 | 112,138 | 111,717 |
| Hungary | 100,143 | 100,310 | 100,454 | 100,662 |
| Ireland | 44,679 | 44,500 | 44,013 | 43,125 |
| Italy | 603,403 | 600,451 | 596,193 | 591,313 |
| Latvia | 22,484 | 22,613 | 22,709 | 22,813 |
| Lithuania | 33,290 | 33,499 | 33,664 | 33,849 |
| Luxembourg | 5,021 | 4,935 | 4,838 | 4,762 |
| Malta | 4,130 | 4,136 | 4,103 | 4,078 |
| Netherlands | 165,750 | 164,858 | 164,043 | 163,580 |
| Poland | 381,673 | 381,359 | 381,156 | 381,255 |
| Portugal | 106,377 | 106,273 | 106,176 | 105,991 |
| Romania | 214,622 | 214,986 | 215,286 | 215,651 |
| Slovakia | 54,249 | 54,123 | 54,010 | 53,936 |
| Slovenia | 20,470 | 20,324 | 20,259 | 20,104 |
| Spain | 459,890 | 458,282 | 452,833 | 444,746 |
| Sweden | 93,407 | 92,563 | 91,829 | 91,133 |
| United Kingdom | 620,080 | 615,960 | 611,793 | 608,167 |
| **EU total** | **5,011,057** | **4,996,952** | **4,976,770** | **4,950,903** |
| Norway | 48,582 | 47,993 | 47,372 | 46,811 |
| Switzerland | 79,060 | 77,830 | 77,019 | 75,935 |

### *Appendix Table PO2. Animal livestock population 2010*

| Country | Cattle (bovine animals) | Ducks | *Gallus gallus* | Geese | Goats | Pigs | Sheep | Solipeds, domestic | Turkeys |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 2,013,281 | - | 65,392,095 | - | 88,798 | 3,164,898 | 414,876 | 72,269 | - |
| Belgium | 2,721,130 | - | - | - | 60,753 | 5,875,878 | 209,263 | 198,039 | - |
| Bulgaria | 1,164,920 | 1,120,987 | - | - | 1,074,379 | - | 2,429,652 | 171,231 | 37,689 |
| Cyprus | 56,180 | 0 | 881,000 | 0 | 538,823 | - | 538,823 | - | 0 |
| Czech Republic | 1,376,311 | 4,082,000 | 153,158,799 | 234,127 | 23,626 | 2,018,943 | 214,214 | 84,350 | 873,803 |
| Denmark | 1,631,863 | - | 21,993,093 | - | 25,368 | 6,657,061 | 172,580 | - | 483,237 |
| Estonia | 234,442 | - | - | - | 3,117 | 315,245 | 75,036 | 8,744 | 187 |
| Finland | 925,791 | 1,005 | 9,295,920 | 1,122 | 6,442 | 1,366,932 | 125,673 | 74,300 | 279,674 |
| France | 18,991,613 | - | - | - | - | 14,063,310 | 6,903,658 | - | - |
| Germany | 12,761,126 | - | - | - | - | 26,900,800 | - | - | - |
| Greece | 726,221 | 15,722 | 112,183,383 | 7,782 | 5,073,721 | 2,223,552 | 11,556,152 | 42,558 | 69,368 |
| Hungary | 760,081 | 5,813,000 | - | 1,384,000 | 16,840 | 2,455,172 | 988,243 | - | - |
| Ireland | 5,825,851 | - | 14,084,215 | 15,000 | 8,565 | 1,296,166 | - | - | 1,094,079 |
| Italy | 5,832,405 | - | - | - | 980,390 | 9,118,428 | 7,452,934 | - | - |
| Latvia | 379,494 | 747 | 3,977,678 | 468 | 13,492 | 323,087 | 76,810 | 12,039 | - |
| Lithuania | 685,047 | 2,438 | 29,428,900 | 2,438 | 7,343 | 656,309 | 55,249 | 13,422 | 450,300 |
| Luxembourg | 198,892 | 157 | 89,581 | 195 | 5,084 | 83,774 | 9,084 | 4,601 | 126 |
| Malta | 14,810 | - | - | - | - | 53,872 | - | - | - |
| Netherlands | 439,620 | 921,624 | 87,228,820 | - | 352,828 | 12,254,072 | 1,511,850 | - | 1,012,104 |
| Poland | 6,067,488 | 3,548,695 | 699,364,936 | 5,177,634 | 41,851 | 19,220,811 | 232,459 | 372,000 | 29,744,243 |
| Portugal | 1,580,895 | 3,559,523 | - | - | - | 2,812,000 | - | 47,600 | - |
| Romania | 2,946,181 | - | 149,270,528 | - | 2,109,782 | - | 14,929,483 | 660,733 | 394,347 |
| Slovakia | 478,442 | - | - | - | 9,305 | 565,927 | 408,299 | - | - |
| Slovenia | 470,151 | 10,069 | 4,618,223 | 2,117 | 47,985 | 395,593 | 227,041 | 19,623 | 68,850 |
| Spain | 5,833,546 | 471,248 | 280,449,081 | 9,017 | 2,798,851 | 33,682,252 | 18,375,464 | 669,070 | 7,281,042 |
| Sweden | 1,536,658 | - | 14,153,385 | - | 11,135 | 1,519,874 | 564,922 | 362,700 | 129,578 |
| United Kingdom | 10,111,687 | 2,469,866 | - | 123,013 | 92,951 | 4,460,317 | 31,084,338 | 311,314 | 3,891,888 |
| **Total** | **85,764,126** | **22,017,081** | **1,645,569,637** | **6,956,913** | **13,391,429** | **151,484,273** | **98,556,103** | **3,124,593** | **45,810,515** |
| Norway | 872,100 | - | - | - | 67,600 | 846,700 | 2,296,900 | - | 363,200 |
| Switzerland | 1,600,563 | - | - | - | 81,232 | 1,580,215 | 423,800 | 55,315 | 58,483 |

## Appendix Table PO3. Animal Slaughter populations 2010

| Country | Cattle (bovine animals) | Ducks | *Gallus gallus* | Geese | Goats | Pigs | Sheep | Solipeds, domestic | Turkeys |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 624,859 | - | 72,310,000 | - | 45,159 | 5,632,643 | 265,568 | 947 | - |
| Belgium | 837,290 | - | - | - | 7,962 | 11,924,052 | 143,196 | 8,970 | - |
| Bulgaria | - | 4,123,651 | - | - | - | - | - | 6,123 | 49,890 |
| Cyprus | - | 0 | 11,088,000 | 0 | - | - | - | - | 0 |
| Czech Republic | 277,983 | 2,388,724 | 128,689,165 | - | 756 | 3,187,752 | 11,125 | 328 | 151,548 |
| Denmark | 496,494 | - | 100,132,000 | - | 2,680 | 18,972,880 | 85,285 | 1,872 | 5,334 |
| Estonia | 47,555 | - | - | - | 321 | - | 19,786 | 8 | - |
| Finland | 264,233 | 1,764 | 55,073,707 | 5,211 | - | 2,251,788 | 35,464 | 1,452 | 957,981 |
| France | 5,059,481 | 76,202,000 | 788,712,000 | 329,000 | 821,840 | 24,930,625 | 4,428,639 | 17,085 | 56,636,000 |
| Germany | 3,755,350 | - | - | - | 23,458 | 58,413,677 | 157,203 | - | - |
| Greece | 242,858 | 40,941 | 112,202,256 | 19,368 | 3,493,040 | 1,804,625 | 6,613,919 | - | 390,433 |
| Hungary | - | - | - | - | - | - | - | - | - |
| Ireland | 1,717,996 | - | 80,464,908 | 40,000 | 235 | 2,747,017 | 2,383,132 | 8,918 | 800,644 |
| Italy | 2,577,427 | - | - | - | 17,797 | 2,456,676 | 214,079 | 6,516 | - |
| Latvia | 90,760 | - | 15,081,405 | - | 27 | 246,236 | 8,528 | 445 | - |
| Lithuania | 196,046 | - | 40,307,427 | - | - | 721,075 | 4,990 | 2,250 | 441,136 |
| Luxembourg | 26,229 | - | 172,364 | - | 284 | 141,820 | 2,258 | 63 | - |
| Malta | 5,808 | - | - | - | - | 83,795 | - | 161 | - |
| Netherlands | 2,043,100 | - | 479,101,200 | - | 108,838 | 13,993,348 | 585,876 | 2,458 | 1,200 |
| Poland | 1,612,387 | 4,365,929 | 678,531,419 | 5,452,322 | 96 | 19,730,521 | 22,507 | 45,147 | 25,704,270 |
| Portugal | 420,681 | - | 139,186,746 | - | - | 5,900,415 | - | 763 | 3,826,440 |
| Romania | 139,757 | - | 179,551,723 | - | 1,524 | 2,972,880 | 431,070 | 24,770 | - |
| Slovakia | 54,184 | - | 43,922,082 | - | 133 | 797,830 | 6,116 | 4 | 18,552 |
| Slovenia | 124,923 | - | 33,030,291 | - | 418 | 313,740 | 9,857 | 1,772 | 463,086 |
| Spain | - | - | - | - | - | - | - | - | - |
| United Kingdom | 2,699,946 | 13,173,532 | - | 411,177 | 11,226 | 9,665,736 | 14,294,653 | - | 15,574,988 |
| **Total** | **23,767,521** | **100,296,729** | **2,957,556,693** | **6,275,074** | **4,536,267** | **189,835,477** | **29,977,880** | **133,993** | **105,516,723** |
| Norway | 322,900 | - | - | - | 22,400 | 1,497,200 | 1,140,600 | 1,300 | 1,388,600 |
| Switzerland | 649,006 | - | - | - | 27,883 | 2,711,101 | 238,683 | - | - |

## *Appendix Table PO4. Animal herd and flock populations 2010*

| Country | Cattle Herd | Ducks Herd | *Gallus gallus* Flock | Geese Flock | Goats Herd | Pigs Herd | Sheep Herd | Solipeds, domestic Herd | Turkeys Flock |
|---|---|---|---|---|---|---|---|---|---|
| Austria | - | - | 6,334 | - | - | - | - | - | - |
| Belgium | - | - | 10,587 | - | - | - | - | - | 146 |
| Bulgaria | 129,454 | - | - | - | - | 68,902 | - | 125,390 | - |
| Cyprus | - | 0 | 2,171 | 0 | - | - | - | - | 0 |
| Czech Republic | - | 108 | 6,618 | 35 | - | - | - | - | 295 |
| Denmark | 20,829 | - | 578 | - | 3,624 | 8,569 | 8,629 | - | 44 |
| Estonia | 5,067 | 103 | 2,557 | 120 | 540 | 142 | 1,910 | 872 | 26 |
| Finland | - | - | - | - | - | - | - | - | - |
| France | - | - | - | - | - | - | - | - | - |
| Germany | - | - | - | - | - | - | - | - | - |
| Greece | - | 7,089 | 9,616 | 789 | - | 5,019 | - | - | 22 |
| Hungary | 17,620 | - | - | - | - | 42,514 | - | - | - |
| Ireland | - | 40 | 977 | 45 | 414 | - | 35,779 | - | 117 |
| Italy | 157,369 | 471 | 37,867 | 362 | 59,533 | 128,689 | 101,965 | 103,714 | 4,034 |
| Latvia | 36,835 | 7 | 169 | 4 | 2,855 | 2,206 | 4,294 | 6,093 | - |
| Lithuania | 104,979 | 109 | 1,296 | 109 | 3,491 | 5,043 | 4,452 | 5,481 | 41 |
| Luxembourg | 1,480 | 40 | 425 | 63 | 92 | 151 | 223 | 529 | 10 |
| Malta | 358 | - | - | - | - | 165 | - | - | - |
| Netherlands | - | - | - | - | - | - | - | - | - |
| Poland | 643,741 | 1,164 | 32,247 | 1,903 | 10,191 | 302,747 | 7,874 | 89,720 | 4,283 |
| Portugal | - | - | - | - | - | - | - | - | 1,220 |
| Romania | - | - | 8,051 | - | - | - | - | - | 73 |
| Slovakia | - | - | - | - | - | - | - | - | 47 |
| Slovenia | - | - | - | - | - | - | - | - | 112 |
| Spain | - | - | - | - | - | - | - | - | - |
| Sweden | - | - | - | - | - | - | - | - | - |
| United Kingdom | - | - | - | - | - | - | - | - | 3,327 |
| **Total** | **1,117,732** | **9,131** | **119,493** | **3,430** | **80,740** | **564,147** | **165,126** | **331,799** | **13,797** |
| Norway | - | - | - | - | - | - | - | - | - |
| Switzerland | - | - | - | - | - | - | - | - | - |

## *Appendix Table SA1. Surveillance systems on* Salmonella *in feedingstuffs, 2010*

| Country | Surveillance compulsory | Domestic raw feed material | | Imported raw feed material (EU and Non-EU countries) | |
|---|---|---|---|---|---|
| | | Animal | Vegetable | Animal | Vegetable |
| Austria | Yes | Each farm, processing plant and retailer are sampled at least twice per year | | Each farm, processing plant and retailer are samples at least twice per year | |
| Belgium | Yes | Official monitoring | | - | - |
| Bulgaria | | Official monitoring | | The samples are taken from farm, processing plant and retail on the random selection | |
| Cyprus | - | - | - | - | - |
| Czech Republic | - | - | - | - | - |
| Denmark | Yes | Targeted sampling | Targeted sampling | Targeted sampling | Targeted sampling |
| Estonia | Yes | Monitoring | Monitoring | - | - |
| Finland | Yes | Self control systems based on requirements of legislation | | Every consignment is sampled or random sampling depending on feed type | Every consignment is sampled |
| - | - | - | - | Sampling frequency depends on raw feed material and it is based on risk assessment | |
| France | Yes[1] | Official monitoring, random sampling | | None | - |
| Germany | Yes | Official surveillance, random sampling | | Samples are taken by official labs. At least 25 samples per batch | - |
| Greece | - | Targeted and routine sampling | Targeted and routine sampling | - | - |
| Hungary | - | - | - | - | - |
| Ireland | Yes | Compulsory sampling regime drawn up in accordance with Directive 1995/53/EC - both imported and domestic | | | |
| Italy | Yes | - | Official control as well as HACCP or own check by the industry | - | - |
| Latvia | Yes | Official and HACCP or own check by the industry | | Border inspections checks, official and HACCP or own check by the industry | |
| Lithuania | Yes | Official control and own check | Official control and own check | Official control and own check | Official control and own check |
| Luxembourg | - | - | - | - | - |
| Malta | - | - | - | - | - |
| Netherlands | Yes | Own check | | - | - |
| Poland | - | - | - | - | - |
| Portugal | - | - | - | - | - |
| Slovakia | - | - | - | - | - |
| Slovenia | Yes | Official target sampling and own check programme based on HACCP by the industry | | Official target sampling and own check programme based on HACCP by the industry | |
| Spain | Yes | Monitoring | Monitoring | - | - |
| Sweden | Yes | Targeted sampling/own check by industry | | Targeted sampling | |
| United Kingdom | - | Sampling of rendered material is required if the rendered material is intended for use in livestock feedingstuffs; reportable | | Tested according to a risk assessment | - |
| Norway | Yes | Own check programme based on requirements of legislation. Random sampling by the official surveillance programme | | x | x |
| Switzerland | Yes | Targeted sampling | Targeted sampling | Targeted sampling (fish meal) | Targeted sampling |

x - routinely performed
1. In France, surveillance is compulsory for feed for breeders (*Gallus gallus.*)

## *Appendix Table SA1. Surveillance systems on* Salmonella *in feedingstuffs, 2010*

| Process control | Compound feed | | | Comments |
|---|---|---|---|---|
| | Cattle | Pig | Poultry | |
| x | Each farm, processing plant and retailer are samples at least twice per year | | | Official sampling is carried out according to Directive 1976/371/EC. Analysis method: ISO 6579:2002 |
| - | x | x | x | |
| Yes | Yes | Yes | Yes | Official sampling is carried out according to Directive 1976/371/EC. Analysis method: ISO 6579:2002 |
| - | - | - | - | |
| - | - | - | - | |
| Targeted sampling | - | - | - | |
| - | Monitoring | Monitoring | Monitoring | |
| x | Self control systems based on requirements of legislation. Final products: risk-based official sampling | | | Official sampling is carried out according to Directive 1976/371/EC. Analysis method in Evira: ISO 6579:2002 with some minor modifications. |
| | - | - | - | |
| Yes[1] | Official monitoring, random sampling | | | Specific agreement for breeding poultry feed plants |
| Yes | Yes | Yes | Yes | |
| - | - | - | ISO 6571, ISO 6581 | |
| - | - | - | - | |
| - | x | x | x | |
| - | Official control as well as HACCP or own check by the industry | | | |
| HACCP by the industry | Official and HACCP by the industry | | | Official sampling is carried out according to Rules of Cabinet of Ministers No 1591 (22.12.2009.). Analysis method: LVS EN ISO 6579:2003 |
| Official control and own check | Official control and own check | Official control and own check | Official control and own check | Analysis method: LST EN ISO 6579:2003 lt |
| - | - | - | - | |
| - | - | - | - | |
| - | Routine testing | - | - | |
| - | - | - | - | |
| - | | - | | |
| - | - | - | - | |
| Official target sampling and own check programme based on HACCP by the industry | Official target sampling and own check programme based on HACCP by the industry | | | |
| - | Monitoring | Monitoring | Monitoring | |
| HACCP sampling prescribed by law[2] and official targeted control | - | - | - | |
| Codes of practice for control is applied as part of the HACCP process | Yes | Yes | Yes | |
| Own check programme based on HACCP by the industry | All complete feedingstuffs must be subject to heat treatment[3] | | | Official sampling according to Directive 1976/371/EC |
| Self control and official target sampling | Yes | Yes | Yes | |

2. In Sweden, at feed mills producing feedingstuffs for poultry a minimum of five samples per week is collected; at feed mills producing feedingstuffs for ruminants, pigs or horses a minimum of two samples per week is collected.
3. In Norway, establishments producing feed are required to establish own check programme based on HACCP. In addition, random samples are collected through an official surveillance programme.
x - routinely performed.

***Appendix Table SA2.* Salmonella *surveillance programmes in poultry breeders* (Gallus gallus)*, 2010***

| **Countries, running an approved monitoring and control programme[1,2] meeting at least the minimum sampling requirements set out by Regulation (EC) No 2160/2003** | | | |
|---|---|---|---|
| MSs with approved surveillance programme (Decision 2006/759/EC) | | All MSs except LU | |
| Non-MS with approved surveillance programmes (ESA[3] Decision No 364/07/COL) | | NO | |
| MSs with EU co-financing (Decision 2009/883/EC as amended by Decision 2010/732/EC) | | 25 MSs except FI, SE | |
| Countries with additional sampling (see Appendix Table SA3) | | AT, DK, FR, NL, SE, UK | |
| MS with no production of poultry breeders | | LU | |
| **Minimum requirement according to Regulation (EC) No 2160/2003** | | | |
| **Rearing period** | | **Production period** | |
| Day old chicks | Dead chickens/destroyed chickens. Samples from the inside of the delivery boxes (internal lining/paper/crate material) | Every 2 or 3 weeks | Hatcher basket liners, swab samples or egg shells/5 pairs of sock samples or 1 pair of sock samples and one dust sample |
| $4^{th}$ week | Faecal samples | At farm: two or three times during production cycle. At hatchery: every $16^{th}$ week | Official sampling instead of above mentioned sampling |
| 2 weeks before moving | Faecal samples | | |
| **Diagnostic methods used** | | | |
| ISO 6579:2002 | BE, BG, CZ, EE, GR, IT, NO, PL, SK, NL, SE | | |
| Modified ISO 6579:2002 | AT, DK, LV, UK | | |
| ISO 6579:2002/Amendment 1:2007 | ES, FI, LV, SI | | |
| AFNOR[4] NF U 47 100 and 47 101 | FR | | |

1. Regulation (EC) 1003/2005 sets the community targets for the reduction of the prevalence of certain *Salmonella* types in breeding flocks of *Gallus gallus*, and sets the testing scheme to verify the achievement of the Community targets for *S*. Enteritidis, *S*. Hadar, *S*. Infantis, *S*. Typhimurium and *S*. Virchow.
2. Non-MSs (EFTA members) must apply the EU legislation according to Decision of the EEA Joint Committee No 101/2006.
3. EFTA Surveillance Authority.
4. Association Française de normalisation.

***Appendix Table SA3.* Salmonella *monitoring programmes in poultry breeders* (Gallus gallus)*, 2010 – additional sampling***

| Country | Rearing period | | Production period | |
|---|---|---|---|---|
| Austria | At week 4, 12 and before laying start | Faecal samples or boot swaps | Every 4 weeks | Faecal samples or boot swabs |
| Denmark | Week 1, 2 and 8 | Faecal samples | Every week | Faecal samples |
| | | | Hatcheries: after each hatch when sampling according to Directive 1992/117/EC is not carried out | Wet dust samples |
| | | | 0-4 weeks before moving, 8-0 weeks before slaughter | Faecal samples |
| France | Day old chicks, 4 weeks and 2 weeks before transfert | Faecal samples and chiffs | Every two weeks at hatchery | 5 Hatch tray layers or 250 g of shells or swabs |
| | | | At farm: before 24 weeks of age, at 34, 42, 50 weeks of age, and finally 8 weeks before slaughter (meat production line); before 24 weeks of age, at 38, 54 weeks of age and finally 8 weeks before slaughter (egg production line) | Faecal samples and swabs |
| Netherlands | Max. 21 days before transfer | Cloacal swabs | From 20 weeks every 4 weeks | Cloacal swabs, 6x25/flock |
| | | | Hatchery | Fluff samples (25 g)/hatching entity |
| Netherlands | 4 weeks | Cloacal swabs | From 20 - 24 weeks and every 9 weeks | |
| | Max. 21 days before transfer | Cloacal swabs | No vaccination | Blood samples[1] |
| | | | Vaccination: | |
| | | | From week 26 and on | Fluff samples, every hatch, every machine |
| United Kingdom | | | Additional operator sampling at hatchery - every hatch | Fluff, dust, meconium, chicks, etc. |

1. Sample size depends on flock size.

## *Appendix Table SA4. Control measures[1] taken in poultry breeder flocks in case of Salmonella infection, 2010*

| Control measures | | Countries |
|---|---|---|
| **Serovars covered** | | |
| | All Serovars | DK, FI, SE, NO, NL, LT |
| | *S.* Enteritidis and *S.* Typhimurium | BG, CZ, DE, IE, IT, LV, ES, UK |
| | *S.* Enteritidis, *S.* Typhimurium, *S.* Hadar, *S.* Virchow, *S.* Infantis | AT, BE, CH, EE, ES, FR, RO, SI, SK |
| **Restrictions on the flock** | | |
| | After confirmation of *Salmonella* infection | CH, ES, NL, PL, IT, SK |
| | Immediately following suspicion of *Salmonella* | AT, BE, BG, CZ, DK, EE, FI, FR, IE, LV, NO, RO, SI, SE, UK |
| | Chicks already delivered covered by restrictions | NO |
| **Consequence for the flock** | | |
| | Slaughter | BE, EE, ES, GR, IE, PL, SK, UK[2], IT |
| | Restrictions for the delivery of hatching eggs | AT[3], BE[4], BG, CZ, EE, ES, FI, LV, NO, NL, DK[3], PL[4], SI, SK, FR, IT, FI, RO, UK[4] |
| | Slaughter and heat treatment | CZ, DK, DE, FI, FR, LV, LT, NL[5], NO, SI[6] |
| | Destruction | AT, CH, CZ, FI, RO, SE, SI[6] |
| **Other consequences** | | |
| | Feedingstuffs are restricted (heat treatment or destruction) | DK, EE, FR, NO, SE, SI[7] |
| | Disposal of manure restricted | DK, EE, FR, FI, NO, LV, SE, UK, PL, SI, SK |
| **Cleaning and disinfection** | | |
| | Obligatory | AT, BE, BG, CH, CZ, DK, EE, ES, FR, FI, SE, IE, IT, LT, LV, NO, NL, PL, RO, SI, SK, UK |
| | Negative bacteriological result required before restocking | AT, BE, BG, CH, CZ, DK, EE, ES, FR, FI, IE, IT, LT, LV, NO, NL, RO, SI, SE, UK |
| | Requirement of an empty period | AT (14 days), EE (3 weeks), ES (12 days after disinfection), FR (less than 30 days), N0 (30 days after disinfection), IT (30 days after disinfection) |
| **Further investigations** | | |
| | Epidemiological investigation is always started | BE, CZ, DK, EE, ES, FI, FR, IE, IT, LV, NO, NL, RO,SK, SE, SI, UK |
| | Feed suppliers are always included in the investigation | CZ, DK, FI, NO, SE, IE, NL, UK, SI, SK, LV |
| | Contact herds are included in the investigation | CZ, DK, FI, FR, IE, NO, NL, SE, SI, UK, LV |
| **Vaccination** | | |
| | Mandatory | AT (only for *S.* Enteritidis), BE, CZ |
| | Recommended | RO[8] |
| | Permitted | BG, CY, EE[9], ES[10], IT, LT, LV, SI, SK, UK |
| | Prohibited | CH, DK, FI, FR[11], NO, SE |

1. Minimum control measures are set out in Regulation (EC) 2160/2003, annex II (C).
2. In the United Kingdom, only flocks that are positive for *S.* Enteritidis or *S.* Typhimurium are compulsorily slaughtered.
3. Destruction of the hatching eggs.
4. Destruction of incubated eggs, not yet incubated eggs may be pasteurised.
5. In the Netherlands, only flocks that are positive for *S.* Enteritidis or *S.* Typhimurium are obligatory slaughtered.
6. In Slovenia, only flocks that are positive for *S.* Enteritidis or *S.* Typhimurium are obligatory slaughtered or destroyed.
7. In case of detection of *S.* Enteritidis, *S.* Typhimurium, *S.* Hadar, *S.* Virchow, *S.* Infantis in feedingstuffs.
8. In Romania vaccination against *Salmonella* could only be performed based on the County Sanitary Veterinary and Food Safety Directorate approval.
9. In Estonia, vaccination against *Salmonella* could only be performed based on the Veterinary and Food Board approval.
10. In Spain vaccination against the relevant *Salmonella* type is mandatory in meat production line breeder flocks entering in a house, where a flock was previously positive for the given *Salmonella* type.
11. In France, vaccination is prohibited in breeding flocks for the egg production line and selection meat line breeders.

## *Appendix Table SA5a.* Salmonella *monitoring programmes in laying hens* (Gallus gallus) *producing table eggs, 2010*

| Countries running an approved monitoring and control programme[1] according to Regulation (EC) No 2160/2003 and meeting at least the minimum sampling requirements set out by Regulation (EC) No 1168/2006[2] | | | |
|---|---|---|---|
| MSs with approved surveillance programme (Decision 2007/848/EC) | | All MSs | |
| Non-MS with approved surveillance programmes (ESA[3] Decision No 364/07/COL) | | NO | |
| MSs with EU co-financing (Decision 2009/883/EC as amended by Decision 2010/732/EC) | | 21 MSs except DK, FI, IE, LT, MT, SE | |
| Countries with additional sampling (see Appendix Table SA5a) | | AT, DK, EE, FR, LT, NL, PL, SK, UK | |
| **Minimum requirement according to Regulation (EC) No 2160/2003 as ammended by Regulation (EC) No 1168/2006** | | | |
| **Rearing period** | | **Production period[4]** | |
| Day old chicks | Samples from the inside of the delivery boxes (internal lining/paper/crate material) | Week 24 ± 2 weeks | Feacal samples or boot swabs |
| 2 weeks before moving | Faecal samples or boot swabs | At least every 15th week thereafter | Feacal samples or boot swabs |
| **Diagnostic methods used** | | | |
| ISO 6579:2002 | | AT, BG, CZ, EE, GR, IT, NO, PL, SE, SI[5], SK | |
| ISO 6579:2002/Amendment 1:2007 | | BE, FI, ES, LU, LV, RO, UK | |
| AFNOR[6] NF 47 100 and 47 101 | | FR | |
| Buffered Peptone water | | PT | |
| Various bacteriological | | DK, LT, UK | |
| No information | | CY, DE, HU, IE, MT | |

1. Non-MSs (EFTA members) must apply the EU legislation according to Decision of the EEA Joint Committee No 101/2006.
2. Regulation (EC) 1168/2006 sets the Community targets for the reduction of the prevalence of certain *Salmonella* types in laying hen flocks of *Gallus gallus* and sets the testing scheme to verify the achievement of the Community targets for *S.* Enteritidis and *S.* Typhimurium.
3. EFTA Surveillance Authority.
4. Once a year, the competent authority sample one flock per holding comprising at least 1,000 birds.
5. ISO 6579:2002, Annex D:2007.
6. Association Française de normalisation.

## *Appendix Table SA5b.* Salmonella *monitoring programmes in laying hens* (Gallus gallus) producing table eggs, 2010 – additional sampling

| Day old chicks | | Rearing period | | Production period | |
|---|---|---|---|---|---|
| **Type of sample** | | | | | |
| Meconium | AT, EE, PL, SK | Faecal samples | DK[1, 2], LT, SK | Blood samples | NL[1] |
| | | Dust samples | FR, UK[3] | Egg samples | DK[2] |
| | | Blood samples | DK[1, 2], NL[1] | Faecal samples collected more frequently than every 15th week | DK, IE, LT, SK |

1. Sample size depends on flock size.
2. All flocks are sampled. Serological test of 60 eggs.
3. Additional dust samples taken by large proportion of UK producers on a voluntary basis before start of lay.

### *Appendix Table SA6. Control measures[1] taken in laying hens (Gallus gallus) producing table eggs in case of Salmonella infections, 2010*

| Control measures | Countries |
|---|---|
| **Serovars covered** | |
| All Serovars | AT[2], DK, FI, NO, LT, LU, SE[3] |
| *S.* Enteritidis and *S.* Typhimurium | AT, BE, BG, CH, CZ, EE, ES, LV, NL, IE, PL, RO, SK, SI, UK[4] |
| **Restrictions on the flock** | |
| Immediately following suspicion | AT, BE, BG, CZ, DK, EE, FI, FR, IE, LV, NO, NL, PL, RO, SI, SE |
| Eggs covered by restrictions already on the basis of suspicion | AT, BE, DK, FI, FR, IE, LV, NO, NL, PL, RO, SE, SI |
| **Consequence for the flock** | |
| Recovery or slaughter | |
| Slaughtered | ES, GR, IE, LU, PL, RO, SK |
| Flocks destroyed | LT |
| Sanitary slaughter | AT, BE, DK, FR |
| Destruction | CY, SE |
| Slaughter or destruction | BG, CH, EE |
| Sanitary slaughter or destruction | SI |
| Slaughter and heat treatment or destruction | AT, CZ, FI, LV, NO, SI |
| Treatment with antibiotics | PL |
| **Consequence for the table eggs[1]** | |
| Destruction | BG, CY, EE, SE[5] |
| Heat treatment | AT, BE, CH, CZ, DK, FI, IE[6], LT, NL[6], RO, SE[7] |
| Destruction or heat treatment | ES, FI, FR, LU, LV, NO, PL, SK, SI, UK |
| **Other consequences** | |
| Feedingstuffs are restricted (heat treatment or destruction) | DK, EE, LU, NO, SI[8], SE |
| Disposal of manure restricted | EE, FI, FR, NO, PL, SK, SI, SE |
| **Cleaning and disinfection** | |
| Obligatory | AT, BE, BG, CH, EE, FR, FI, DK, IE, LT, LU, LV, NO, NL, PL, RO, SK, SI, SE |
| Negative bacteriological result required before restocking | AT, BE, BG, CH, DK, ES, FR, FI, IE, LV, NO, NL, RO, SI, SE |
| Requirement of an empty period | AT (14 days), DK, EE (21 days), LU (21 days), NO (30 days) |

Table continued overleaf

***Appendix Table SA6 (continued). Control measures[1] taken in laying hens (Gallus gallus) producing table eggs in case of Salmonella infections, 2010***

| Control measures | Countries |
|---|---|
| **Further investigations** | |
| Epidemiological investigation is always started | BE, EE, ES, FR, FI, IE, LU, LV, NO, NL, RO, SE, UK, SI |
| Feed suppliers are always included in the investigation | AT, EE, FI, IE, LU, LV,NO, NL, SE, SI |
| Contact herds are included in the investigation | AT, EE, FI, FR, IE, LU, LV, NO, NL, SE, SI |
| Intensification of the examination of non-infected flocks on the same farm | AT, DK, FI, FR, IE, LU, LV, NO, NL, SE, SI |
| **Vaccination** | |
| Mandatory | AT[9], BE[10], CZ, HU |
| Recommended | BE[10] |
| Permitted | BG, DK[11], EE[12], ES[13], FR, LT, LV, RO[14], SK, SI, UK |
| Prohibited | CH, FI, NO, SE |

Note: No measures are fixed in Directive 2003/99/EC.
1. Minimum control measures are set out in Regulation (EC) 2160/2003, annex II (D). By 1st January 2009, eggs originating from flocks with unknown health status, that are suspected of being infected or from infected flocks may be used for human consumption only if treated in a manner that guarantees the elimination of all *Salmonella* serotypes with public health significance in accordance with Community legislation on food hygiene.
2. In Austria, all serovars are covered in case of food-borne outbreaks.
3. In Sweden, for invasive serovars and non-invasive serovars different control strategies may be applied.
4. In the United Kingdom, all isolations of *Salmonella* must be reported.
5. Invasive *Salmonella.*
6. Eggs are pasteurised until the flock is destroyed.
7. Non-invasive *Salmonella.*
8. In Slovenia, cases of detection of *S*. Enteritidis or *S*. Typhimurium in feedingstuffs.
9. In Austria, vaccination against *S*. Enteritidis mandatory since 2009.
10. In Belgium, vaccination against *S*. Enteritidis is mandatory and vaccination against *S*. Typhimurium is recommended.
11. In Denmark, no vaccination occurs, as no vaccines have been approved by the Danish Veterinary and Food Administration.
12. In Estonia, vaccination against *Salmonella* could only be performed based on the Veterinary and Food Board approval.
13. In Spain, only in rearing period.
14. In Romania, vaccination against *Salmonella* could only be performed based on the the County Sanitary Veterinary and Food Safety Directorate approval.

### *Appendix Table SA7a.* Salmonella *monitoring programmes in broiler flocks* (Gallus gallus), *2010*

| Countries running an approved monitoring and control programme[1] according to Regulation (EC) No 2160/2003 and meeting at least the minimum sampling requirements set out by Regulation (EC) No 646/2007[2] | | |
|---|---|---|
| MSs with approved surveillance programme (Decision 2008/815/EC) | | All MSs |
| Non-MS with approved surveillance programmes (ESA[3] Decision No 364/07/COL) | | NO |
| MSs with EU co-financing (Decision 2009/883/EC as amended by decision 2010/273/EU) | | All MSs except FI, LT, SE |
| Countries with additional sampling | | DK[4] |
| **Minimum requirement according to Regulation (EC) No 2160/2003 as ammended by Regulation (EC) No 646/2007** | | |
| **Rearing period[5]** | | |
| Within 3 weeks of slaughter | At least two pairs of boot/sock swabs pooled into one sample[6] | |
| **Diagnostic methods used** | | |
| ISO 6579:2002 | | CZ, EE, ES, FI, FR, GR, IT, NO, PL, SE (faecal samples), SK, UK |
| Modified ISO 6579, Annex D | | LU |
| Modified ISO 6579:2002 | | AT, CH, DE, SI |
| ISO 6579:2002/Amendment 1:2007 | | BE, ES, FI (Flocks), LV (Flocks), RO |
| Bacteriological culture | | DK, LT, UK, IE |
| ISO 6579:2002/Annex D:2007 | | SI |

1. Non-MSs (EFTA members) must apply the EU legislation according to Decision of the EEA Joint Committee No 101/2006.
2. Regulation (EC) 646/2007 sets the Community targets for the reduction of the prevalence of certain *Salmonella* types in broiler flocks and sets the testing scheme to verify the achievement of the Community targets for *S*. Enteritidis and *S*. Typhimurium.
3. EFTA Surveillance Authority.
4. In Denmark, all flocks are tested twice during rearing at 15-21 days and 7-10 days before slaughter.
5. Once a year, the competent authority sample at least one flock on 10 % of holdings comprising at more than 5,000 birds.
6. Two pairs of boot/sock swabs might be replaced by one pair of boot/sock swabs and one sample of dust collected in multiple places in the broiler house.

### *Appendix Table SA7b.* **Salmonella** *monitoring programmes in broiler meat products, 2010*

| Slaughterhouse and cutting plant | | Processing plants | | At retail | |
|---|---|---|---|---|---|
| **Type of sample** | | | | | |
| Neck skin samples | AT, BE, CZ, DK, EE, IE, LV, LT, RO, SE, SI, UK[1] | Depend on survey or own-control plans | DK, SE | Depend on survey or own-control plans | DK, SE, UK |
| Breast skin samplezs | NL | Fresh meat, minced meat, final products | AT, BE, EE, LT, LV | Fresh meat and/or, final products | AT, BE, EE, LT, LV |
| Carcass swabs | IE | Carcass, fresh meat, final products | IE | Fresh meat | NL, SI |
| At cutting plants: Crushed meat samples | DE, EE[2], FI[2], SE[2] | Final product | CZ, DE, IE | Final product | CZ, DE, IE |
| | | | | Meat preparations, meat products,minced meat | SI[3] |
| **Frequency of sampling** | | | | | |
| Weekly | CZ, DK[7], SI | Weekly | BE, CZ | Monitoring | DE[4], IE, NL |
| Every 2 weeks | IE | Surveys or own-control | DK, SE | Survey or own-control | DK, SE |
| Random | BE | Random and continuous | AT, EE | Random and continuous | AT, CZ, EE, IE, SI |
| Random and continuous | AT, EE, FI | Continuous | IE, LV | Continuous | LV, UK |
| Systematic and continuous | SE | Twice a year | IE | Weekly | BE |
| Continuous | LV | Random or routine, depend on programme | LT | | |
| Each flock | IE, LT | | | | |
| Each flock/batch | IT, NL, UK | | | | |
| **Diagnostic methods** | | | | | |
| ISO 6579 (2002) | | CZ, EE, ES, FI, FR, GR, NO, PL, SK, UK | | | |
| Modified ISO 6579 (2002) | | AT, DE, SI | | | |
| ISO 6579 (2002)/Amendment 1:2007 | | BE, ES, LU, RO | | | |
| NMKL No 71:1999 | | FI, SE (meat samples) | | | |
| Bacteriological culture | | DK, LT, UK, IE | | | |
| Method in accordance with the OIE manual, 5th ed., 2004 | | SI | | | |
| **Countries with no official monitoring** | | | | | |
| | | CZ, ES, IT[5], LU, PT[6], UK[1] | | | |

1. Voluntary operator monitoring in the United Kingdom. All isolations of *Salmonella* must be reported.
2. Number of samples depend on flock size or slaughterhouse/cutting plant capacity.
3. Voluntary operator monitoring.
4. In Germany, the food surveillance covers all level off the food chain.
5. In Italy, a monitoring programme is running in the Veneto Region.
6. In Portugal, a surveillance programme is running in the Beira Lotoral Region.
7. If the slaughterhouse only slaughter ante mortem negative flocks or if daily sampling are not performed.

## *Appendix Table SA8. Measures taken in broilers* (Gallus gallus) *in case of* Salmonella *infections, 2010*

| Control measures | | Countries |
|---|---|---|
| **Serovars covered** | | |
| | All Serovars | BE, DK, FI, LT, LU, NO, NL, SE[1] |
| | *S.* Enteritidis and *S.* Typhimurium | AT, BG, CH, EE, ES, FR[2], IE, LV, RO, SI, SK, UK[3] |
| **Restrictions on the flock** | | |
| | Immediately following suspicion | DK, EE, FI, FR, LU, NO, NL, RO, SI, SE |
| **Consequence for the flock** | | |
| | Slaughter | SK |
| | Slaughtered and heat treated | CH, DK, FI, LT, LU, LV, SI |
| | Slaughtered and heat treated or destruction | NO |
| | Sanitary slaughter | AT, BE, IE, NL, UK |
| | Destruction | FI, FR, LV, SE |
| | Slaughter or destruction | BG, EE, IE, SK, UK |
| **Other consequence** | | |
| | Feedingstuffs are restricted (heat treatment or destruction) | EE, LU, NO, SE |
| | Disposal of manure restricted | DK, EE, FI, NO, SK, SI, SE |
| **Cleaning and disinfection** | | |
| | Obligatory | AT, BE, BG, CH, DK, EE, ES, FI, FR, LT, LV, NO, NL, SI, SE, ES, FR, SE |
| | Negative bacteriological result required before restocking | AT, BE, BG, CH, CZ, DK, EE, ES, FI, FR, LU, NL, NO, RO, SI, SE |
| | Requirement of an empty period | AT (14 days), EE (21 days), LU (21 days), NO (30 days after disinfection), DK, ES (12 days) |
| **Further investigations** | | |
| | Epidemiological investigation is always started | CZ, DK, EE, ES, FI, FR, IE, LU, NO, SE, SK, UK |
| | Feed suppliers are always included in the investigation | AT, DK, EE, FI, IE, LU, NO, NL, SE |
| | Contact herds are included in the investigation | DK, EE, FI, FR, LU, NO, SE |
| | Breeding flock that contributed to the hatch will be traced | AT, DK, FI, FR, IE, LU, NO, NL, UK, SE |
| **Vaccination** | | |
| | Permitted | AT, CZ, EE[4], FR, LT, LU, LV, SI, SK, UK |
| | Vaccine not registered | AT, BE, ES |
| | Prohibited | CH, DK, FI, NO, SE |

Note: No measures fixed in Directive 2003/99/EC.
1. In Sweden, for invasive serovars and non-invasive serovars different control strategies may be applied but are not used in practice.
2. In France, all isolation of *Salmonella* spp. must be reported.
3. In the United Kingdom, all isolations of *Salmonella* must be reported.
4. In Estonia, vaccination against Salmonella could only be performed based on the Veterinary and Food Board approval.

### *Appendix Table SA9.* Salmonella *monitoring programmes in turkey breeders, 2010*

| Day old chicks | | Rearing period | | | Production period | | |
|---|---|---|---|---|---|---|---|
| **Sampling scheme following the provisions of Directive 1992/117/EC** | | | | | | | |
| Samples from the inside of the delivery boxes (internal lining/paper/crate material) | FI, NO, PL, SK, LT | At age of 4 weeks and 2 weeks before moving | Faecal samples | FI, NO, PL, SK, LT | Official sampling every 8 weeks | Meconium samples at the hatchery | PL, SK |
| Meconium | SE | At age of 4 weeks and 2 weeks before moving | 2 pairs of sock samples | FI, SE | At hatchery: every 2 weeks; At holding: every 2 weeks | Samples from the underlying papers of hatching baskets. 1 pair of sock sample and one dust sample. | FI |
| Dead chickens/destroyed chickens | PL, SK, LT | | | | Every 2 weeks | Faecal samples | LT |
| | | | | | Every 2 weeks | 5 pair of sock samples | NO, SE |
| | | | | | Offical sampling 3 times during production period | 5 pair of sock samples | NO, SE |
| | | | | | Every 2 weeks | Dead chickens | PL, SK |
| **Other sampling schemes** | | | | | | | |
| Internal lining papers of delivery boxes | FR | | Swabs/ faeces | FR, NL | | Swabs/faeces | FR, NL |
| Sample scheme approved by EU (Decision 96/389/EC) | IE | Every 4 weeks | Chicks, dust swab | FR | Every 4 weeks | On farm: Chicks, dust swab | FR |
| Samples from the lorry and 1 week after arrival: Wooswool samples | NL | Sample scheme approved by EU (Decision 96/389/EC) | | IE | Sample scheme approved by EU (Decision 96/389/EC) | | IE |
| | | | | | Hatchery, every hatch, every machine | Fluff samples | NL |
| | | | | | Every 4 weeks | At hatchery: Environmental swab | FR |
| | | | | | Hatchery | Samples of imported eggs | AT |
| **Diagnostic methods used** | | | | | | | |
| ISO 6579:2002 | | CZ, NO, PL, SE | | | | | |
| ISO 6579:2002/Amendment 1:2007 | | FI | | | | | |
| **Countries not providing detailed information about monitoring programmes** | | | | | | | |
| No information available | | CY, FR, DE, GR, HU, IE, LT, LU, MT, PT, ES | | | | | |
| No official surveillance programme | | BG, CZ, IT, NL, UK[1] | | | | | |
| No turkey breeder flocks present | | AT, BE, DK, EE, LV, SI | | | | | |

1. In the United Kingdom monitoring programmes are voluntary. Farmers producing breeders are encouraged to monitor in the same way as for *Gallus gallus* under Regulation (EC) No 2160/2003. All isolations of *Salmonella* must be reported.

## *Appendix Table SA10.* Salmonella *monitoring programmes in turkeys, turkey meat and meat products, 2010*

| Day old chicks | | Rearing period and before slaughter | | At slaughter and at cutting plants | | Processing plants | | Turkey meat and meat products at retail | |
|---|---|---|---|---|---|---|---|---|---|
| **Type of sample** | | | | | | | | | |
| Dust samples | IE | Faecal samples/boot swabs | AT, DK, FI, FR, NO, NL, RO, SE, SK, SI | Fresh meat | AT, SI | Crushed meat | SE[1] | Fresh meat, meat preparations, meat products, minced meat | |
| Chicks | NL | Dust samples | FR | | | Fresh meat, minced meat, final products | AT, IE, LV, LT | Fresh meat, final products | EE, LV, LT |
| Sampling based on the directive | PL | Sampling based on the directive | PL | Neck skin samples | AT[1], LT, SE[1] | | | Final product | CZ, DE, IE |
| | | - | | Dependent on survey | UK | Final product | IE, DE[3] | Depend on survey | DK, SE, UK |
| | | | | Carcasses | AT | Depend on survey | DK, UK | Fresh meat, meat preparations | DE[4] |
| | | | | Cloacal swabs and caecum | IT | | | | |
| | | | | Crushed meat | FI[1, 2] | | | | |
| **Frequency of sampling** | | | | | | | | | |
| Every two months | IE | 1 - 3 weeks before slaughter | AT, DK, FI, NO, PL, SK, SI | Every Batch | SE | Twice yearly | IE | Surveys | DK |
| | | Max 4 weeks before slaughter | NL | Random and continuos | FI | Surveys | DK, UK | Random and continuous | CZ, EE, SI |
| | | 2 weeks before slaughter | SE | Continuous | AT | Continuous | AT, IE, LV, SE | Continuous | IE, LV |
| | | | | Monthly | SI | Random or routine, depend on programme | LT | Monitoring | DE, UK, LT |
| | | | | Every flock | LT | | | | |
| | | | | | | | | | |

Table continued overleaf.

**Appendix Table SA10 (continued). Salmonella monitoring programmes in turkeys, turkey meat and meat products, 2010**

| Day old chicks | Rearing period and before slaughter | At slaughter and at cutting plants | Processing plants | Turkey meat and meat products at retail |
|---|---|---|---|---|
| **Diagnostic methods used** | | | | |
| ISO 6579:2002 | CZ, EE, FI, FR, IT, LT, LV, NO, PL, SE (faecal samples), SI, UK | | | |
| NMKL No 71:1999 | FI, SE (meat samples) | | | |
| Modified ISO 6579:2002 | AT, DE, IT | | | |
| ISO 6579:2002/Amendment 1:2007 | FI (Flocks), RO | | | |
| Depend on the laboratory and/or survey | DK | | | |
| Bacteriological culture | IE | | | |
| **Countries not providing detailed information about monitoring programmes** | | | | |
| No information available | AT, CY, DE, GR, HU, LT, LU, MT, PT, SK, ES | | | |
| No official surveillance programme | BE, BG, CZ, IT, UK[5] | | | |
| No turkey production flocks present | EE, LV | | | |

1. Sample size and frequency depend on slaughterhouse and cutting plant capacity.
2. Crushed fresh meat from cleaning tools, tables etc.; similar approach for ducks, geese and guinea fowl.
3. In Germany, the food surveillance covers all level of the food chain.
4. One year national monitoring programme.
5. Monitoring programme in the United Kingdom is voluntary. All isolations of *Salmonella* must be reported.

***Appendix Table SA10a. Measures taken in turkey in case of* Salmonella *infections, 2010***

| Control measures | Countries |
|---|---|
| **Serovars covered** | |
| All Serovars | DK, FI, NO, SE |
| *S.* Enteritidis and *S.* Typhimurium | CZ, FR, PL, PT, RO, SI, UK |
| **Restrictions on the flock** | |
| Immediately following suspicion | CZ, FI, NO, PL, RO, SI |
| **Consequence for the flock** | |
| Slaughter | PL, RO, SK, UK |
| Slaughtered and heat treated | FI, FR[5], SI |
| Slaughtered and heat treated or destruction | NO |
| Sanitary slaughter | BE, DK, FI |
| Destruction | SE, UK[7] |
| Slaughter or destruction | CZ, PL, SI |
| **Other consequence** | |
| Feedingstuffs are restricted (heat treatment or destruction) | FI, NO, PL[6] |
| Disposal of manure restricted | CZ, NO, PL, SK, SI |
| **Cleaning and disinfection** | |
| Obligatory | BE, CZ, DK, FI, FR, NO, PL, PT, RO, SK, SI, SE, UK |
| Negative bacteriological result required before restocking | BE, CZ, DK, FI, NO, SK, SI, SE, UK |
| Requirement of an empty period | NO |
| **Further investigations** | |
| Epidemiological investigation is always started | CZ[2], FI, NO, PL, SE, UK |
| Feed suppliers are always included in the investigation | FI, NO |
| Contact herds are included in the investigation | FI, NO |
| Breeding flock that contributed to the hatch will be traced | NO |
| **Vaccination** | |
| Permitted | CZ[1], ES, FR[3], SI, UK |
| Vaccine not registered | |
| Prohibited | DK, FI, FR[4], NO |

1. In the Czech Republic, vaccination of breeding and fattening turkeys is mandatory.
2. In the Czech Republic, epidemiological investigation is performed in the case of positive official samples and positive confirmatory examination for *S.* Enteritidis and/or *S.*Tyhimurium.
3. In France, vaccination of parent flocks is authorised with inactivated vaccines only.
4. In France, vaccination of elite flocks is forbidden.
5. In France, carcasses are heat-treated if *Salmonella* is identified in muscle.
6. In Poland, in case of positive resuts in feed samples.
7. In the UK, eggs from positive flocks must be removed from hatchery and destroyed.

### *Appendix Table SA11.* Salmonella *monitoring programmes in duck breeders, 2010*

| Day old chicks | | Rearing period | | | Production period | | |
|---|---|---|---|---|---|---|---|
| **Sampling scheme following the provisions of Directive 1992/117/EC** | | | | | | | |
| Dead chickens | PL, SK, LT | At age of 4 weeks and 2 weeks before moving | Faecal samples | NO, PL, SK, LT, SE | Every 2 weeks | Dead chickens | PL, SK |
| Samples from the internal linings of the delivery boxes | NO, PL, SK, LT | | | | Every 2 weeks | Sock samples | NO, SE |
| Meconium | SE | | | | Every 2 weeks | Faecal samples | LT |
| Each flock is sampled six times a year in accordance with plan approved by Decision 96/389/EC | IE | | Each flock is sampled six times a year in accordance with plan approved by Decision 96/389/EC | IE | Official sampling - 3 times during the production period | | NO, SE |
| | | | | | Official sampling every 8 weeks | Meconium samples at the hatchery | PL, SK |
| **Other schemes** | | | | | | | |
| Internal lining papers of delivery boxes | FR | At 2, 10 weeks and 2 weeks before moving | On farm: Faecal and litter samples, dust swab | FR[1] | Every 2 month | On farm: Faecal and litter samples, dust swab | FR[1] |
| | | | | | | In hatchery: Environmental swab | FR[2] |
| | | | | | | | |
| **Diagnostic methods used** | | | | | | | |
| ISO 6579:2002 | | NO, PL, LT, SE (faecal samples) | | | | | |
| NMKL No 71:1999 | | SE (meat samples) | | | | | |
| **Countries not providing detailed information about monitoring programmes** | | | | | | | |
| No information available | | AT, CY, FI, FR, DE, GR, HU, IE, LT, LU, MT, NL, PT, ES | | | | | |
| No official surveillance programme | | BE, BG, CZ, DK, IT, SI, UK[3] | | | | | |
| No duck breeder flocks present | | EE, LV | | | | | |

1. In France, 1 gauze swab (the sampling method consists in wiping 5 different sites of the poultry house).
2. In France, 1 gauze swab (the sampling method consists in wiping the wall of the hatching cabinets or the lining pads of 5 different hatching trays).
3. In the United Kingdom monitoring programmes are voluntary. Farmers producing breeders are encouraged to monitor in the same way as for *Gallus gallus* under Regulation (EC) No 2160/2003. All isolations of *Salmonella* must be reported.

## *Appendix Table SA12.* Salmonella *monitoring programmes in geese breeders, 2010*

| Day old chicks | | Rearing period | | | Production period | | |
|---|---|---|---|---|---|---|---|
| **Sampling scheme following the provisions of Directive 1992/117/EC** | | | | | | | |
| Samples from the internal linings of the delivery boxes | NO, PL, SK | At age of 4 weeks and 2 weeks before moving | Faecal samples | NO, PL, SK, SE | Every 2 weeks | Dead chickens | PL, SK |
| Dead chickens | PL, SK | | | | Every 2 weeks and once in between production cycles | 5 pair of sock samples | NO[1] |
| Meconium | SE | | | | Every 2$^{nd}$ week | Sock samples | SE |
| | | | | | Official sampling every 8 weeks | Meconium samples at the hatchery | PL, SK |
| **Other schemes** | | | | | | | |
| Internal lining papers of delivery boxes | FR | At 2, 10 weeks and 2 weeks before moving | On farm: Faecal and litter samples, dust swab | FR | Every 2 month | On farm: Faecal and litter samples, dust swab | FR |
| | | | | | | In hatchery: Environmental swab | FR |
| **Diagnostic methods used** | | | | | | | |
| ISO 6579:2002 | | CZ, NO, PL, SE | | | | | |
| **Countries not providing detailed information about monitoring programmes** | | | | | | | |
| No information available | | AT, CY, FI, DE, GR, HU, IE, LT[2], LU, MT, NL, PT,ES | | | | | |
| No official surveillance programme | | BE, BG, CZ, DK, IT, SI, UK[3] | | | | | |
| No geese breeder flocks present | | EE, LV | | | | | |

1. Official sampling twice during production period.
2. In Lithuania there are no breeding flocks at the moment. Lithuania applies general monitoring programme for poultry.
3. In the United Kingdom monitoring programmes are voluntary. Farmers producing breeders are encouraged to monitor in the same way as for *Gallus gallus* under Regulation (EC) No 2160/2003. All isolations of *Salmonella* must be reported.

## *Appendix Table SA13.* Salmonella *monitoring programmes in ducks and geese – production level, 2010*

| Day old chicks | | Rearing period and before slaughter | | At slaughter | |
|---|---|---|---|---|---|
| **Type of sample** | | | | | |
| Sampling based on the Directive 2003/99/EC | PL | Faecal samples/ boot swabs | AT, DK[1], NO, SE | Carcass samples | AT, IE |
| | | Sampling based on the Directive 2003/99/EC | PL | Sampling based on the Directive 2003/99/EC | PL |
| | | Cloacal swabs | AT | Neck skin samples | AT[2], SE |
| | | | | | |
| **Frequency of sampling** | | | | | |
| | | 1 – 3 weeks before slaughter | AT, DK, NO, PL, SE | | |
| **Diagnostic methods used** | | | | | |
| ISO 6579:2002 | | NO, PL, LT, SE | | | |
| NMKL No 71:1999 | | SE (neck skin) | | | |
| **Countries not providing detailed information about monitoring programmes** | | | | | |
| No information available | | AT, CY, FI, FR, DE, GR, HU, LT, LU, MT, NL, PT, SK, ES | | | |
| No official surveillance programme | | BE, BG, CZ, IT, SI, UK[3] | | | |
| No duck and geese production flocks present | | EE, LV | | | |

1. In Denmark, from 2007 all flocks are slaughtered abroad hence no sampling at the moment.
2. In Austria, flocks with positive findings in boot swabs (and if the carcasses is not subject to heat-treatment).
3. Monitoring programme in the United Kingdom is voluntary. All isolations of *Salmonella* must be reported.

### *Appendix Table SA14.* Salmonella *monitoring programmes in pigs, 2010*

| Breeding and multiplying herds - at farm | | Fattening herds - at farm | | Fattening herds - at slaughter | |
|---|---|---|---|---|---|
| **Type of sample** | | | | | |
| Blood samples | DK | Blood samples | BE[1] | Meat juice | DE[2], DK[3], SI[1],UK[4] |
| Faecal samples/ boot swabs | CZ, DK[5], EE [6], FI[6], NO, SE | Faecal samples/ boot swabs | DK[5], EE[6], FI, NL, NO, SE[7] | Faecal samples/ boot swabs | DK[5], ES |
| Carcass/rectal swabs/litter/feed | SI | Carcass/rectal swabs/litter/feed | SI | Lymph nodes | BG, EE, ES, FI[1], LU, NO[1, 8], SI[1], SE[1] |
| | | | | Fresh meat | SI[1] |
| | | | | Carcass swabs | BE, DK, EE, FI[1], LU, NO[1, 8], SE[1] |
| **Frequency of sampling** | | | | | |
| Monthly | DK | Clinical suspicion | DK, FI, NO, SE, SI, SK | Clinical suspicion | DK, NO, SE |
| Clinical suspicion | DK, FI, NO, SE, SI, SK | Random samples | NL | Continuous, random samples | BE, BG, DK, EE, ES, FI, NO, SE, SI |
| Once a year – all elite herds | FI, NO, SE | Every four months | BE | | |
| Twice a year - all sow herds | SE | | | | |
| **Diagnostic methods used** | | | | | |
| Modified ISO 6579:2002 | | AT, DK, LT, SE (faecal samples) | | | |
| ISO 6579:2002 | | BG, EE, FI, GR, LU, NL, NO (faecal samples), SI, SK, ES | | | |
| Mix ELISA | | BE, DK, UK | | | |
| NMKL No 71:1999 | | FI, NO, SE (at slaughter) | | | |
| **Strategies in countries with no official sampling strategies** | | | | | |
| No official monitoring | | CY, FR, GR, IT[9], LV, PL, SK, LT, UK[4] | | | |

Note: Monitoring is not compulsory according to Directive 2003/99/EC.
1. Sample size depends on slaughterhouse capacity or farm capacity.
2. In Germany, meat juice monitoring by Quality control systems of meat producers.
3. In Denmark, all herds producing more than 200 pigs for slaughter per year are monitored.
4. In the United Kingdom, sampling is voluntary. All isolations of *Salmonella* must be reported.
5. In Denmark, pen feacal sampling is carried out if serological results from the blood samples (breeding and multiplying herds) and meat juice samples (fattening pigs) are too high.
6. In Finland and Estonia, all pigs sent to semen collection centres have to be examined for *Salmonella* with negative results.
7. In Sweden, pen faecal samples herds are affiliated to voluntary health control program.
8. In Norway, sows from multiplying herds are sampled in the same way as slaughter pigs at slaughter.
9. In Italy, a monitoring programme is running in the Veneto Region.

## *Appendix Table SA15. Measures taken in pig herds in case of* Salmonella *infections or* Salmonella *findings, 2010*

| Control measures | Countries |
|---|---|
| **Serovars covered** | |
| All Serovars | AT[1], BE[2], DK, EE, FI, LU, SE, NO, UK[3], SI |
| Only *S.* Enteritidis, *S.* Typhimurium | CZ |
| **Restrictions on the farm** | |
| Animal movement prohibited | FI, SE, NO, SI[4] |
| Isolation of *Salmonella* positive animals | EE, FI, NO, SE, SI[4] |
| Person contacts restricted | EE, LU, NO, SI[4], SE |
| Advise to the farm for controlling the infection | BE[2], FI, SE, NO, UK, SI[4] |
| **Consequence for slaughter animals** | |
| Slaughterhouse is informed on positive animals | BE[2], EE, FI, LU, NO, SE |
| Sanitary slaughter | DK[5], EE, FI, NO[6], SE[7] |
| Contaminated food withdrawn from market | NO, SE |
| Treatment with antibiotics | EE, SI |
| **Other consequences** | |
| Feedingstuffs are restricted (heat treatment or destruction) | LU, SE, SI |
| Treatment of manure/sludge | EE, DK[5], LU, SI[4] SE, NO |
| Public health advice | UK |
| Cleaning and disinfection obligatory | EE, FI, LU, NO, SI[4], SE |
| Repeated negative testing necessary before lifting the restrictions[8] | EE, FI, SE, NO, SI[9] |
| Reduction in payment for positive slaughter pigs | DK |
| **Further investigations** | |
| Epidemiological investigation is started | BE[2], DK, EE, FI, LU, NO, SI[4], SE |
| Feed suppliers are included in the investigation | DK, EE, FI, LU, NO, SE |
| Contact herds are included in the investigation | DK, FI, LU, NO, SE |
| **Vaccination** | |
| Permitted | BG, CZ, LU, SI[4], UK |
| No vaccination occur | AT, BE[10], DK[10], SE |
| Prohibited | EE, FI, NO |

Note: No measures fixed in Directive 2003/99/EC.

1. In Austria, the carcasses contaminated with *Salmonella* are unfit for human consumption and must be removed. In all slaughtered animals descending from the same holding a post-mortem bacteriological examination has to be initiated.
2. In Belgium, measures only for *Salmonella* risk herds (3 consecutive mean S/P ratio's of > 0,6).
3. Monitoring programme in the United Kingdom is voluntary. All isolations of *Salmonella* must be reported.
4. Measures are taken in case of clinical signs.
5. In Denmark, herds with a high serological *Salmonella* index.
6. In Norway, samples from all sanitary slaughtered animals must be tested for *Salmonella.* If positive, the carcase is condemned.
7. In Sweden, samples are collected from all sanitary slaughtered animals.
8. Typically, two consecutive samplings one month apart.
9. Two consecutive samplings 7 days apart.
10. No vaccine has been approved

### *Appendix Table SA16.* Salmonella *monitoring programmes in pigs and pig meat, 2010*

| Slaughterhouse and cutting plant | | Processing plants | | Pork and pork products at retail | |
|---|---|---|---|---|---|
| **Type of sample** | | | | | |
| Meat juice | DK, SI, UK[1] | Surface swabs | HU, LU | Depend on survey or own-control plans | DK[2], SE[2], UK |
| Surface swabs | BE, CZ, DK[4,8], EE[3], FI[3], DE, NO[3], SE[3] | Depend on survey or own-control plans | DK[2], SE[2] | Fresh meat | DE[4], LU, NL |
| Fresh meat | EE[3], HU[5], SI | Fresh meat | EE, HU[4], IE, LV | Final product | CZ, DE, IE, LU |
| Lymph nodes | BG, EE[3], FI, NO[3], SE[3], SI | Final product | CZ, DE, EE, IE, LU, SI | Minced meat | AT, DE[4], LU |
| Cutting and minced meat samples | BE, NO[6] | Minced meat, meat products, meat preparations | BE | Meat preparations | DE[4], LU, NL |
| Crushed meat samples (cutting plants) | FI[3], NO[3,7], SE[3] | | | Minced meat, meat products, meat preparations | BE, LU |
| Not reported | ES | | | Meat products, meat preparations (meat from bovine animals and pig) | SI |
| | | | | Fresh meat, final products | AT, EE, LV, LT , LU |
| | | Not reported | ES | Not reported | ES |
| **Frequency** | | | | | |
| Random and continuous | BG, DK, EE, ES, FI, HU, NO, SE, SI[4] | Random and continuous | CZ, DE, EE, ES, LV, LU, SI | Random and continuous | AT, CZ, DE, EE, ES, LU, LV, NL, SE, SI |
| Weekly | BE | Random | BE | Weekly | BE |
| Monthly | CZ | Continuous | IE | Continuous | IE |
| **Diagnostic methods used** | | | | | |
| Modified ISO 6579:1999 | | AT, DE, IT | | | |
| Belgian official method SP-VG-M002 | | BE | | | |
| ISO 6579:2002 | | BG, CZ, EE, FI, HU, IT, LV, SI, SE, ES | | | |
| Depend on the laboratory and/or survey | | DK | | | |
| NMKL No 71:1999 | | FI, NO, SE | | | |
| Any method according to Commission Decision 2003/470 | | DK, SE | | | |
| Bacteriological culture | | IE | | | |
| ELISA | | DK | | | |

Note: Monitoring is not compulsory according to Directive 2003/99/EC.
In this table priority is given to slaughterhouse sample based approaches; farm based approaches at slaughterhouse may be described in Table SA14.
1. Voluntary monitoring and control scheme in the United Kingdom.
2. Sampling by local authorities.
3. Sample size and frequency depend on slaughterhouse capacity.
4. Frequency of sampling depends on slaughterhouse and cutting plant capacity.
5. In Hungary, sampling strategy is based on the previous years production.
6. Sampling according to Directive 94/65/EC.
7. Samples collected from cutting equipment, cleaning tools, tables etc.
8. Carcass swabs.

***Appendix Table SA17. Salmonella* monitoring programmes in cattle and bovine meat, 2010**

| Breeding herds - at farm | | Cattle - at farm | | Slaughterhouse and cutting plant | | Processing plants | | Beef at retail | |
|---|---|---|---|---|---|---|---|---|---|
| **Type of sample** | | | | | | | | | |
| Faecal samples | EE[1], FI[1], LU | Faecal samples | DK[2], CZ, EE[3], FI, DE, NL, NO, SE, SK, SI[4], UK[5] | Carcass swabs | CZ, DK[5], EE[6], FI[6], NO[6], SE[6] | Depend on survey or own-control plans | DK[7], SE[7] | Depend on survey or own-control plans | DK[7], SE[7], UK[7] |
| | | Bulk milk/Blood samples | DK | Lymph nodes at slaughter | FI[6], NO[6], SE[6] | Scrapings | SE | Minced beef | AT, BE, EE |
| | | Organ samples | SI[4], UK[5] | Fresh meat at cutting plants | AT, HU, SI | Fresh meat, minced meat, final products | AT, BE, DE, EE, ES, IE, HU, LU | Fresh meat | NL |
| | | | | Crushed meat samples[8] at cutting plants | EE[6],FI[6], NO[6], SE[6] | Final product | CZ, DE, HU, SI | Fresh meat, final products | AT, EE, HU, LT |
| | | | | Faeces (at slaughterhouse) | DE, ES, SK | | | Final product | CZ, DE, IE |
| | | | | | | | | Fresh veal meat and meat preparations from veal | DE[9] |
| | | | | Minced beef | AT, BE | | | Meat preparations,meat products | BE, SI, LU, LV |
| **Frequency of sampling** | | | | | | | | | |
| | | Every three month | DK | Random | BE | Random | BE | Random | BE |
| | | Once a year | NL | Monthly | CZ | Random and continuous | AT, CZ, EE, DE, HU, ES, SI | Random and continuous | AT, CZ, EE, HU, DE, ES, SI |
| | | Clinical suspicion | FI, DE, LU, NO, CZ, SK, SE, SI[4] | Random and continuous | AT, EE, DK, DE, FI, NO, SE, SI[5], ES | Sampling according to Directive 94/65/EC | NO | Sampling distributed evenly throughout the year | LV |
| | | | | Clinical suspicion | CZ, DE | Continuous | IE | Continuous | IE |

Table continued overleaf.

***Appendix Table SA17 (continued).* Salmonella *monitoring programmes in cattle and bovine meat, 2010***

| Breeding herds - at farm | Cattle - at farm | Slaughterhouse and cutting plant | Processing plants | Beef at retail |
|---|---|---|---|---|
| **Diagnostic methods used** | | | | |
| Modified ISO 6579:2002 | AT, CZ, DE, EE, FI, FR, HU, IT, SE, SK, SI, ES, LT | | | |
| ISO 6579:2002 | CZ, EE, FI, GR, LU, LV, SK | | | |
| ISO 6579:2002, Annex D | LU, NO (faecal samples) | | | |
| Mix-ELISA | DK | | | |
| Belgian official method SP-VG-M002 | BE | | | |
| NMKL No 71:1999 | FI, NO (at slaughter), SE | | | |
| Other approved methods according to Decision 2003/470/EC | SE | | | |
| Bacteriological culture | IE | | | |
| **Strategies in countries with no official sampling strategies, 2009** | | | | |
| No official monitoring | BE, BG, CY, CZ, FR, GR, IT[10], PL, SK, UK[11] | | | |

Note: Monitoring is not compulsory by Directive 2003/99/EC.
1. In Estonia and Finland, all animals sent to semen collection centres have to be examined for *Salmonella* with negative results.
2. In Denmark, when requested by the farmer or if clinical symptoms/suspiscion.
3. In Estonia, sample size depend on herd size.
4. In Slovenia, sampling of calves.
5. Frequency of sampling depends on slaughterhouse and cutting plant capacity.
6. Sample size and frequency depend on slaughterhouse and cutting plant capacity.
7. Sampling by local authorities.
8. Samples collected from cutting equipment, cleaning tools, tables etc.
9. One year national monitoring programme.
10. In Italy, a monitoring programme is running in the Veneto Region.
11. In the United Kingdom, sampling is voluntary. Reporting of isolation of *Salmonella* in all farmed animals is statutory.

## *Appendix Table SA18. Measures to take in cattle herds in case of* Salmonella *infections or* Salmonella *findings, 2010*

| Control measures | Countries |
|---|---|
| **Serovars covered** | |
| All Serovars | AT, DE, DK, EE, FI, NO, SE, UK[1], SI |
| Only *S.* Enteritidis, *S.* Typhimurium | CZ |
| **Restrictions on the farm** | |
| Animal movement prohibited | FI, DK, SE, NO, SI[2] |
| Isolation of *Salmonella* positive animals | EE, FI, NO, SE, SI[2] |
| Person contacts restricted | EE, NO, SE, SI[2] |
| Restriction on marketing of milk | FI, NO, SE |
| Pasteurisation of milk obligatory | EE, FI, NO, SE |
| Advise to the farm for controlling the infection | DK, FI, NO, SK, SE, UK, SI[2] |
| **Consequence for slaughter animals** | |
| Slaughterhouse is informed on positive animals | DK, EE, FI, NO, SE |
| Sanitary slaughter | EE, DK, FI, NO[3], SE[4] |
| Contaminated food withdrawn from the market | AT, NO, SE |
| Destruction of positive animals | DE, DK (in some instances), SE (in some instances) |
| Treatment with antibiotics | EE, SI[2] |
| **Other consequences** | |
| Feedingstuffs are restricted (heat treatment or destruction) | LU, SK, SE, SI[2] |
| Treatment of manure/sludge | EE, DK, NO, SK, SE, SI[2] |
| Cleaning and disinfection obligatory | EE, FI, NO, SE, SI[2] |
| Repeated negative testing necessary before lifting the restrictions[5] | EE, DE, FI, NO, SE, SI[2,6] |
| Public health advise | UK |
| **Further investigations** | |
| Epidemiological investigation is always started | DK, EE, FI, NO, SK, SE, UK[7], SI[2] |
| Feed suppliers are always included in the investigation | EE, FI, NO, SE |
| Contact herds are included in the investigation | DK, FI, NO, SE |
| **Vaccination** | |
| Permitted | CZ, DE, LU, UK (*S.* Dublin), SI |
| No vaccination occur | AT, BE[8], DK[8], SE |
| Prohibited | EE, FI, NO |

Note: No measures fixed in Directive 2003/99/EC.
1. Scanning surveillance in the United Kingdom in 2009. All isolations of *Salmonella* must be reported.
2. Measures are taken in calves in case of clinical signs.
3. In Norway samples from all sanitary slaughtered animals must be tested for *Salmonella*. If positive, the carcase is condemned.
4. In Sweden, all sanitary slaughtered animals are analysed for *Salmonella.*
5. Typically, two consecutive samplings one month apart.
6. Two consecutive samplings 7 days apart.
7. In Northern Ireland, when *S.* Enteritidis, *S.* Typhimurium is isolated, or any serotype is isolated in milk.
8. No vaccine has been approved.

***Appendix Table SA19. Notification on* Salmonella *in humans (V=Voluntary, O=Other),* Gallus gallus, *other animals and food, 2010.***

| Country | Notifiable in humans | Notifiable in *Gallus gallus* | Notifiable in other animals | Notifiable in food |
|---|---|---|---|---|
| Austria | yes, since 1947 | yes, since 1998[1] | yes, since 1994[2] | yes, since 1975 |
| Belgium | yes< 1999 V | yes, since 1998 | yes, since 1998 | yes, since 2004 |
| Bulgaria | yes | yes, since 2008 | yes, since 2007 | - |
| Cyprus | yes | yes | yes | - |
| Czech Republic | yes | yes | yes | - |
| Denmark | yes, since 1979 | no | yes, since 1993[4] | - |
| Estonia | yes, since 1958 | yes, since 2000 | yes, since 2000 | yes, since 2000 |
| Finland | yes, since 1995[3] | yes, since 1970's | yes, since 1970's | yes, since 1970's |
| France | yes, since 1986 V | yes, since 1995 | - | yes |
| Germany | yes | yes[4] | yes | yes |
| Greece | yes | yes, since 1992 | yes, since 1980 | - |
| Hungary | yes, since 1959 | no | no | yes, since 1984 |
| Ireland | yes, since 1948 | yes, since 1996 | yes, since 1992 | no |
| Italy | yes, since 1990 | yes, since 1954 | yes, since 1954 | yes, since 1962 |
| Latvia | yes, since 1958 | yes, since 1967 | yes, since 1967 | yes, since 2002 |
| Lithuania | yes, since 1962 | yes | yes | - |
| Luxembourg | yes | c | yes, since 1985 | - |
| Malta | yes | - | - | - |
| Netherlands | no[5]V | yes | yes | - |
| Poland | yes, since 1961 | yes, since 1999[6] | - | - |
| Portugal | yes | yes | yes | - |
| Romania | yes | yes[7] | no | RASFF |
| Slovakia | yes | yes, since 2004 | yes[4] | yes, since 2000 |
| Slovenia | yes, since 1949 | yes, since 1991[8] | yes, since 1991[8] | yes, since 2003 |
| Spain | yes, since 1982 V | yes, since 1994 | yes, since 1994 | yes, since 1994 |
| Sweden | yes, since 1968 | yes, since 1961 | yes, since 1961 | yes, since 1961 |
| United Kingdom | no O | yes, since 1989[9] | yes, since 1989[9] | no |
| Iceland | yes | - | - | - |
| Liechtenstein | yes | - | - | - |
| Norway | yes, since 1975 | yes, since 1965 | yes, since 1965 | yes, since 1995[10] |
| Switzerland | yes | yes, since 1966 | yes, since 1966 | - |

1. In Austria, detection of *S.* Enteritidis, *S.* Typhimurium, *S.* Pullorum and *S.* Gallinarum notifiable in breeding animals.
2. Clinical cases notifiable.
3. In Finland, notifiable also before 1995, but legislation changed in 1995.
4. In Germany, as in all MS, controls and reports are notifiable according to Reg 1168/2006.
5. In the Netherlands, only notifiable if the patient is working in the food industry, hotels, restaurants or cafés, treating or nursing other persons, or belongs to a group of two or more persons which eat/drink the same food within a period of 24 hours.
6. In Poland, *S.* Enteritidis, *S.* Typhimurium, *S.* Pullorum and *S.* Gallinarum are notifiable in poultry.
7. In Romania, only findings of *S*. Enteritidis and *S*. Typhimurium in poultry is notifiable.
8. In Slovenia, the year of independence, however this disease was notifiable before 1991.
9. Reportable diseases (in animals) are those where there is a statutory requirement to report laboratory confirmed isolation of organisms of the genus *Salmonella* under the Zoonoses Order 1989.
10. In Norway, only those detected in the national control programme.

## *Appendix Table CA1.* Campylobacter *monitoring, surveys and diagnostic methods used for humans animals and food, 2010*

| Country | Human Sample type | Diagnostic | *Gallus gallus* Sample type | Diagnostic | Broiler meat Sample type | Diagnostic | Other sample type | Diagnostic |
|---|---|---|---|---|---|---|---|---|
| Austria | Faecal | Bacteriology | At slaughter: Caeca | Bacteriology, ISO 10272-1:2006(E) | At slaughter: Carcass. At processing/retail: Fresh and meat products | Bacteriology, ISO 10272-1:2006(E) | Retail: Raw milk, cheeses made from raw milk<br>Cattle and pig: Colon | ISO 10272:1995 or enrichment method<br>Bacteriology (in cattle at first enrichment) |
| Belgium | - | - | - | - | At slaughter/processing/retail: Carcass, cut and meat preparation | SP-VG-M003 (enrichment, bacteriology and PCR) | Pork at slaughter/ processing/ retail: Carcass and minced meat | SP-VG-M003 (enrichment, bacteriology and PCR) |
| Bulgaria | - | Bacteriology | At slaughter: Caeca | - | At slaughter/processing/ retail: Carcass, cut and meat preparation | - | no | no |
| Cyprus | - | - | - | - | - | - | - | - |
| Czech Republic | - | - | At slaughter: Intact caeca | ISO 10272:1997 | At slaughter: Carcass<br>At processing/retail: Fresh and meat products | ISO 10272:1995 | Retail: Cheeses | ISO 10272:1995 |
| Denmark | Faecal | Bacteriology | At farm, before slaughter: Sock samples. At slaughter: Clocal swabs | PCR | At processing/retail: Depends on survey | - | - | - |
| Estonia | Faecal | Bacteriology | At slaughter: Intact caeca | ISO 10272 -1:2006 (E) | At slaughter: Carcass (neck skin at laboratory), Intact caeca<br>At retail: Meat preparation, meat products, minced meat | Slaughter/ processing: ISO 10272-1:2006 | Pig meat and bovine meat at retail | Retail: NMKL 119:1990 |
| Finland | - | Bacteriology | At slaughter: Caeca | NMKL 119:2007 w/no enrichment | - | - | - | - |
| France | Faecal | Bacteriology | At slaughter: Caeca | ISO 10272 | At slaughter: Carcass (neck skin)<br>At retail: Fresh meat | ISO 10272 | - | - |
| Germany | - | - | - | - | Fresh meat, meat preparations | ISO 10272 | Food surveillance | ISO 10272 |
| Greece | - | - | - | - | - | - | - | - |
| Hungary | Faecal | Bacteriology | - | - | - | - | - | - |
| Ireland | - | - | Carcass | Bacteriology | At slaughter/processing: carcass<br>At processing/retail: Meat products | Bacteriological culture | Retail/Processing: Pork and Turkey meat products<br>Retail: Bovine meat products, Processed foods and prepared dishes | Various bacteriological methods |

Table continued overleaf.

***Appendix Table CA1 (continued). Campylobacter monitoring, surveys and diagnostic methods used for humans animals and food, 2010***

| Country | Human Sample type | Diagnostic | *Gallus gallus* Sample type | Diagnostic | Broiler meat Sample type | Diagnostic | Other sample type | Diagnostic |
|---|---|---|---|---|---|---|---|---|
| Italy | - | - | At slaughter: Cloacal swabs (Veneto region) | Bacteriology | - | - | - | - |
| Latvia | - | - | In 2009, there was no control programme in place for the thermophilic *Campylobacter* in food and animals. | - | In 2009, there was no control programme in place for the thermophilic *Campylobacter* in food and animals. | - | - | - |
| Lithaunia | - | Bacteriology | At slaughter: Cloacal and neck skin | Bacteriology | At processing/retail: Depends on survey | - | - | - |
| Luxembourg | - | - | Meat | Vidas,conf. Bacteriology | Meat | Vidas/bacteriology | Meat | Vidas/bacteriology |
| Netherlands | - | - | - | - | at retail | ISO 10272:2006 | Raw meat at retail; turkey at retail | ISO 10272:2006 |
| Poland | Faecal | Bacteriology | - | - | - | - | - | - |
| Portugal | - | - | - | - | - | - | - | ISO 10272, typing by Lior method |
| Romania | | | | | At slaughter: Neck skin | Bacteriology, ISO 10272-1:2006(E) | | |
| Slovakia | Faeces or blood | Bacteriology | - | - | - | - | - | ISO 10272 |
| Slovenia | Faecal | Bacteriology | At slaughter: Caeca | ISO 10272-1:2006 | At slaughter: Neck skin, fresh meat | ISO 10272-1:2006 ISO 10272-2:2006 | At retail: Turkey meat, prepared dishes | ISO 10272-1:2006 |
| Spain | - | Bacteriology | At slaughter: Caeca | ISO 10272/PCR | At slaughter/processing/retail: Fresh meat and skin | ISO 10272:2006 | - | - |
| Sweden | Faeces and blood | Bacteriology | At slaughter: Caeca | ISO 10272 | At retail | NMKL 119:1990 | - | NMKL 119:1990, ISO 10272, PCR |
| United Kingdom | Faecal | Bacteriology | At slaughter: Caeca and neck skin | ISO 10272:2006 | At retail: Fresh refrigerated meat | ISO 10272:2006 | - | - |
| Norway | Faecal | Bacteriology | At the farm, before slaughter: Faeces At slaughter: Caeca | At the farm, before slaughter: PCR At slaughter: NMKL 119:1990 (without enrichment) | At retail: Fresh meat | NMKL 119:1990 | - | - |
| Switzerland | - | - | At slaughter: Cloacal swabs | Bacteriology | At retail: Fresh meat | Swiss food manual | - | - |

### *Appendix Table CA2. Notification on* Campylobacter *in humans (V=Voluntary, O=Other), animals and food, 2010*

| Country | Notifiable in humans | Notifiable in animals | Notifiable in food |
|---|---|---|---|
| Austria | yes, since 1947 | no | yes, since 1975 |
| Belgium | yes, since 2000 V | yes, since 1998 | yes, since 2004 |
| Bulgaria | yes | - | - |
| Cyprus | yes, since 2005 | - | - |
| Czech Republic | yes | no | yes |
| Denmark | yes, since 1979 | no | no |
| Estonia | yes, since 1988 | yes, since 2000 | yes[1] |
| Finland | yes, since 1995 | yes, since 2004[2] | no[3] |
| France | yes, since 2002 V | - | - |
| Germany | no | yes[4] | yes |
| Greece | - | no | no |
| Hungary | yes, since 1998 | no | no |
| Ireland | yes, since 2004 | yes, since 1992 | no |
| Italy | yes, since 1990 V | no | yes, since 1962 |
| Latvia | yes, since 1999 | yes | yes, since 2004 |
| Lithuania | yes, since 1990 | yes >30 years | - |
| Luxembourg | yes | no | - |
| Malta | yes | - | - |
| Netherlands | yes V | yes | yes |
| Poland | yes, since 2004 | - | - |
| Portugal | no | no | - |
| Romania | yes | no | - |
| Slovakia | yes, since 1980's | no | yes, since 2000 |
| Slovenia | yes, since 1987 | no | yes, since 2003 |
| Spain | yes, since 1989 V | yes, since 1994 | yes, since 1994 |
| Sweden | yes, since 1989 | no | no |
| United Kingdom | no O | no | no |
| Iceland | yes | - | - |
| Liechtenstein | yes | - | - |
| Norway | yes, since 1991 | yes[5] | yes[5] |
| Switzerland | yes | yes, since 1966 | no |

1. In Estonia, only *C. jejuni*
2. In Finland, C*ampylobacter* notifiable in *Gallus gallus* only
3. In Finland, food business operator has to notify to the competent authority, but there is no central notification system.
4. In Germany, *Campylobacter* is notifiable in cattle (veneric infection).
5. In Norway, only positive samples from *Gallus gallus* detected in the national control programme.

## *Appendix Table LI1. Monitoring programmes and diagnostic methods for* Listeria monocytogenes*, 2010*

| Country | Surveillance | Frequency and type of samples | HACCP | Diagnostic method | Human diagnostic | Survey on cheeses from raw and thermised milk |
|---|---|---|---|---|---|---|
| Austria | No monitoring programme. Surveys by the local authorities | - | yes | ISO 11290-1:1996 (E):1996,1998 | Isolation of *L. monocytogenes* from blood, cerebral spinal fluid, vaginal swabs | - |
| Belgium | Monitoring programme started in 2004 | Fresh meat and final products sampled weekly | - | AFNOR[1] validated VIDAS LMO2 followed by a chromogenic medium | - | - |
| Bulgaria | No monitoring programme | - | yes | - | - | yes |
| Cyprus | - | - | - | - | - | - |
| Czech Republic | Monitoring according to the Decree of the Ministry of Health No. 132/2004 Coll | - | yes | ISO 11290-1:1996 (E):1996,1998 | - | yes |
| Denmark | No monitoring programme. Surveys by the local authorities | - | - | - | Bacteriology | yes |
| Estonia | No monitoring programme. Surveys by the local authorities | Random sampling | - | ISO 11290 | Isolation of *L. monocytogenes* from blood and cerebral spinal fluid | - |
| Finland | Survey on gravad and cold-salted fishery products | Monthly sampling | - | ISO 11290-1:1996 /Amd.1:2004(E) and ISO 11290-2:1998 /Amd.1:2004(E) | Bacteriological culture | - |
| France | Official monitoring programme on meat products at retail | Random sampling | yes | ISO 11290-1 (detection) or ISO 11290-2 (enumeration) or AFNOR alternative methods validated against reference methods | Isolation of *L. monocytogenes* from blood and cerebral spinal fluid. | no |
| Germany | Surveillance, surveys and own-control | Food surveillance: Random sampling | - | - | Isolation of *L. monocytogenes* from blood and cerebral spinal fluid | Food surveillance: Random sampling |
| Greece | No monitoring programme. Surveys by the local authorities | Routine and target sampling | - | - | - | - |
| Hungary | Monitoring milk products (EU requirements) based on Directive 92/46 | - | - | - | Isolation of *L. monocytogenes* from blood and cerebral spinal fluid | - |
| Ireland | Surveillance in RTE foods | Continuous | no | Bacteriological culture | - | no |
| Italy | - | - | yes | - | - | - |
| Latvia | No monitoring programme for animals. State surveillance programme for food | Food - target sampling | yes | ISO 11290; AR; Bacteriological culture | Isolation of L. monocytogenes from blood and cerebral spinal fluid; serology | yes |
| Lithuania | - | - | - | - | Isolation of *L. monocytogenes* from blood and cerebral spinal fluid | - |
| Luxembourg | - | Meat and meat products | - | BRD:07/04-09/98+ BRD:07/05-09/01 | - | - |
| Malta | Survey on cheese | - | - | - | - | - |
| Netherlands | Survey on raw meat; survey on smoked fish | Random sampling | - | ISO 11290 | - | - |

Table continued overleaf.

***Appendix Table LI1 (continued). Monitoring programmes and diagnostic methods for* Listeria monocytogenes*, 2010***

| Country | Surveillance | Frequency and type of samples | HACCP | Diagnostic method | Human diagnostic | Survey on cheeses from raw and thermised milk |
|---|---|---|---|---|---|---|
| Poland | - | - | - | - | Isolation of *L. monocytogenes* from blood and cerebral spinal fluid, articular or pericardial fluid | - |
| Portugal | Surveillance in raw milk and milk cheese | - | - | ISO 11290 | - | - |
| Romania | Surveillance in ready-to-eat food for infants and special medical purposes, minced meat, meat preparations and meat products to be eaten raw, fish products, raw milk from milk industry, milk products from raw milk | | | ISO 11290-1,2/2000 A1/2005 | | yes |
| Slovakia | No monitoring programme. Surveys by the local authorities | - | - | ISO 11290 | Isolation of *L. monocytogenes* | - |
| Slovenia | No active monitoring programme for animals. Annual monitoring programme for food. In 2010 Sampling of milk (raw) from milk mashines. Sampling of meat products, milk products and fishery products (at processing) and sampling of different RTE products-meat, fishery and milk products, vegetables, other RTE products (at retail) | Depend on monitoring programme. | yes | ISO 11290-1:1996 ISO 11290-2:1998 (E):1996,1998 | Isolation of *L. monocytogenes* | yes |
| Spain | - | - | - | ISO 11290-1:1996 ISO 11290-2:1998 | Isolation of *L. monocytogenes* from a normally sterile site. | - |
| Sweden | No official programme. Surveys by the local authorities | Depend on survey | surveys | NMKL 136:2004, SLO METHOD | Isolation of *L. monocytogenes* from blood and cerebral spinal fluid | - |
| United Kingdom | No monitoring programme. National and regional surveys by the local authorities | Depend on survey | surveys | BS EN ISO 11290 | culture | yes |
| Norway | No monitoring programme. Surveys. Obligatory own-check of certain products of milk and fish | Depend on survey | yes | NMKL 136 | Isolation of *L. monocytogenes* from a normally sterile site. | - |
| Switzerland | Annual monitoring programme for cheeses | Random sampling | yes | ISO 11290-1 ISO 11290-2 | Isolation of *L. monocytogenes* | |

1. Association Française de normalisation.

### *Appendix Table LI2. Notification of* Listeria *in humans (V=Voluntary), animals and food, 2010*

| Country | Notifiable in humans | Notifiable in animals | Notifiable in food |
|---|---|---|---|
| Austria | yes, since 1947 | no | yes, since 1975 |
| Belgium | yes < 1999[1] V | yes, since 1998 | yes, since 2004 |
| Bulgaria | yes | - | - |
| Cyprus | yes, since 2005 | - | - |
| Czech Republic | yes | yes | - |
| Denmark | yes, since 1993 | no | - |
| Estonia | yes, since 2003 | yes, since 2000 | yes, since 2000 |
| Finland | yes, since 1995 | yes, since 1995[2] | no[3] |
| France | yes, since 1998 | no | yes, since 1994 |
| Germany | yes | yes | yes |
| Greece | yes | yes, since 1980 | - |
| Hungary | yes, since 1998 | no | yes, since 2003 |
| Ireland | yes, since 2004 | - | no |
| Italy | yes, since 1990 | no | yes, since 1962 |
| Latvia | yes, since 1990 | yes | yes, since 2003 |
| Lithuania | yes, since 1998 | yes >30 years | - |
| Luxembourg | yes | no | no |
| Malta | yes | - | - |
| Netherlands[6] | yes, since 2008 | yes | yes |
| Poland | yes, since 1966 | - | - |
| Portugal | no | no | - |
| Romania | yes | no | - |
| Slovakia | yes | yes | yes, since 2000 |
| Slovenia | yes, since 1977 | yes <1991[4] | yes, since 2003 |
| Spain | yes, since 1982 V | yes, since 1994 | yes, since 1994 |
| Sweden | yes, since 1969[5] | yes | no |
| United Kingdom | yes V | no | no |
| Iceland | yes | - | - |
| Liechtenstein | yes | - | - |
| Norway | yes, since 1975 | yes, since 1965 | no |
| Switzerland | yes | yes, since 1966 | - |

1. In Belgium, in the Flemish Community.
2. In Finland, notifiable also before 1995, but legislation changed in 1995.
3. In Finland, food business operator has to notify to the competent authority, but there is no central notification system.
4. In Slovenia, the year of independence, however this disease was notifiable before 1991.
5. In Sweden, only clinical cases notifiable.
6. Notification mandatory since 2008.

***Appendix Table TB-BR1. Status as officially free of bovine brucellosis (OBF), officially free of* B. melitensis *in sheep and goats (ObmF) and officially free of bovine tuberculosis (OTF), 2010***

| Country | Bovine brucellosis | | *Brucella melitensis* | | Bovine tuberculosis | |
|---|---|---|---|---|---|---|
| | OBF[1] | Comments | ObmF[2] | Comments | OTF[1] | Comments |
| Austria | yes, since 1999 | | yes, since 2001 | | yes, since 1999 | |
| Belgium | yes, since 2003 | No cases since 2000 | yes, since 2001 | | yes, since 2003 | |
| Bulgaria | no | No cases since 1958 | - | | no | |
| Cyprus | no | Never detected in domestic animals, imported cases in 1921 and 1932 | no | Eradication programme. | - | |
| Czech Republic | yes, since 2004 | Eradication programme terminated in 1964 | yes, since 2004 | Never detected | yes, since 2004 | Eradication programme terminated in 1967 |
| Denmark | yes, since 1980 | No cases since 1962 | yes, since 1979 | Never detected | yes, since 1980 | |
| Estonia | yes, since 2010 | No cases since 1961 | yes, since 2010 | No cases since 1962, surveillance of breeding herds | yes, since 2010 | No cases since 1986 |
| Finland | yes, since 1994 | No cases since 1960 | yes, since 1994 | Never detected | yes, since 1994 | No cases since 1982 |
| France | yes, since 2005 | No case since 2002 | yes, since 2001 (64 departements) | No case in the other departements since 2003 | yes, since 2000 | |
| Germany | yes, since 2000 | | yes, since 2000 | | yes, since 1997 | |
| Greece | no | Eradication programme. Thessaloniki area is eradication and vaccination area for Bovine brucellosis, only | no | Eradication programme on Islands, vaccination on the mainland | - | |
| Hungary | no | Declared free by OIE in 1985 | yes, since 2004 | Never detected | no | |
| Ireland | yes, since 2009 | No confirmed case since April 2006 | yes, since 1993 | Never detected | no | |
| Italy | yes (six provinces and ten regions) | Vaccination in two areas (Monti Nebrodi in Sicily and Caserta in Campania) | yes (six provinces and ten regions) | Vaccination in Sicily | yes (six provinces and ten regions) | |
| Latvia | no | No cases since 1963 | yes, since 2010 | Never detected | - | No cases since 1989 |
| Lithuania | no | Yes, according to OIE demands | yes, since 2010 | Yes, according to OIE demands | no | |
| Luxemburg | yes, since 1999 | No cases since 1999 | yes | | yes, since 1996 | |
| Malta | no | No cases since 1996 | no | No cases since 1996 | - | |

Table continued overleaf.

***Appendix Table TB-BR1 (continued). Status as officially free of bovine brucellosis (OBF), officially free of* B. melitensis *in sheep and goats (ObmF) and officially free of bovine tuberculosis (OTF), 2010***

| Country | Bovine brucellosis | | *Brucella melitensis* | | Bovine tuberculosis | |
|---|---|---|---|---|---|---|
| | OBF[1] | Comments | ObmF[2] | Comments | OTF[1] | Comments |
| Netherlands | yes, since 1996 | | yes, since 1993 | Never detected | yes | |
| Poland | yes, since 2009 | | yes | Surveillance of breeding herds, *B. melitensis* never detected | yes, since 2009 | |
| Portugal | yes, since 2002 (six islands of the Azores) | Eradication programme, vaccination in exeptional situations | yes, since 2002 (Azores) | Eradication programmes, regional vaccination | no | |
| Romania | no | | yes, since 2007 | According EU Decision 399/2007 | no | |
| Slovakia | yes, since 2005 | | yes, since 2004 | Never detected | yes, since 2005 | No case since 1992 |
| Slovenia | yes | No cases since 1961 | yes, since 2005 | | yes, since 2009 | No cases since 1997 |
| Spain | yes (two provinces of the Canary Islands) | Eradication programmes, vaccination in high risk areas | yes, since 2001 (Canaries) | Eradication programmes, vaccination in high risk areas | no | |
| Sweden | yes, since 1995 | No cases since 1957 | yes, since 1994 | | yes, since 1995 | Free for TB in 1958 and after joining the EU in 1995 also OFT |
| United Kingdom | yes, since 1985 (Great Britain) | Northern Ireland not officially free | yes, since 1991 | Never detected | yes, since 2009 (Scotland) | |
| Norway | yes, since 1994 | Declared eliminated in 1953 | yes, since 1994 | Never detected | yes, since 1994 | |
| Switzerland | yes, since 1959 | | yes, since 1998 | | yes, since 1959 | |

1. OBF and OTF according to Directive 64/432/EC and Decision 2003/467/EC as last amended by Decision 2009/761/EC.
2. ObmF according to Directive 91/68/EC and Decision 93/52/EC, as last amended by Decision 2008/97/EC.

***Appendix Table TB1. Notification of tuberculosis in humans,* Gallus gallus, *other animals and food, 2010***

| Country | Notifiable in humans | Notifiable in *Gallus gallus* | Notifiable in other animals | Notifiable in food |
|---|---|---|---|---|
| Austria | yes, since 1947/2004[1] | - | yes, since 1909/1999[1] | - |
| Belgium | yes < 1999 | yes, since 1998 | yes, since 1963 | yes, since 2004 |
| Bulgaria | yes | - | - | - |
| Cyprus | yes, since 1932 | - | yes (bovine) | - |
| Czech Republic | yes | yes | yes | - |
| Denmark | yes, since 1905 | yes, since 1993 | yes, since 1920[2] | - |
| Estonia | yes, since 1950 | yes, since 1962 | yes, since 1962 | no |
| Finland | yes, since 1995[3] | yes, since 1995[3] | yes, since 1902 | yes, since 1902 |
| France | yes | - | yes, since 1934 | - |
| Germany | yes | yes | yes | yes |
| Greece | yes | - | yes, since 1936 (bovine) | - |
| Hungary | yes, since 1946 | no | yes (bovine) | no |
| Ireland | yes, since 1948 | - | yes, since 1966 (Cattle), 1992 (Other ruminant animals) | not notifiable[4] |
| Italy | yes, since 1990 | - | yes, since 1954 | yes, since 1928 |
| Latvia | yes | yes | yes, since 1927 | - |
| Lithuania | yes, since 1990 | yes | yes | - |
| Luxembourg | yes | - | yes, since 1912 | - |
| Malta | yes | - | - | - |
| Netherlands | yes | no | yes | - |
| Poland | yes, since 1919 | - | yes (bovine) | - |
| Portugal | yes, since 1957 | yes | yes | - |
| Romania | yes | - | yes(bovine) | - |
| Slovakia | yes | no | yes | - |
| Slovenia | yes, since 1949 | - | yes <1991[5] | yes, since 2003 |
| Spain | yes, since 1948 | - | yes, since 1952 | yes, since 1952 |
| Sweden | yes >30 years ago | yes | yes, since 1897 | - |
| United Kingdom | yes | no | yes >1984[6] | - |
| Iceland | yes | - | - | - |
| Liechtenstein | yes | - | - | - |
| Norway | yes, since 1900 | yes, since 1965 | yes, since 1894 | yes, since 1894[7] |
| Switzerland | yes | yes, since 1950 | yes, since 1950 | - |

1. In Austria, *M. bovis* notifiable since 2004 in humans and since 1999 in animals, *M. tuberculosis* notifiable since 1947 in humans and since 1909 in animals.
2. In Denmark, only clinical cases are notifiable.
3. In Finland, notifiable also before 1995, but legislation changed in 1995.
4. In Ireland, reportable by food business operators to competent authority under SI 154/2004 - European Communities (Monitoring of Zoonoses) Regulations 2004.
5. In Slovenia, the year of independence. The disease was notifiable before 1991.
6. In the United Kingdom, the first tuberculosis orders were passed in 1913 and 1925 to remove clinically ill cattle. In deer, tuberculosis has been notifiable since 1st June 1989. In 2005, tuberculosis became notifiable in all mammals except man.
7. In Norway, mandatory meat inspection at slaughterhouse.

### *Appendix Table BR1. Notification of* Brucella *in humans (V=Voluntary, O=Other), animals and food, 2010*

| Country | Notifiable in humans | Notifiable in animals | Notifiable in food |
|---|---|---|---|
| Austria | yes, since 1947 | yes, since 1957 | yes, since 1975 |
| Belgium | yes < 1999 V | yes, since 1978 | yes, since 2004 |
| Bulgaria | yes | - | - |
| Cyprus | yes, since 1983 | - | - |
| Czech Republic | yes | yes | - |
| Denmark | no[1] | yes, since 1920[2] | - |
| Estonia | yes, since 1947 | yes, since 1962 | no |
| Finland | yes, since 1995 | yes, since 1920's | yes, since 1920's |
| France | yes, since 1960[3] V | yes, since 1965 | - |
| Germany | yes | yes | yes |
| Greece | - | yes, since 1972 | - |
| Hungary | yes, since 1950 | yes, since 1928 | no |
| Ireland | yes, since 1948 | yes, since 1966 (Cattle), 1992 (Other ruminant animals) | no |
| Italy | yes, since 1990 V | yes, since 1954 | yes, since 1929 |
| Latvia | yes, since 1974 | yes, since 1927 | yes |
| Lithuania | yes, since 1957 | yes >30 years | - |
| Luxembourg | yes | yes, since 1948 | - |
| Malta | yes | - | - |
| Netherlands | yes V | yes | yes |
| Poland | yes, since 1946 | yes, since 1951 | - |
| Portugal | yes | yes | - |
| Romania | yes | yes | - |
| Slovakia | yes | yes | - |
| Slovenia | yes, since 1977 | yes <1991[4] | yes, since 2003 |
| Spain | yes, since 1943 V | yes, since 1952 | yes, since 1952 |
| Sweden | yes, since 2004 | yes | no |
| United Kingdom | yes, since 1996[5] O | yes, since 1971[6] | yes, since 1989 |
| Iceland | yes | - | - |
| Liechtenstein | yes | - | - |
| Norway | yes, since 1975 | yes, since 1903 | no |
| Switzerland | yes | yes, since 1966 | - |

1. In Denmark, only imported cases registered centrally.
2. In Denmark, only clinical cases are notifiable.
3. In France, mainly imported cases.
4. In Slovenia, the year of independence. The disease was notifiable before 1991.
5. In the United Kingdom, reportable under Reporting of Injuries, Disease and Dangerous Occurrences Regulations - applies to all work related activities but not to all incidents.
6. In the United Kingdom organisms of the genus *Brucella* are reportable in animals - i.e. there is a statutory requirement to report laboratory confirmed isolation of the organism.

## Appendix Table RA1. Vaccination programmes for rabies in animals, 2010

| Country | Vaccination programmes in pets | Vaccination programmes in wildlife |
|---|---|---|
| Austria | Voluntary vaccination of pets | Oral vaccines distributed to foxes twice a year in fox populations in areas of higher risk. |
| Bulgaria | Compulsory vaccination of dogs | - |
| Belgium | Compulsory vaccination of dogs and cats in the south and if staying at public campgrounds | Oral vaccines was distributed from 1989 to 2003. |
| Cyprus | Compulsory vaccination of animals entering Cyprus | - |
| Czech Republic | Compulsory vaccination of carnivores in captivity | In 1989, oral vaccination of foxes in some districts. In 2003, covers the whole country except for rabies free districts. Since 2004, vaccination twice a year by air in selected areas, mainly along the border with Poland and Slovakia. The programme is approved and co-financed by EU (Decision 2007/782/EC) for 2008-2009. |
| Denmark | - | - |
| Estonia | Compulsory vaccination of dogs and cats | In autumn 2005 oral vaccination of wildlife in the Northern part of the country. Since 2006 oral vaccines distributed to foxes twice a year by airplane. The programme is approved and co-financed by EU (Decision 2007/782/EC) for 2008-2011. |
| Finland | Vaccination in dogs and cats are recommended | Since 1991, oral vaccines distributed to foxes and raccoon dogs twice a year along the Russian border by flight. Since 2004, oral vaccines distributed to foxes twice a year. The programme is approved and co-financed by EU (Decision 2007/782/EC) for 2008-2010. |
| France | Voluntary vaccination of pets | - |
| Germany | Voluntary vaccination of pets | Oral vaccines distributed to foxes twice a year in endemic areas until 2008. Germany is free of rabies. |
| Greece | Compulsory vaccination of dogs and cats | - |
| Hungary | Compulsory vaccination of dogs, voluntary vaccination of cats | Since 2004, oral vaccines distributed to foxes twice a year by flight. The programme started in 1997. |
| Ireland | - | - |
| Italy | Compulsary vaccination of dogs in infected municipalities | Oral vaccines distributed to foxes in the Region Friuli Venezia Giulia |
| Latvia | Compulsory vaccination of dogs, cats and pet ferrets | Since 1998, oral vaccines distributed to foxes and raccoon dogs twice a year, from 2005, by flight. The programme is approved and co-financed by EU (Decision 2007/782/EC) for 2008-2010. |
| Lithuania | Compulsory vaccination of dogs and cats | Since 1995, Oral vaccines distributed to foxes twice a year by flight. |
| Luxembourg | Compulsory vaccination of dogs | - |
| Malta | - | - |
| Netherlands | - | - |
| Poland | Vaccination programme for dogs since 1949 | Since 2002, oral vaccines distributed to foxes twice a year by flight. |
| Portugal | Compulsory vaccination of dogs since 1925 | - |
| Romania | Compulsory vaccination of dogs and cats | In 2009, aerial vaccination programme was not implemented for foxes |
| Slovakia | Compulsory vaccination of domestic carnivores | Since 1994, oral vaccines distributed to foxes twice a year by flight. |
| Slovenia | Compulsory vaccination of dogs since 1947 | Oral vaccines distributed to foxes twice a year by flight. The programme is approved and co-financed by EU (Decision 2007/782/EC) for 2008-2012. |
| Spain | Compulsory vaccination dogs in 14 regions, Ceuta and Melilla. Voluntary in the remaining 3 regions. | From 2004, compulsory surveillance according to Directive 2003/99/EC |
| Sweden | Vaccination of dogs and cats being brought in and out of the country | - |
| United Kingdom | Vaccination is permitted those animals being exported, and those undergoing quarantine | - |
| Norway | Vaccination of dogs and cats being brought in and out of the country | - |
| Switzerland | Compulsory vaccination of dogs, cats and ferrets brought in to the country from countries not free from rabies | - |

***Appendix Table RA2. Type of samples and diagnostic methods used when diagnosing rabies in humans and animals, 2010***

| Country | Humans | | Animals | |
|---|---|---|---|---|
| | Type of sample | Diagnostic test | Type of sample | Diagnostic test |
| Austria | Liquor, smears from pharynx, swab from conjuntivae, biopsy at the nape of the neck and serum | FAT, immunohistochemistry, Reverse Transcriptase-PCR | Brain | Fluorescent Antibody Test (FAT), Rabies Tissue Culture Infection Test (RTCIT). Mouse Inoculation Test (MIT) |
| Belgium | Blood, cerebrospinal fluid, saliva, post mortem brain tissue | Antigen detection, Virus isolation in neuroblastoma cells, Reverse Transcriptase-PCR, Virus isolation in mice; Rapid Fluorescent Focus Inhibition Test (RFFIT) | Brain | FAT, virus cultivation in neurobast |
| Bulgaria | - | - | | Direct Immune-Flourescent Test (IFT) |
| Cyprus | - | - | Brain | Hellers stain |
| Czech Republic | - | - | Brain | FAT |
| Denmark | Blood samples, skin biopsy from neck | - | Brain | FAT, virus isolation |
| Estonia | - | - | Brain | FAT |
| Finland | - | Human: cultivation, serology, antigen-test, direct microscopy | Brain | FAT, cell culture, Reverse Transcriptase-PCR |
| France | Cerebrospinal fluid, blood, saliva, if post-mortem: brain tissue | PCR, FAT, immunohistochemistry, direct microscopy, Rapid Fluorescent Focus Inhibition Test (RFFIT) | Brain | FAT, cell culture, Reverse Transcriptase-PCR, Mouse Inoculation Test (MIT) |
| Germany | - | - | - | FAT, cell culture |
| Greece | - | - | - | - |
| Hungary | Cerebrospinal fluid, blood | In vivo from cornea imprint of the patient by immunofluorescence method, or determination of specific antibody titre of the blood or liquor by immunofluorescence method during the second week of the illness. Post mortem: detection of the Negri-body in the brain tissue, or the antigen by immunofluorescence method, or identification of the viral genetic material by PCR, or isolation of the virus in mouse | - | - |
| Ireland | - | - | - | - |
| Italy | Cerebrospinal fluid, liquor, saliva, blood, brain tissue | FAT, Tissue Culture Infection Test (TCIT), Reverse Transcriptase-PCR | Brain | FAT, Tissue Culture Infection Test (TCIT), Reverse Transcriptase-PCR |

Table continued overleaf.

***Appendix Table RA2 (continued). Type of samples and diagnostic methods used when diagnosing rabies in humans and animals, 2010***

| Country | Humans | | Animals | |
|---|---|---|---|---|
| | Type of sample | Diagnostic test | Type of sample | Diagnostic test |
| Latvia | Cerebrospinal fluid, blood, saliva, if post-mortem: brain tissue | Serology, antigen detection, isolation of virus | Brain tissue | FAT, cell culture, PCR |
| Lithuania | Cerebrospinal fluid, saliva | Isolation of virus, antigen detection, mouse inoculation test, ELISA, PCR. | - | - |
| Luxembourg | - | - | Brain | FAT, virus isolation (by sub-contractance) |
| Malta | - | - | - | - |
| Netherlands | - | - | - | - |
| Poland | Cerebrospinal fluid, blood, saliva, if post-mortem: brain tissue | FAT, Reverse Transcriptase-PCR, Mouse Inoculation Test (MIT), Rapid Fluorescent Focus Inhibition Test (RFFIT). | Brain | FAT, Mouse Inoculation Test (MIT), Rapid Fluorescent Focus Inhibition Test (RFFIT). |
| Portugal | Cerebrospinal fluid | Reverse Transcriptase-PCR | - | Direct Immune-Flourescent Test (IFT) |
| Romania | - | - | Brain | FAT, Mouse Inoculation Test (MIT), Reverse Transcriptase-PCR, Fluorescent Antibody Virus Neutralization (FAVN), ELISA |
| Slovakia | Cerebrospinal fluid, saliva, serum, brain tissue | Isolation of virus, antigen detection, detection of virus nucleic acids, virus neutralization assay | Brain | FAT, ELISA, Reverse Transcriptase-PCR, Mouse Inoculation Test (MIT), Fluorescent Antibody Virus Neutralization (FAVN) |
| Slovenia | Cerebrospinal fluid (CSF), saliva, if post-mortem: brain tissue | Serology, isolation on cell cultures, mouse inoculation test, Reverse Transcriptase-PCR, FAT | Brain | Serology, isolation on cell cultures, mouse inoculation test, Reverse Transcriptase-PCR, FAT |
| Spain | Cerebrospinal Fluid, skin biopsy from neck. | FAT, Rapid Fluorescent Focus Inhibition Test (RFFIT), Mouse Inoculation Test (MIT), PCR | Brain tissue | FAT, ELISA |
| Sweden | Serum, Cerebrospinal fluid ( | Serology, antigen detection, isolation of virus, PCR | Brain tissue | FAT, Mouse Inoculation Test (MIT), PCR, virus isolation |
| United Kingdom | Cerebrospinal fluid, blood, saliva | Serology, antigen detection, isolation of virus | Brain tissue | FAT, Mouse Inoculation Test (MIT), histology, PCR |
| Norway | Cerebrospinal fluid, serum, if post-mortem: brain tissue | Serology, antigen detection, virus isolation | Brain tissue | FAT, Reverse Transcriptase-PCR |
| Switzerland | - | Rapid Fluorescent Focus Inhibition Test (RFFIT) | - | FAT, Rabies Tissue Culture Infection Test (RTCIT), Rapid Fluorescent Focus Inhibition Test (RFFIT) |

## Appendix Table RA3. Notification of rabies in humans (O=Other) and animals, and Official Rabies Free status, 2010

| Country | Notifiable in humans | Last indigenous case | Notifiable in animals | Last case | Rabies status | Year |
|---|---|---|---|---|---|---|
| Austria | yes, since 1913 | - | yes, since 1957 | 2006 | Declared itself free from rabies[1] | 2008 |
| Belgium | yes <1999 | 1923 | yes, since 1883 | 1999 | Declared itself free from rabies[1] | 2001 |
| Bulgaria | yes | - | - | - | - | - |
| Cyprus | yes, since 2004 | <1976 | yes | <1976 | Rabies free | - |
| Czech Republic | yes | - | yes, since 1999 | 2002 | Declared itself free from rabies[1] | 2005 |
| Denmark | yes, since 1964 | - | yes, since 1920 | 1982 (classical rabies) | - | - |
| Estonia | yes, since 1946 | 1987 | yes, since 1950 | 2009 | - | - |
| Finland | yes, since 1995 | - | yes, since 1922 | 1989 | Declared itself free from rabies[1] | 1991 |
| France | yes | - | yes | - | Declared itself free from rabies[1] | 2001 |
| Germany | yes | - | yes | 2006 | Rabies free | 2008 |
| Greece | yes | 1970 | yes, since 1936 | 1987 | Rabies free | - |
| Hungary | yes, since 1950 | - | yes, since 1928 | - | - | - |
| Ireland | yes, since 1976 | - | - | - | Declared itself free from rabies[1] | - |
| Italy | yes, since 1990 | 1968 | yes, since 1954 | 2008 | Rabies free | 1997 |
| Latvia | yes, since 1974 | 2003 | yes, since 1918 | - | - | - |
| Lithuania | yes, since 1957 | - | yes <1975 | - | - | - |
| Luxembourg | yes | - | - | - | Declared itself free from rabies[1] | 2003 |
| Malta | yes | - | - | - | Rabies free since 1911 | - |
| Netherlands | yes | - | yes (dogs) | - | - | - |
| Poland | yes, since 1919 | - | yes, since 1927 | - | - | - |
| Portugal | yes | - | yes, since 1953 | 1961 | Rabies free since 1956 | - |
| Romania | yes | 2010 | yes, the end of the 19th century | 2009 | - | - |
| Slovakia | yes | 1990 | yes, since 1950 | 2006 | - | - |
| Slovenia | yes, since 1949 | 1950 | yes <1991[2] | 1950 | - | - |
| Spain | yes, since 1901 | 1975 | yes, since 1952 | 1978[3] | The mainland and islands are considered rabies free | - |
| Sweden | yes <1975 | 1886 | yes | 1886 | Rabies free since 1886 | - |
| United Kingdom | yes O | 1902 | yes | 1922 | Declared itself free from rabies[1] | - |
| Iceland | yes | - | - | - | - | - |
| Liechtenstein | yes | - | - | - | - | - |
| Norway | 1975 | 1815 | yes, since 1965 | 1999[4] | Declared itself free from rabies (the mainland)[1] | - |
| Switzerland | 1952 | 1974 | yes, since 1952 | 1996 | Declared itself free from rabies[1] | 1998 |

1. According the criteria set up by OIE; where a country with no new cases of rabies during a two year period may declare itself free from rabies. The criteria exclude European Bat *Lyssavirus.*
2. In Slovenia, the year of independence, however, this disease was notifiable before 1991.
3. In Spain, the mainland and islands not Ceuta and Melilla.
4. In Norway, in the archipelago of Svalbard.

## *Appendix Table VT1. Notification of VTEC in humans (V=Voluntary, O=Other), animals and food, 2010*

| Country | Notifiable in humans | Notifiable in animals | Notifiable in food |
|---|---|---|---|
| Austria | yes, since 1947 | no | yes, since 1975 |
| Belgium | yes < 1999 V | yes, since 2005 | yes, since 2004 |
| Bulgaria | yes | - | - |
| Cyprus | yes, since 2005 (EHEC) | - | - |
| Czech Republic | - | yes | - |
| Denmark | yes, since 2000 +HUS (EHEC) | no | - |
| Estonia | yes, since 1958 (EHEC) | yes, since 2000 | yes, since 2000 |
| Finland | yes, since 1998 | yes, since 2004[1] | no[2] |
| France | yes, since 1996 (HUS) V | - | -[3] |
| Germany | yes | - | yes, since yes |
| Greece | yes (EHEC) | - | - |
| Hungary | yes, since 1998 | no | - |
| Ireland | yes, since 2004 (EHEC) | - | no |
| Italy | yes, since 1990 V | no | yes, since 1962 |
| Latvia | yes, since 1999 | yes[4] | yes, since 2004 |
| Lithuania | yes, since 2004 | yes >30 years | - |
| Luxembourg | yes V | no | no |
| Malta | yes | - | - |
| Netherlands | yes | no | yes |
| Poland | yes, since 2004 | - | - |
| Portugal | no | - | - |
| Romania | yes | - | yes, since 2007 |
| Slovakia | yes | no | yes, since 2000 |
| Slovenia | yes, since 1995 | no | yes, since 2003 |
| Spain | yes, since 1989[5] V | yes, since 1994 | yes, since 1994 |
| Sweden | yes, since 2004[6] | yes, since 1996[7] | no |
| United Kingdom | no O | no | no |
| Iceland | yes | - | - |
| Liechtenstein | - | - | - |
| Norway | yes, since 1995 | no[8] | no[8] |
| Switzerland | yes, since 1999 | no | - |

1. In Finland, only notifiable in cattle.
2. In Finland, food business operator has to notify to the competent authority, but there is no central notification system.
3. In France, the food business operators have to notify the competent authority when contaminated products are on the market.
4. In Latvia, only clinical cases notifiable.
5. In Spain, Microbiological information System.
6. In Sweden, VTEC O157 infection have been notifiable since 1996, since 2004 all clinical VTEC have been notifiable.
7. In Sweden, infections with VTEC notifiable since 1996. Since 1999 findings of VTEC associated with human cases of EHEC notifiable.
8. Notification required when further transmission to humans is suspected or has occurred.

***Appendix Table YE1. Notification on* Yersinia *in humans (V=Voluntary, O=Other), animals and food, 2010***

| Country | Notifiable in humans | Notifiable in animals | Notifiable in food |
|---|---|---|---|
| Austria | yes, since 1947 | no | yes, since 1975 |
| Belgium | yes <1999[1] V | yes, since 1998 | yes, since 2004 |
| Bulgaria | yes | - | - |
| Cyprus | yes, since 2005 | - | - |
| Czech Republic | yes | no | - |
| Denmark | yes, since 1979 | no | - |
| Estonia | 1982 | no | yes, since 2000 |
| Finland | 1995 | no | no[2] |
| France | yes V | - | - |
| Germany | yes | - | yes |
| Greece | - | - | - |
| Hungary | yes, since 1998 | no | - |
| Ireland | yes, since 2004 | yes, since 1992 | no |
| Italy | yes, since 1990 V | no | yes, since 1962 |
| Latvia | yes, since 1988 | yes[3] | yes |
| Lithuania | yes, since 1985 | yes >30 years | - |
| Luxembourg | yes | no | no |
| Malta | yes | - | - |
| Netherlands | - | yes | yes |
| Poland | yes, since 2004 | - | no |
| Portugal | no | no | - |
| Romania | yes | no | - |
| Slovakia | yes | no | yes, since 2000 |
| Slovenia | yes, since 1977 | no | yes, since 2003 |
| Spain | yes, since 1989[4] V | yes, since 1994 | yes, since 1994 |
| Sweden | yes, since 1996 | no | no |
| United Kingdom | no O | no | no |
| Iceland | - | - | - |
| Liechtenstein | yes | - | - |
| Norway | yes, since 1992 | no | no |
| Switzerland | yes[5] | yes, since 1966 | - |

1. In Belgium, in the Flemish Community.
2. In Finland, food business operator has to notify to the competent authority, but there is no central notification system.
3. In Latvia, only clinical cases are notifiable.
4. In Spain, Microbiological Information System.
5. In Switzerland, only outbreaks are notifiable.

***Appendix Table TR1. Diagnostic methods and monitoring programmes for* Trichinella*, 2010***

| Country | Humans Diagnostic methods | Animals Diagnostic methods | Animals - monitoring programmes Meat inspection at slaughter | Other monitoring |
|---|---|---|---|---|
| Austria | Serology (ELISA ), Western Blot | Regulation (EC) No 2075/2005 | Pigs, horses, farmed wild boars | Wild boars: monitoring scheme |
| Belgium | Serology (ELISA), histopathology | Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Other wildlife monitored when relevant |
| Bulgaria | | Compression method | Pigs, horses, wild boars, bears, badgers | - |
| Cyprus | EU recommendations | Directive 77/96/EC (digestion method) | Pigs (started in 2004, 80 % examined) | - |
| Czech Republic | - | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Other wildlife monitored when relevant |
| Denmark | Serology, histopathology | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs and horses slaughtered at export approved slaughterhouses, all wild boars | - |
| Estonia | Clinical symptoms, eosinophilia | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Other wildlife monitored when relevant |
| Finland | Serology, histopathology | Regulation (EC) No 2075/2005 | Pigs, horses, wild boars, bears | Continuous wildlife monitoring programme covering foxes, raccoon dogs, mustelids, lynxes and wolves |
| France | Serology, histopathology | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Wild boars: sampling are carried out as a survey |
| Germany | Serology (ELISA), histopathology | Directive 77/96/EC (digestion or compression method) and PCR | Pigs, horses, wild boars | Other wildlife monitored when relevant |
| Greece | - | Directive 77/96/EC (digestion or compression method) | Pigs | - |
| Hungary | Serology (ELISA ), histopathology, Western Blot | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Other wildlife monitored when relevant |
| Ireland | - | Pepsin digest method according to Regulation (EC) No 2075/2006 | Pigs, horses, farmed wild boars | Wildlife monitoring programme covering foxes, badgers and rodents |
| Italy | - | Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Wildlife monitoring programme covering foxes, mustilids and othre carnivores including birds of prey |
| Latvia | Serology (ELISA) | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars and farmed game | Slaughtering at home is allowed only for personal consumption. In this case the owner is responsible for ensuring control |

Table continued overleaf.

*Appendix Table TR1 (continued). Diagnostic methods and monitoring programmes for* Trichinella*, 2010*

| Country | Humans Diagnostic methods | Animals Diagnostic methods | Animals - monitoring programmes Meat inspection at slaughter | Other monitoring |
|---|---|---|---|---|
| Lithuania | Serology (ELISA) | - | - | - |
| Luxembourg | - | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Foxes |
| Malta | - | Compression method | Horses | Pigs: random on the slaughter line |
| Netherlands | - | Directive 77/96/EC (digestion method) | Pigs, horses | - |
| Poland | Serology and histopathology | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | - |
| Portugal | Serology, histopathology | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Priority: wild boars, breeding pigs and pigs not raised under controlled housing condition |
| Romania | Serology (ELISA) | Pepsin digest method according to Regulation (EC) No 2075/2005. Home slaughtering is allowed only for personal consumption. In this case the owner is responsible for ensuring control | Pigs, horses, wild boars | - |
| Slovakia | Serology, histopathology | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Other wildlife monitored when relevant |
| Slovenia | Serology, histopathology | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars, bears | Other wildlife monitored when relevant. Testing of pigs slaughtered on the holding for private domestic consumption is not mandatory |
| Spain | Decision no. 2002/253/EC - serology, histopathology | Pepsin digest and compression method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars | Home slaughtering. Other wildlife monitored when relevant |
| Sweden | Serology (ELISA/Indirect Immuno Fluorenscence) | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars, bears | Survey of approx. 300 foxes annually, other wildlife monitored when relevant |
| United Kingdom | Histopathology | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, farmed wild boars | Foxes, approximately 400-700 annually |
| Norway | Serology and histopathology | Pepsin digest method according to Regulation (EC) No 2075/2005 | Pigs, horses, wild boars, bears | Wildlife and farmed foxes occasionally |
| Switzerland | - | Directive 77/96/EC (digestion method) | Pigs, horses, wild boars | Survey of foxes in 2006-2007, other wildlife monitored when relevant |

## *Appendix Table TR2. Notification of* Trichinella *in humans (V=Voluntary), animals and food, 2010*

| Country | Notifiable in humans | Notifiable in animals | | Notifiable in food |
|---|---|---|---|---|
| Austria | yes, since 1947 | yes, since 1994 | Pigs, horses, wild boars | yes, since 1994 |
| Belgium | yes <1999[1] V | yes, since 1998 | - | yes, since 2004 |
| Bulgaria | yes | - | - | - |
| Cyprus | yes, since 2005 | yes | Pigs | - |
| Czech Republic | yes | yes | Pigs, horses, wild boars, other wildlife | - |
| Denmark | no | yes, since 1920[2] | Pigs, horses, wild boars | - |
| Estonia | yes, since 1945 | 2000 | Pigs, horses, wild boars, other wildlife | yes, since 2000 |
| Finland | yes, since 1995 | 1930 | Pigs, horses, farmed and wild game | yes, since 1930 |
| France | yes, since 2000 V | 2006 | Pigs, horses, wild boars | yes < yes 1990 |
| Germany | yes | yes | Pigs, horses, wild boars, other wildlife | yes |
| Greece | yes | 1980 | Pigs | yes, since 1977 |
| Hungary | yes, since 1960 | no | Pigs, horses, nutria, wild boars | yes, since 1984 |
| Ireland | yes, since 2004 | yes | Pigs, horses, wild boars, other wildlife | no |
| Italy | yes, since 1990 | yes, since 1958 (pigs), 1994 (horses) | Pigs, horses, wild boars | 1958 |
| Latvia | yes, since 1988 | yes | Pigs, horses, wild boars and farmed game, other wildlife | - |
| Lithuania | yes, since 1990 | yes >30 years | - | - |
| Luxembourg | yes | 1947 | Pigs, horses, wild boars | - |
| Malta | yes | - | Pigs (random), horses | - |
| Netherlands | yes | yes | Pigs, horses, wild boars | - |
| Poland | yes, since 1919 | yes, since 1928 | Pigs, horses, wild boars | - |
| Portugal | yes, since 1987 | yes, since 1953 | Pigs | yes |
| Romania | yes | yes, since 1913 | Pigs, horses, wild boars, bears, other wildlife | yes > 50 years |
| Slovakia | yes | yes | All animals for human consumption | yes, since 2000 |
| Slovenia | yes, since 1977 | yes <1991[3] | Pigs, horses, wild boars, bears | yes, since 2003 |
| Spain | yes, since 1982 | yes, since 1952 | Pigs, wild boars | yes, since 1952 |
| Sweden | yes >30 years | yes>50 years | Pigs, horses, wild boars, bears | yes >50 years |
| United Kingdom | yes V | yes[4] | Pigs, horses | yes |
| Iceland | - | - | - | - |
| Liechtenstein | yes | - | - | - |
| Norway | yes, since 1975 | yes, since 1965 | Pigs, horses, wild boars, bears | yes, since 1965 |
| Switzerland | yes, since 2009 | yes, since 1966 | Pigs, horses | no |

Note: Directive 64/433/EC and/or Directive 77/96/EC were no longer in force in 2006. Replaced by Regulation (EC) No 2075/2005.
1. In Belgium, the Flemish Community.
2. In Denmark, only clinical cases are notifiable.
3. In Slovenia, the year of independence. The disease was notifiable before 1991.
4. In the United Kingdom, notifiable only under the Specified Animal Pathogens Order 1998.

***Appendix Table EH1.* Echinococcus *monitoring programmes and diagnostic methods in humans and/or animals, 2010***

| Country | Type of data | Diagnostic methods | Monitoring, treatment etc. |
|---|---|---|---|
| Austria | Laboratory confirmed | Humans: ELISA, Western blot. Animals: Histopathology, ultrasound, X-ray, computed tomography, serology or combo serology DNA (PCR) | Foxes tested on request |
| Belgium | Laboratory confirmed | Humans: *E. granulosus*: ELISA and Indirect hemagglutination Assay (IHA), *E. multilocularis* ELISA. Animals: visual examination of organs, microscopic examination of mucosal scrapings of the gut | Information campaign in wooded areas about consumption of berries |
| Bulgaria | - | - | - |
| Cyprus | - | - | Scheme to treat dogs and stray dogs with Pranziquantel |
| Czech Republic | Laboratory confirmed | Animal: Microscopical diagnostic | A monitoring programme for *Echinococcus* in foxes was introduced in 2005. Samples are taken from foxes hunted for control of vaccination efficiency against Rabies |
| Denmark | Laboratory confirmed | Humans: Abdominal Computed Tomography Scan, serology, histopathology | - |
| Estonia | Laboratory confirmed | Histopathology, serology | - |
| Finland | Laboratory confirmed | Humans: Serology, histopatology. Animals: copro-ELISA, copro-PCR, PCR, visual examination of organs | Treatment required for dogs and cats imported for countries other than Sweden, Norway (other parts than Spitsbergen), United kingdom and Ireland and animals less than three months old entering from MS, recommended for hunting dogs before and after hunting season. Continuous surveillance for *Echinococcus* in foxes and raccoon dogs |
| France | Voluntary reporting | Animals: Faeces: Flotation, PCR and sequencing, Intestines: Scrapping and sedimentation, Liver or lung: PCR and sequencingHumans : ELISA, Western blot, histopathology, X-ray | A survey on *Echinococcus multilocularis* in foxes. Faecal samples analysis |
| Germany | Laboratory confirmed | Animals: microscopic examination of mucosal scrapings of the gut | Mostly sporadic testing, monitoring in some federal states |
| Greece | - | Humans: X-ray, echo and serological investigation | - |
| Hungary | Laboratory confirmed | Western blot | - |
| Ireland | - | - | - |
| Italy | - | - | - |
| Latvia | Laboratory confirmed/monthly | Serology | Macroscopic investigation on hydatic cysts at the slaughterhouse is a part of the meat inspection procedure. Treatment with an anti-helmintic drugs is recommended in the final hosts - dogs and cats |

Table continued overleaf.

***Appendix Table EH1 (continued).* Echinococcus *monitoring programmes and diagnostic methods in humans and/or animals, 2010***

| Country | Type of data | Diagnostic methods | Monitoring, treatment etc. |
|---|---|---|---|
| Lithuania | Laboratory confirmed | Serology (ELISA and Western blot), Histopathology, imaging | - |
| Luxembourg | Laboratory confirmed | Foxes: Microscopical diagnostic and PCR in feces<br>Other animals: Inspection at slaughterhouse | Foxes tested on request |
| Malta | - | - | - |
| Netherlands | Laboratory confirmed | Serology | - |
| Poland | Laboratory confirmed | Serology (ELISA and Western blot) and histopathology | - |
| Portugal | Laboratory confirmed, passive case finding | Humans: histopathology, serology, imaging | 3 regions have a programme running where dogs are dewormed |
| Romania | Laboratory confirmed | Dogs: faeces - flotation and ELISA coproantigen; intestines - scrapping and sedimentation | Surveillance program for EH 1 in dogs was introduced since 2005 - ELISA coproantigen, after treatment. Treatment with an antihelminthic drugs is recommanded in the final parts (dogs). |
| Slovakia | Laboratory confirmed | Humans: Serology and histopathology | - |
| Slovenia | Laboratory confirmed | Humans: Serology, X – Ray, Computed Tomography Scan, Magnetic Resonance Imaging (MRI)<br>Animals: Macroscopic (visual) examination of organs and laboratory microscopic parasitological identification of the agent | Visual examination of the slaughtered/killed animal and its organs, and palpation of the liver. Systematic dehelminthisation of dogs along with anti-rabies vaccination. |
| Spain | Laboratory confirmed, passive case finding | According to Decision 2119/98/EC, Decision 2002/253/EC and Decision 2002/243/EC | Control infection in animals and meat inspection |
| Sweden | Laboratory confirmed, *E. granulosus*: passive case finding; *E. multilocularis* surveillance in foxes | Humans: Copro-ELISA, copro-PCR, PCT, visual examination of organs | Since 2001, an annual investigation of 300-400 foxes. Anthelmintic treatment required for dogs imported from countries other than Finland and Norway |
| United Kingdom | Visual meat inspection - voluntary reporting | - | Treatment for imported dogs and cats. Regional deworming programme. Slaughterhouse testing Meat inspection - carcass condemnation |
| Norway | Laboratory confirmed | Humans: Serology, Histopathology. Animals: PCR, egg detection, histopathology | Anthelmintic treatment required for dogs imported from countries other than Finland and Sweden. Mandatory meat inspection for hydatid cysts, survey of *E. multilocularis* in foxes. |
| Switzerland | Animals: Laboratory confirmed<br>Humans: Voluntary reporting | Animals: ELISA, PCR, morphology, microscopic examination | Research project with deworming baits in city foxes (2004-2010). |

### *Appendix Table EH2. Notification of* Echinococcus *in humans (V=Voluntary), animals and food, 2010*

| Country | Notifiable in humans | Notifiable in animals | Notifiable in food |
|---|---|---|---|
| Austria | yes, since 2004 | yes, since 1994 | yes, since 1994 |
| Belgium | yes < 1999 V | yes, since 1998 | yes, since 2004 |
| Bulgaria | yes | - | - |
| Cyprus | yes, since 1969 | - | - |
| Czech Republic | yes | no | - |
| Denmark | no | yes | - |
| Estonia | yes, since 1986 | yes, since 2000 | yes, since 2000 |
| Finland | 1995 | yes, since 1995[1] | yes, since 1995[1] |
| France | yes V | no | - |
| Germany | yes | yes, since 2004 | - |
| Greece | yes | yes, since 1980 | - |
| Hungary | yes, since 1960 | no | yes, since 1984 |
| Ireland | yes, since 2004 | - | no |
| Italy | - | yes | yes, since 1964 |
| Latvia | yes, since 1999 | yes | yes |
| Lithuania | yes, since 1990 | yes | - |
| Luxemburg | yes | no | - |
| Malta | yes | - | - |
| Netherlands | no | yes | yes |
| Poland | yes, since 1959/1997[2] | - | - |
| Portugal | yes | yes | - |
| Romania | yes | yes, since 1942 | - |
| Slovakia | yes | yes[3] | no |
| Slovenia | yes, since 1977 | yes<1991[4] | yes, since 2003 |
| Spain | yes, since 1982 | yes, since 1994 | yes, since 1994 |
| Sweden | yes, since 2004 | yes >30 years | yes >30 years |
| United Kingdom | yes V | yes, since 1998[5] | no |
| Iceland | - | - | - |
| Liechtenstein | yes | - | - |
| Norway | yes, since 2003 | yes, since 1985 | yes, since 1965[6] |
| Switzerland | no | yes, since 1966 | - |

1. In Finland, notifiable also before 1995, but legislation changed in 1995.
2. In Poland, from 1959 registered together with other tapeworms, from 1997 reported separately.
3. In Slovakia, only clinical cases.
4. In Slovenia, the year of independence, however this disease was notifiable before 1991.
5. In the United Kingdom, notifiable only under the Specified Animal Pathogens Order 1998.
6. Mandatory meat inspection for hydatid cysts.

## *Appendix Table TO1. Notification of* Toxoplasma *in humans and animals, 2010*

| Country | Notifiable in humans | Notifiable in animals since |
|---|---|---|
| Austria | no | no |
| Belgium | - | - |
| Bulgaria | yes | - |
| Cyprus | yes | - |
| Czech Republic | yes | - |
| Denmark | no | no |
| Estonia | yes | - |
| Finland | yes | yes[1] |
| France | - | - |
| Germany | - | yes[2] |
| Greece | - | - |
| Hungary | yes | - |
| Ireland | yes | - |
| Italy | yes | - |
| Latvia | yes | yes |
| Lithuania | yes[3] | - |
| Luxembourg | yes | - |
| Malta | yes | - |
| Netherlands | - | - |
| Poland | yes | yes |
| Portugal | - | - |
| Romania | yes | - |
| Slovakia | yes | - |
| Slovenia | yes | - |
| Spain | yesV[4] | - |
| Sweden | yes | no |
| United Kingdom | yes[5] | - |
| Iceland | yes | - |
| Liechtenstein | - | - |
| Norway | no | yes[6] |
| Switzerland | no | yes |

1. In Finland *Toxoplasma gondii* is a notifiable disease in all animals except hares, rabbits and rodents.
2. In Germany toxoplasmosis is notifiable in pigs, dogs and cats.
3. Every probable, suspected, or confirmed case is registered in personal healthcare institution according Health minister's order and is informed to territorial public healthcare institution where cases are registered. All detected cases are reported to the national level Centre for Communicable Diseases Prevention and Control and cases are registered in State register for communicable diseases.
4. Not compulsory but voluntary reporting from laboratories.
5. Toxoplasmosis is only notifiable in humans in Scotland. In the rest of the United Kingdom the human cases relate to voluntary laboratory reporting.
6. Toxoplasmosis in animals has been a List C disease according to the Animal Diseases Act since 1965.

***Appendix Table QF1. Regulations, control and diagnostic methods for Q fever, 2010***

| Country | Regulation (Monitoring or Surveys) | Type of sample (Frequency) | Control measures | Diagnostic method | | National Reference Laboratories | |
|---|---|---|---|---|---|---|---|
| | | | | Isolation and direct identification[1] | Serology[2] | Animal | Human |
| Austria | - | Abortion material, blood samples | - | ICH, Real-time PCR | CFT, ELISA (IDVET) | no | no |
| Belgium | - | - | - | Real-time PCR (Taqvet Kit LSI) and staining | CFT (virion-Serion), ELISA (LSI kit) | yes | - |
| Bulgaria | Existing Q fever regulation for ruminants, for export/import purpose | Abortion material, crude milk and manure | Govermental financial help for stockbreeders | Staining | IFA, CFT | yes | yes |
| Cyprus | - | - | - | Staining | IFA, ELISA | yes | yes |
| Czech Republic | - | - | - | - | CFT (virion), ELISA (IDVET) | no | no |
| Denmark | Existing Q Fever Regulation for ruminants | - | Govermental financial help for stockbreeders | Real-time PCR, gel-based isolation and staining (FISH)[3] | CFT (dogs, cats, pigs), ELISA (ruminants) | yes | - |
| Estonia | - | - | - | - | - | no | no |
| Finland | Existing Q Fever Regulation for ruminants | Crude milk | - | Gel-based isolation (Adigene) and staining | ELISA | yes | yes |
| France | - | - | - | Real-time PCR, gel-based isolation and staining | IFA, CFT, ELISA (LSI, IDVET, IDEXX) | yes | yes |
| Germany | Existing QFever Regulation for ruminants | Abortion material and crude milk | - | Real-time PCR, gel-based isolation and staining | CFT, ELISA (IDEXX) | yes | yes |
| Greece | - | - | - | Real-time PCR, gel-based isolation and staining | CFT, ELISA (IDEXX) | yes | - |
| Hungary | - | - | - | Gel-based isolation (Hum HM) | IFA (human), CFT (animal) | - | yes |
| Ireland | - | - | - | - | - | - | - |
| Italy | Existing Q Fever Regulation for ruminants | Abortion material, crude milk and manure | - | Gel-based isolation | IFA (human), ELISA (CHEKIT) | yes | - |
| Latvia | - | - | - | - | - | - | yes |
| Lithuania | - | - | - | - | - | yes | - |
| Luxembourg | - | - | - | - | - | yes | - |
| Malta | - | - | - | - | - | - | - |

Table continued overleaf.

***Appendix Table QF1 (continued). Regulations, control and diagnostic methods for Q fever, 2010***

| Country | Regulation (Monitoring or Surveys) | Type of sample (Frequency) | Control measures | Diagnostic method | | National Reference Laboratories | |
|---|---|---|---|---|---|---|---|
| | | | | Isolation and direct identification[1] | Serology[2] | Animal | Human |
| Netherlands | Existing Q fever regulation for ruminants, for dairy sheep and goats only | Abortion material, crude milk and manure | Vaccination/ breeding ban/ hygiene protocol started 2009 | Real-time PCR and staining (IHC) | CFT, ELISA (IDEXX, LSI) | no | no |
| Poland | - | - | - | Gel-based isolation and staining | IFA, CFT, ELISA | yes | yes |
| Portugal | - | - | - | Gel-based isolation | ELISA (IDEXX) | yes | yes |
| Romania | Existing Q fever regulation for ruminants | Abortion material | Govermental financial help for stockbreeders | - | ELISA (IDEXX) | yes | - |
| Slovakia | - | - | - | - | CFT | no | no |
| Slovenia | Existing Q fever regulation for ruminants. | Abortion material, crude milk and manure Monitoring programme: blood | - | Real-time PCR and gel-based isolation (Adigene) | CFT (virion-Serion), ELISA (IDEXX) | no | no |
| Spain | - | - | - | Conventional and Real-time PCR, gel-based isolation and staining | IFA, CFT, ELISA | yes | yes |
| Sweden | - | - | - | Real-time PCR (Adiagene) | IFA (Q-focus for human), CFT (Behring Antigen), ELISA (Virion for human, IDEXX for animal) | yes | yes |
| United Kingdom | No statutory monitoring (no existing Q fever regulation). Voluntary scanning surveillance (clinical diagnostic sampes). National survey (sheep and goats) carried out in 2009 | Abortion material, milk, serum | - | Real-time PCR and staining | CFT, ELISA (under evaluation) | yes | yes |
| Norway | Existing Q fever regulation for ruminants, for export/import purpose | - | - | - | ELISA (IDEXX) | yes | - |
| Switzerland | Existing Q fever regulation for ruminants | Abortion material | - | Gel-based isolation and staining | ELISA (IDEXX) | yes | - |

1. FISH: Fluorescent in situ hybridization, IHC: Immuno Histo Chemistry, ICH: Immuno Histo Chemical Straining.
2. CFT: Complement fixation test, IFA: Immunofluorescence assay tests, ELISA: Enzyme-Linked Immunosorbent Assay .
3. Fluorescent in situ hybridization (FISH) with oligonucleotide probe targeting 16S rRNA; formalin-fixed placenta.

***Appendix Table QF2. Notification of Q fever in humans and animals and registration of occupational disease, 2010***

| Country | Notifiable in humans | Notifiable in animals | Occupational disease |
|---|---|---|---|
| Austria | no | no | no |
| Belgium | yesV | - | - |
| Bulgaria | yes | yes | yes |
| Cyprus | yes | - | - |
| Czech Republic | yes | yes | yes |
| Denmark | - | yes | yes |
| Estonia | yes | - | - |
| Finland | yes | yes | - |
| France | yesV | yes, since 1986 | yes |
| Germany | yes | yes | yes |
| Greece | yes | yes | yes, also non confirmed |
| Hungary | yes | - | yes |
| Ireland | yes | - | - |
| Italy | yes | yes | yes |
| Latvia | yes | yes, since 1999 | - |
| Lithuania | yes | yes | - |
| Luxembourg | yes | - | - |
| Malta | yes | - | - |
| Netherlands | yes | yes, since 2008 | yes |
| Poland | yes | yes | yes |
| Portugal | yes | - | yes |
| Romania | yes | - | - |
| Slovakia | yes | - | yes |
| Slovenia | yes | yes | yes |
| Spain | yesV | yes | - |
| Sweden | yes | yes | - |
| United Kingdom | yesV | - | yes |
| Iceland | yes | - | - |
| Liechtenstein | - | - | - |
| Norway | yes | - | - |
| Switzerland | - | yes | - |