EFSA monitoring data and the relevant risk assessments on *Campylobacter* in poultry

DG SANCO WORKSHOP ON THE CONTROL OF CAMPYLOBACTER IN POULTRY, Brussels, 07/05/2014

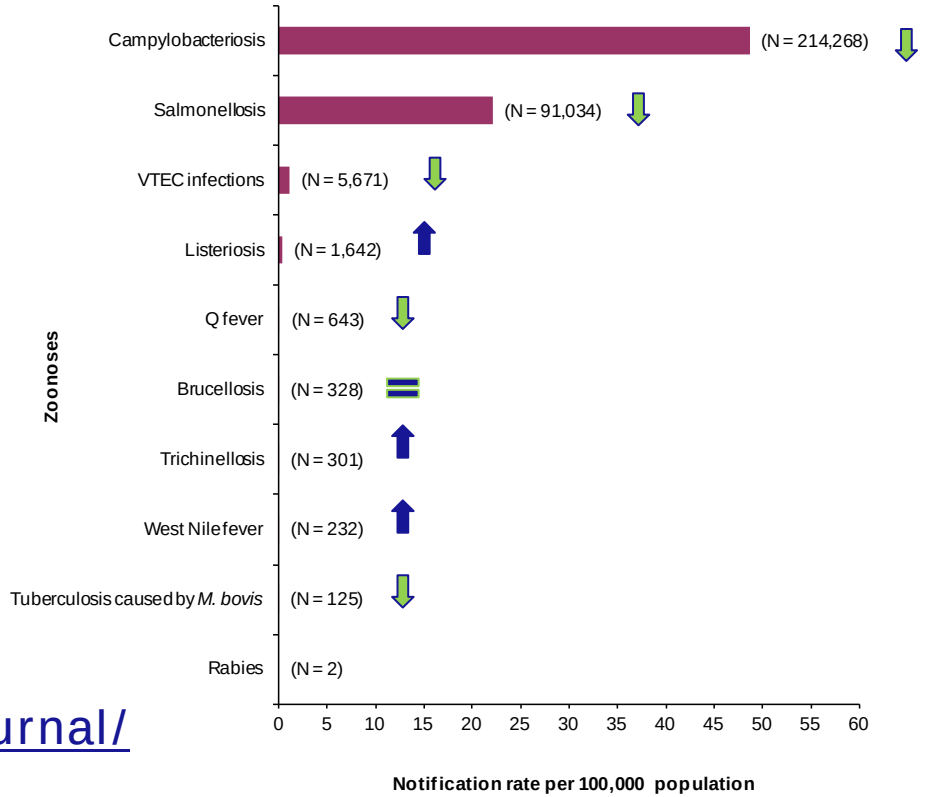
efsa
European Food Safety Authority

www.efsa.europa.eu

HUMAN CAMPYLOBACTERIOSIS

Human zoonoses cases and notification rates, EU, 2012

- Campylobacteriosis was the most frequently reported zoonosis in 2012: 55.49 cases per 100,000 population
- 4.3% decrease compared to 2011



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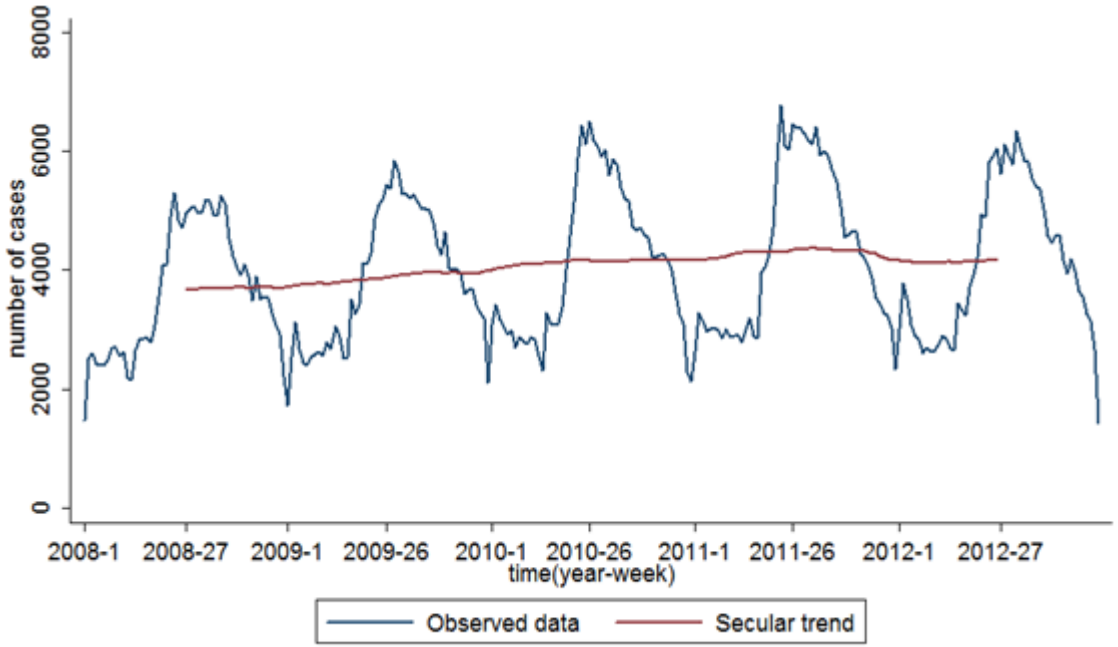
HUMAN CAMPYLOBACTERIOSIS

Human zoonoses cases and notification rates, EU, 2012 cntd

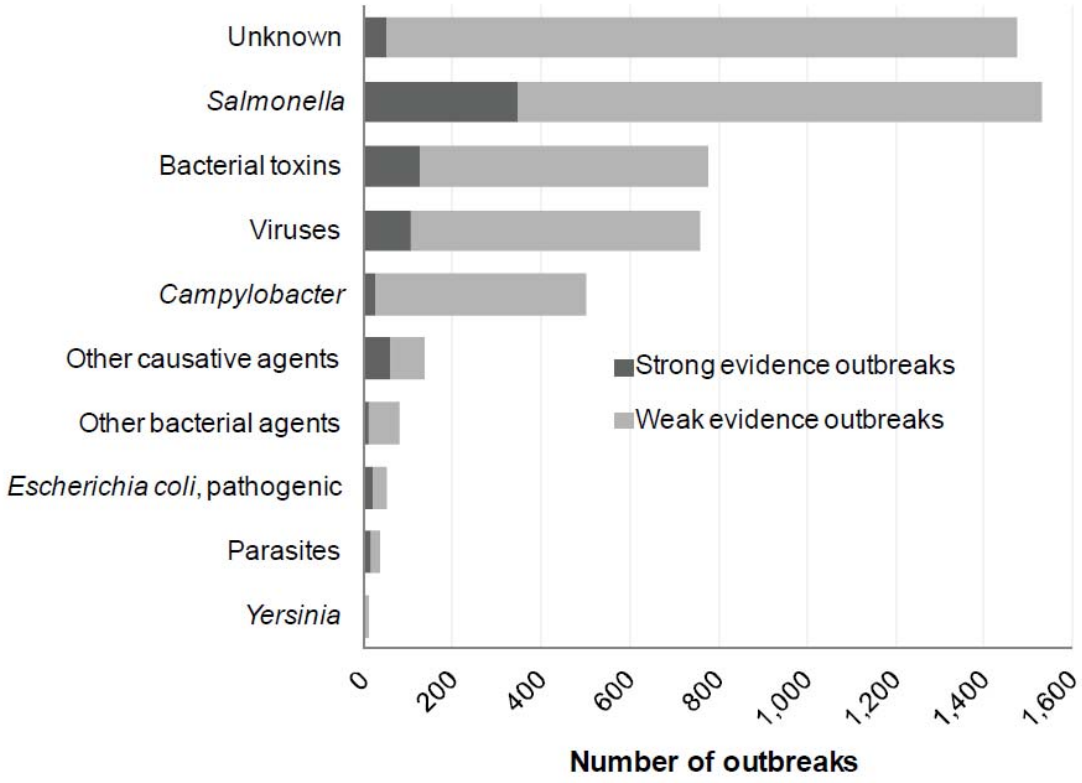
- Clear seasonal trend
- Significant increasing trend since 2008



HUMAN CAMPYLOBACTERIOSIS

Food-borne outbreaks, EU, 2012

- Distribution of food-borne outbreaks by causative agent

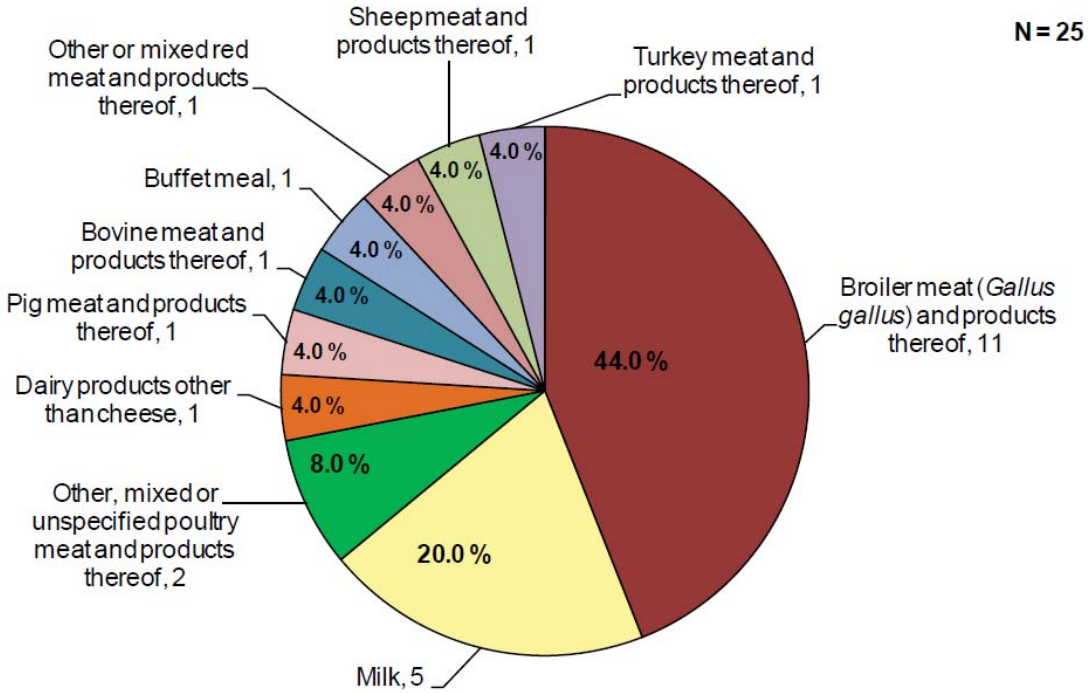


Campylobacter accounted for **9.3%** of the detected causative agent in the food-borne outbreaks reported

HUMAN CAMPYLOBACTERIOSIS

Food-borne outbreaks, EU, 2012

- Distribution of food vehicles in strong-evidence outbreaks caused by *Campylobacter*



As in previous years, broiler meat was the most frequently identified food vehicle, associated with **44.0 %** of these outbreaks

EU MONITORING DATA, 2012

Campylobacter in broilers

- 8 MSs reported data on broiler flocks, slaughter batches or animals (N≥25)
- Occurrence varied widely among MSs

Country	Description	2012		
		N	N pos	% pos
Animal-based data				
Germany	At farm, official sampling	672	62	9.2
Flock-based data				
Denmark	At farm, boot swabs, monitoring, industry sampling	3,376	392	11.6
Germany	At farm, official sampling	43	0	0
Hungary	At slaughterhouse, monitoring	165	138	83.6
Slovenia	At slaughterhouse, neck skin, monitoring, official sampling	30	23	76.7
	At slaughterhouse, faeces, monitoring, official sampling	41	26	63.4
Sweden	At slaughterhouse, monitoring, official sampling	2,346	217	9.2
Iceland	At farm, faeces, monitoring, industry sampling	645	28	4.3
Norway[1]	At farm, faeces, surveillance	2,417	106	4.4
Switzerland[2]	At slaughterhouse, cloacal swab, monitoring, official sampling	546	190	34.8
Slaughter batch-based data				
Austria	At slaughterhouse, caecum, monitoring - active, official sampling	312	146	46.8
Finland	At slaughterhouse, caecum, control and eradication programmes, industry sampling[3]	1,534	82	5.3
	At slaughterhouse, caecum, control and eradication programmes, industry sampling[4]	321	5	1.6
Spain	At slaughterhouse, faeces, monitoring	153	95	62.1
Iceland	At slaughterhouse, caecum, monitoring, official and industry sampling	589	26	4.4

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- 8 MSs reported data on broiler flocks, slaughter batches or animals (N≥25)
- Occurrence varied widely among MSs

Country	Description	2012		
		N	N pos	% pos
Animal-based data				
				9.2
				11.6
				0
				83.6
				76.7
				63.4
				9.2
				4.3
				4.4
				34.8
Austria	At slaughterhouse, caecum, monitoring - active, official sampling	312	146	46.8
Finland	At slaughterhouse, caecum, control and eradication programmes, industry sampling[3]	1,534	82	5.3
	At slaughterhouse, caecum, control and eradication programmes, industry sampling[4]	321	5	1.6
Spain	At slaughterhouse, faeces, monitoring	153	95	62.1
Iceland	At slaughterhouse, caecum, monitoring, official and industry sampling	589	26	4.4

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

http://www.efsa.europa.eu/en/efsajournal/pub/3547.htm

EU MONITORING DATA, 2012

Campylobacter in broiler meat

- 15 MSs reported data on fresh broiler meat (N≥25)
- **23.6 %** of the samples (single or batch) were found to be positive for *Campylobacter*
- Occurrence varied widely among MSs

Country	Description	Sample unit	Sample weight	2012		
				N	N pos	% pos
At slaughterhouse						
Belgium	Carcase, neck skin	Single	1 g	440	44	10.0
Bulgaria	Carcase	Single	-	98	18	18.4
Czech Republic	Carcase, caecum, monitoring	Batch	25 g	125	75	60.0
Denmark[1]	Fresh chilled meat, monitoring	Single	10 g/15 g	865	185	21.4
Estonia	Carcase, neck skin, monitoring	Batch	25 g	48	6	12.5
Hungary	Carcase, meat	Single	25 g	70	32	45.7
Poland	Carcase, carcase swab	Single	-	401	218	54.4
Spain	Carcase, meat	Single	25 g	72	39	54.2
At processing plant or cutting plant						
Belgium	Fresh meat	Single	1 g	714	16	2.2
Germany	Fresh meat	Single	25 g	62	18	29.0
Hungary	Fresh meat	Single	25 g	140	42	30.0
Netherlands	Fresh meat	Single	160 g	411	160	38.9
Poland	Fresh meat, surveillance	Batch	25 g	56	16	28.6
	Fresh meat	Single	500 g	521	5	1.0
Portugal	Fresh meat	Single	25 g	50	16	32.0
Slovenia	Fresh meat	Single	20 g	66	46	69.7
Spain	Fresh meat	Single	25 g	29	4	13.8
At retail						
Austria	Fresh meat, imported, surveillance	Single	25 g	29	1	3.4
Belgium	Fresh meat	Batch	1 g	383	44	11.5
Czech Republic	Fresh meat	Single	25 g	30	0	0
Denmark[2]	Fresh chilled meat, monitoring	Single	10 g/15 g	521	59	11.3
	Fresh frozen meat, monitoring			216	9	4.2
Estonia	Fresh meat, national survey	Single	25 g	217	29	13.4
Germany	Fresh meat	Single	25 g	627	146	23.3
Hungary	Fresh meat	Single	25 g	276	104	37.7
Luxembourg	Fresh meat	Single	10 g	93	75	80.6
Netherlands	Fresh meat	Single	25 g	563	216	38.4
Romania	Fresh meat, monitoring EFSA specifications	Batch	25 g	466	150	32.2
Spain	Fresh meat	Single	25 g	74	37	50.0
Total (15 MSs)				**7,663**	**1,810**	**23.6**
Iceland	At retail, wings with skin, national survey	Batch	-	117	0	0
	At retail, skinned loins, survey	Single	-	117	0	0
	At retail, neck skin of whole chicken, chilled, national survey	Single	25 g	117	0	0

EU MONITORING DATA, 2012

Campylobacter

- 23.6 % of the

It should be noted that results from different countries are not directly comparable owing to between-country variation in the sampling (e.g. season) and testing methods used

In food and in animals:
no major changes as compared to previous years

Poultry meat still appears to be the most important food-borne source of *Campylobacter* since the occurrence of the bacteria remained at a high level in fresh poultry meat

Country	Description	Sample unit	Sample weight	2012		
				N	N pos	% pos
At slaughterhouse						
Belgium	Carcase, neck skin	Single	1 g	440	44	10.0
Bulgaria	Carcase	Single	-	98	18	18.4
						60.0
						21.4
						12.5
						45.7
						54.4
						54.2
						2.2
						29.0
						30.0
						38.9
Poland	Fresh meat, surveillance	Batch	25 g	56	16	28.6
	Fresh meat	Single	500 g	521	5	1.0
Portugal	Fresh meat	Single	25 g	50	16	32.0
						69.7
						13.8
						3.4
						11.5
						0
						11.3
						4.2
						13.4
						23.3
						37.7
						80.6
						38.4
						32.2
						50.0
						23.6
						0
Iceland	At retail, skinned loins, survey	Single	-	117	0	0
	At retail, neck skin of whole chicken, chilled, national survey	Single	25 g	117	0	0

EU HARMONISED BASELINE SURVEY

Objectives

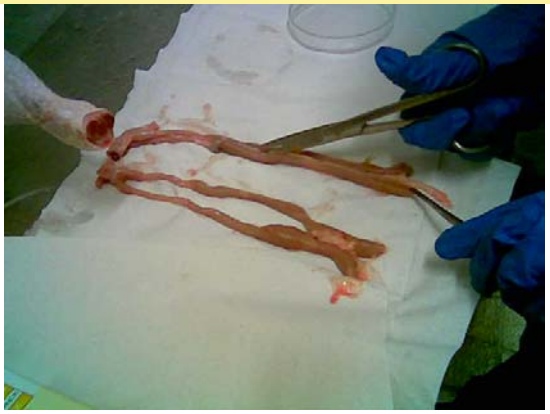
- to estimate the prevalence of *Campylobacter*-colonised broiler batches, at EU level and per MS
- to estimate the prevalence of *Campylobacter*-contaminated broiler carcasses, at EU level and per MS
- to investigate the counts of *Campylobacter* bacteria on broiler carcasses, at EU level and per MS
- to investigate the *Campylobacter* species distribution and determine the most frequently occurring *Campylobacter* species in broiler batches and on broiler carcasses across the EU
- to investigate the effects of factors associated with the *Campylobacter-colonised* broiler batches
- to investigate the effects of factors associated with the *Campylobacter-contaminated* broiler carcasses

EU HARMONISED BASELINE SURVEY

Method

- 10,132 broiler batches were sampled from 561 slaughterhouses in 2008

From every batch one pooled sample from the caecal contents of 10 carcasses was examined for *Campylobacter*

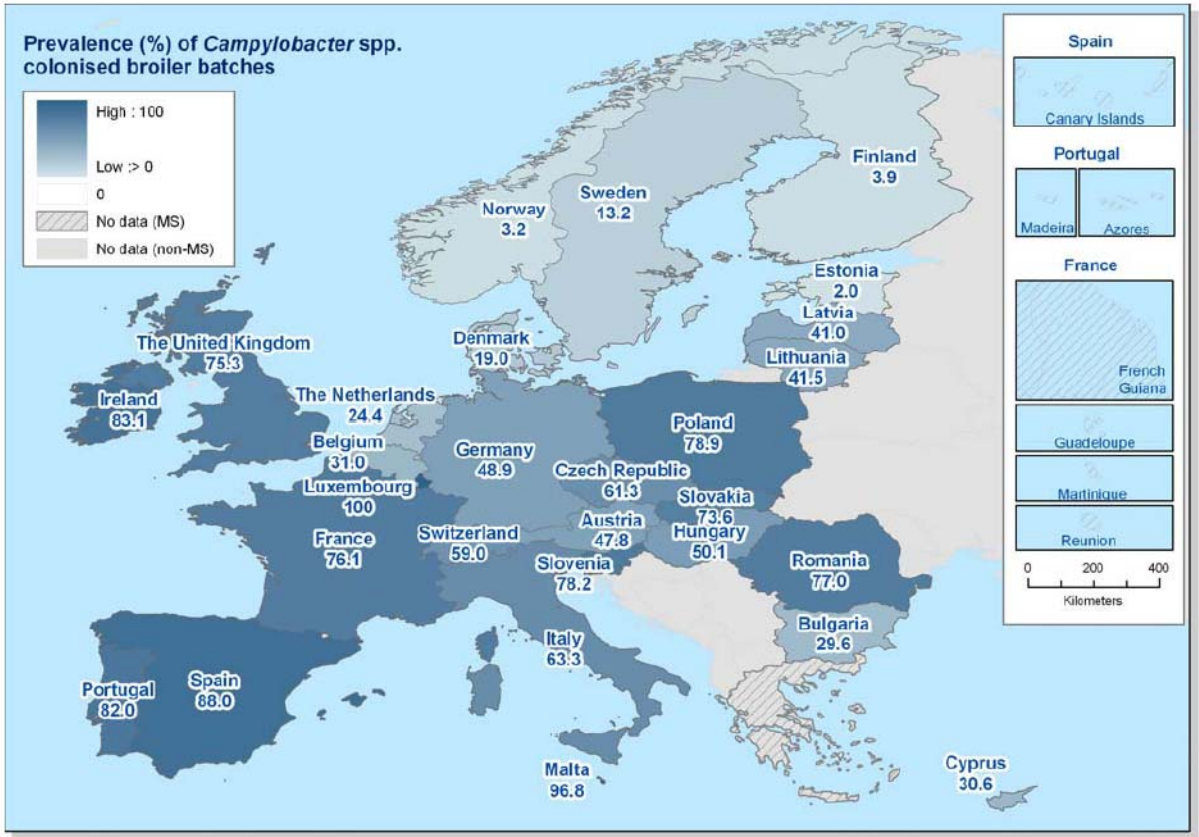


From the same batch, one carcass was collected after chilling from which the neck skin together with the breast skin was examined for the presence and counts of *Campylobacter*

EU HARMONISED BASELINE SURVEY

Results: colonised broiler batches

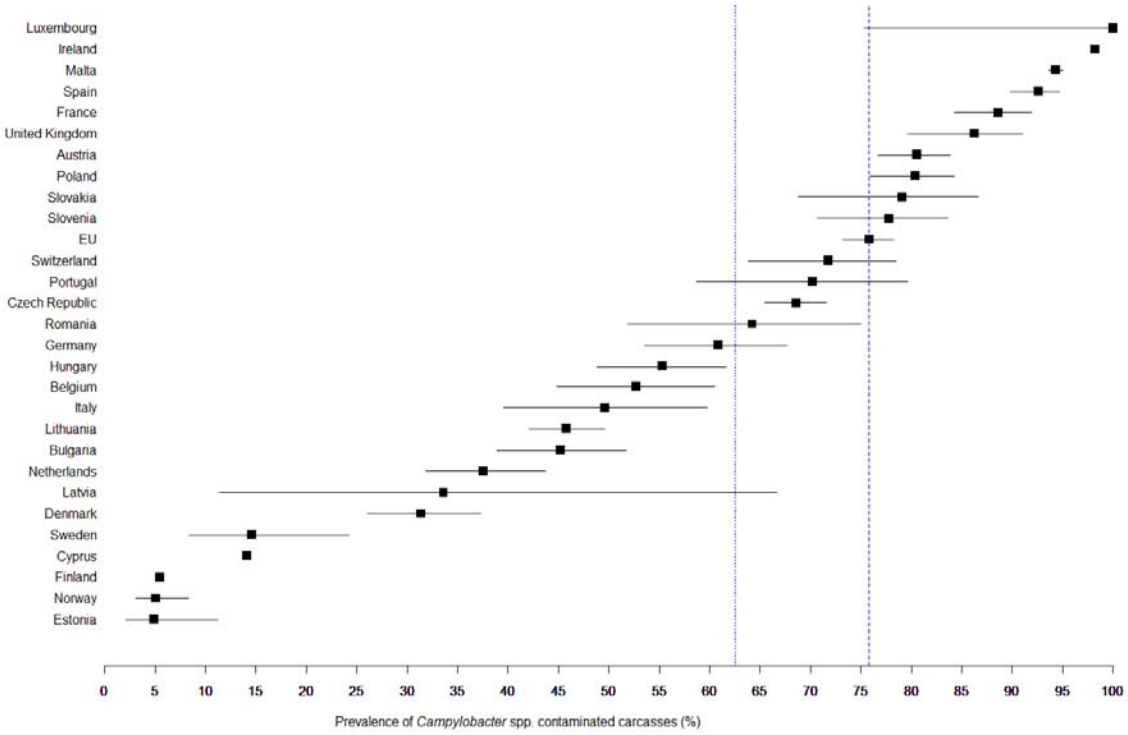
- At EU level the prevalence of *Campylobacter*-colonised broiler batches was 71.2%
- The MS-specific prevalence varied from 2-100%



EU HARMONISED BASELINE SURVEY

Results: prevalence broiler carcasses

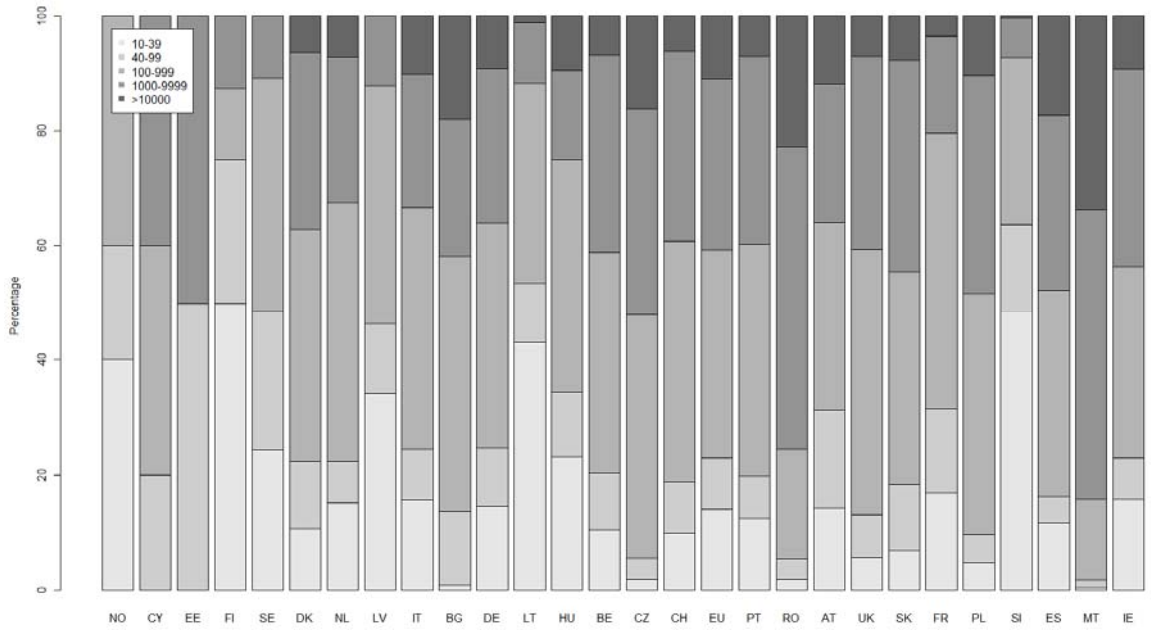
- *Campylobacter* spp. : 75.8% (73.2 – 78.3)



- *Campylobacter jejuni* : 51.0% (48.3 – 53.7)
- *Campylobacter coli* : 35.5% (32.6 – 38.5)

EU HARMONISED BASELINE SURVEY

Results: counts broiler carcasses



- The proportion of samples negative by enumeration (< 10 cfu/g) varied from 3.8-98.6% among MSs
- The proportion of samples with very high counts > 10,000 cfu/g varied from 0-31.9%

RISK BY BROILER MEAT TO HUMAN CAMPYLOBACTERIOSIS

Mandate from the EC

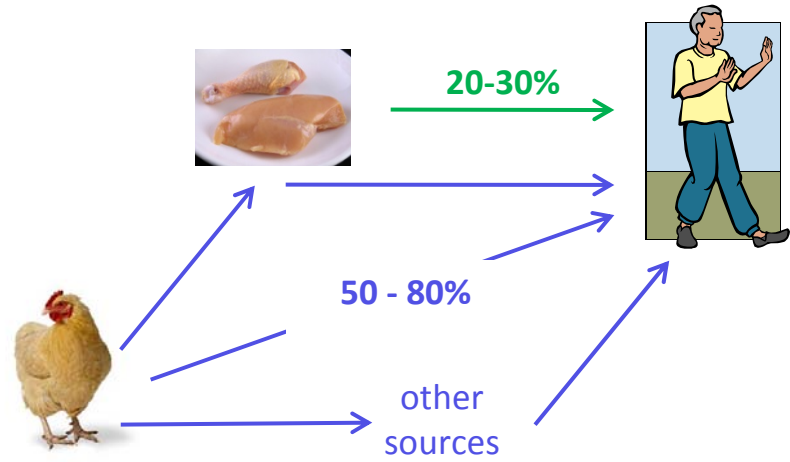
- The risk posed by broiler meat to human campylobacteriosis in the EU (EFSA-Q-2008-459)
- Published Jan 2010: www.efsa.europa.eu/en/efsajournal/pub/1437.htm

ToR 1: Assess the extent to which meat derived from broilers contributes to human campylobacteriosis at EU level. The importance may be expressed as a percentage of the total number of human campylobacteriosis cases.

RISK BY BROILER MEAT TO HUMAN CAMPYLOBACTERIOSIS

Answers to ToR1

- Handling, preparation and consumption of broiler meat may account for 20-30% of human cases of campylobacteriosis
- 50- 80% may be attributed to the chicken reservoir



- Data for source attribution in EU are limited and there are indications that the epidemiology of human campylobacteriosis differs between regions => conclusions to be interpreted with care

Some general conclusions

- There are multiple pathways of human exposure
- There is considerable underascertainment and underreporting
- Travelling is a reported risk factor. A large proportion of cases is associated with travelling within the EU and would be preventable by EU-wide control measures
- Few data available on certain reservoirs (e.g. pets and wild birds)

RISK BY BROILER MEAT TO HUMAN CAMPYLOBACTERIOSIS

Some recommendations

- To establish active surveillance of campylobacteriosis in all MS
- To obtain a representative collection of isolates from humans and putative reservoirs
- To develop research on: *Campylobacter* virulence and ecology, role of immunity on human campylobacteriosis

CONTROL OPTIONS

Mandate from the EC

- *Campylobacter* in broiler meat production: control options and performance objectives and/or targets at different stages of the food chain (EFSA-Q-2009-00233)
- Published April 2011: www.efsa.europa.eu/en/efsajournal/pub/2105.htm

ToR 2: Identify and rank the possible control options within the broiler meat production chain, taking into account the expected efficiency in reducing human campylobacteriosis [...]

CONTROL OPTIONS

Approach

- Description of risk factors and interventions
  - based on literature review and EU baseline survey report
- Estimation of effect of control options on human campylobacteriosis
  - based on quantitative model
- Description of advantages and disadvantages of potential interventions
  - based on expert opinion

CONTROL OPTIONS

Approach

- Quantitative model developed by contractor (CAMO)* + some modifications (dose response model)
- Data sources:
  - EU-wide baseline survey and CSR of 2008
  - Peer-reviewed literature
  - Expert opinion
- Applicable to any EU MS, but intervention analysis run for four countries
- Output: relative reduction of human campylobacteriosis cases attributable to broiler meat (PH risk reduction)

http://www.efsa.europa.eu/en/supporting/doc/132e.pdf

CONTROL OPTIONS

Results interventions primary production

- Fly screens (indoor flocks) } ~ 60% PH risk reduction
- Restriction of slaughter age to a max 28 days (indoor flocks) ★ } < 50% PH risk reduction
- Discontinued thinning ★ }

These PH risk reductions are expected to vary considerably between MSs

★ Directly available interventions (from technical point of view)

CONTROL OPTIONS

Results interventions post-slaughter

- Irradiation/cooking ★ — 100% PH risk reduction
- Freezing for 2-3 weeks
- ↓ conc in intestines at slaughter by > 3 $\log_{10}$ units ★ — 90% PH risk reduction
- Freezing for 2-3 days ★
- Hot water decontamination ★
- Chemical carcass decontamination ★ — 50-90% PH risk reduction

★ Directly available interventions (from technical point of view)

CONTROL OPTIONS

General conclusions

- ~ 9 million campylobacteriosis cases per year in the EU27
- Estimated disease burden is 0.35 million DALYs per year and total annual costs are 2.4 billion €
- The public health benefits of controlling *Campylobacter* in primary broiler production are expected to be greater than control later in the chain as bacteria may also spread from farms to humans by other pathways than broiler meat

PERFORMANCE OBJECTIVES AND/OR TARGETS

Mandate from the EC

- *Campylobacter* in broiler meat production: control options and performance objectives and/or targets at different stages of the food chain (EFSA-Q-2009-00233)
- Published April 2011: www.efsa.europa.eu/en/efsajournal/pub/2105.htm

ToR 3: Propose potential performance objectives and/or targets at different stages of the food chain in order to obtain e.g. 50% and 90% reductions of the prevalence of human campylobacteriosis in the EU caused by broiler meat consumption or cross-contamination [...]

PERFORMANCE OBJECTIVES AND / OR TARGETS

Targets in primary production

- Approach
  - Specific model (CamPrev)
  - Expected risk reduction if BFP reached a target of 50%, 25%, 10%, 5%, 1%, or 0%

PERFORMANCE

Results

Country		Current BFP[a]	Risk reduction if BFP would be reduced to					
			50%	25%	10%	5%	1%	0%
Austria	AT	47.8%	0.0%	47.7%	79.1%	89.5%	97.9%	100.0%
Belgium	BE	30.3%	0.0%	17.4%	67.0%	83.5%	96.7%	100.0%
Bulgaria	BG	33.1%	0.0%	24.5%	69.8%	84.9%	97.0%	100.0%
Cyprus	CY	31.7%	0.0%	21.2%	68.5%	84.2%	96.8%	100.0%
Czech Republic	CZ	61.1%	18.2%	59.1%	83.6%	91.8%	98.4%	100.0%
Denmark	DK	19.2%	0.0%	0.0%	47.9%	73.9%	94.8%	100.0%
Estonia	EE	2.0%	0.0%	0.0%	0.0%	0.0%	49.0%	100.0%
Finland	FI	4.1%	0.0%	0.0%	0.0%	0.0%	75.8%	100.0%
France	FR	75.1%	33.4%	66.7%	86.7%	93.3%	98.7%	100.0%
Germany	DE	48.6%	0.0%	48.6%	79.4%	89.7%	97.9%	100.0%
Hungary	HU	50.5%	0.9%	50.5%	80.2%	90.1%	98.0%	100.0%
Ireland	IE	80.7%	38.1%	69.0%	87.6%	93.8%	98.8%	100.0%
Italy	IT	63.9%	21.7%	60.9%	84.3%	92.2%	98.4%	100.0%
Latvia	LV	41.0%	0.0%	39.0%	75.6%	87.8%	97.6%	100.0%
Lithuania	LT	42.0%	0.0%	40.4%	76.2%	88.1%	97.6%	100.0%
Malta	MT	97.0%	48.5%	74.2%	89.7%	94.8%	99.0%	100.0%
Poland	PL	79.2%	36.9%	68.4%	87.4%	93.7%	98.7%	100.0%
Portugal	PT	82.9%	39.7%	69.8%	87.9%	94.0%	98.8%	100.0%
Romania	RO	76.5%	34.6%	67.3%	86.9%	93.5%	98.7%	100.0%
Slovakia	SK	70.6%	29.2%	64.6%	85.8%	92.9%	98.6%	100.0%
Slovenia	SI	77.7%	35.7%	67.8%	87.1%	93.6%	98.7%	100.0%
Spain	ES	87.7%	43.0%	71.5%	88.6%	94.3%	98.9%	100.0%
Sweden	SE	12.4%	0.0%	0.0%	19.6%	59.8%	92.0%	100.0%
The Netherlands	NL	24.2%	0.0%	0.0%	58.8%	79.4%	95.9%	100.0%
United Kingdom	UK	75.8%	34.0%	67.0%	86.8%	93.4%	98.7%	100.0%
Weighted EU average			**29.3%**	**61.6%**	**84.4%**	**92.1%**	**98.4%**	**100.0%**
Norway	NO	3.3%	0.0%	0.0%	0.0%	0.0%	69.5%	100.0%
Switzerland	CH	59.5%	15.9%	58.0%	83.2%	91.6%	98.3%	100.0%

[a]BFP: between-flock prevalence based on EU baseline survey indoor flocks (EFSA, 2010a)

PERFORMANCE OBJECTIVES AND/OR TARGETS

Targets in primary production: conclusions

- Achieving a target of **25%** or **5%** **between-flock prevalence** (BFP) is estimated to result in **50%** and **90%** PH risk reduction at EU level
- Higher PH risk reduction if current BFP is higher
- The realistic time period needed to obtain reductions will differ between countries
- Targets are not realistic for flocks with outdoor access

PERFORMANCE OBJECTIVES AND/OR TARGETS

Microbiological criteria

- Approach
  - Specific model (CAMC)
  - EU baseline survey data
  - The percentage of batches not complying with the criterion (BNMC) is calculated to evaluate the public health impact of a MC

PERFORMANCE OBJECTIVES AND/OR TARGETS

Microbiological criteria: conclusions

- A **PH risk reduction >50%** or **>90%** at the EU level could be achieved if all batches that are sold as fresh meat would comply with MC with a critical limit of **1000** or **500 cfu/gram** of neck and breast skin
- If applied, a total of **15%** and **45%**, of all batches tested in the EU BS of 2008, would **not comply** with these criteria.
- The impact could be very different between MSs.

POULTRY MEAT INSPECTION

Mandate from the EC

- The public health hazards to be covered by inspection of meat (poultry) (EFSA-Q-2010-1469)

- Published June 2012: http://www.efsa.europa.eu/de/efsajournal/pub/2741.htm

POULTRY MEAT INSPECTION

ToR 1: to identify and rank the main risks for PH that should be addressed by meat inspection at EU level.

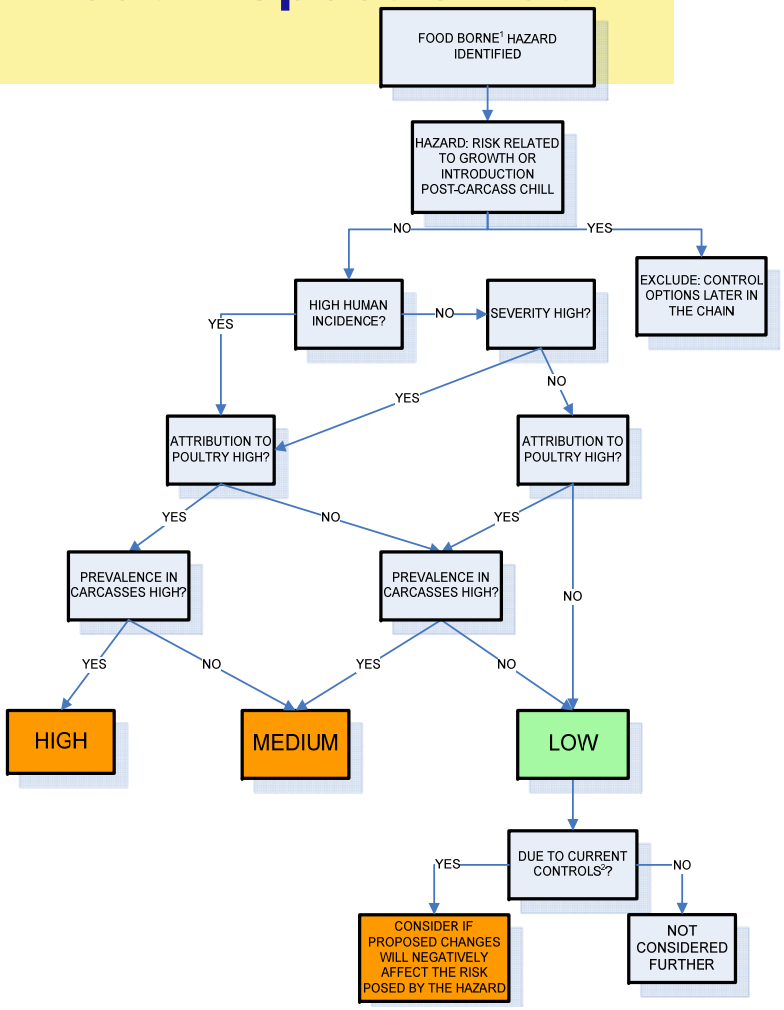
- Hazards from scientific literature were ranked qualitatively using a **decision tree**

***Salmonella* spp.: HIGH relevance**

***Campylobacter* spp.: HIGH relevance**

ESBL/AmpC (*E. coli*): MEDIUM to HIGH relevance

ESBL/AmpC (*Salmonella*): LOW to MEDIUM relevance



POULTRY MEAT INSPECTION

ToR 2: to assess the strengths and weaknesses of the current meat inspection and to recommend alternative methods

STRENGHTS

- Ante-mortem inspection enables:
  - Food Chain Information (FCI) provides information on disease occurrence and veterinary treatments, enabling a focused inspection
  - Verification of FCI and provision of feedback to producers
  - Detection of birds heavily contaminated with faeces
- Post-mortem inspection enables visual detection of fecal contamination of carcasses, which can be an indicator of slaughter hygiene

POULTRY MEAT INSPECTION

ToR 2: to assess the strengths and weaknesses of the current meat inspection and to recommend alternative methods

WEAKNESSES

- Current visual inspection are not able to detect the PH hazards identified as the main concerns for food safety
- The high speed of the slaughter lines reduces the sensitivity of detection of lesions or carcass contamination by visual inspection

POULTRY MEAT INSPECTION

ToR 3: to recommend inspection methods fit for new hazards currently not covered by the meat inspection system

To establish:

A comprehensive food safety assurance for poultry meat, combining measures applied on-farm and at-abattoir

- allowing **risk categorisation of flocks** based on FCI
- enabling **classification of abattoirs** according to their capability to prevent/reduce fecal contamination of carcasses, based on technologies applied and based on the process hygiene, measured by the establishment of Process Hygiene Criteria (PHC)

POULTRY MEAT INSPECTION

ToR 4: to recommend adaptations of inspection methods and/or frequency of inspections

FCI could be used for risk categorisation of flocks/batches

→ requires additional food safety information, e.g. indicators for the main public health hazards

Ante-mortem **inspection** detects fecally contaminated birds and assessment of general health status of the flock

→ no adaptations to existing *ante-mortem* inspection required

POULTRY MEAT INSPECTION

ToR 4: to recommend adaptations of inspection methods and/or frequency of inspections

***Post-mortem* inspection:**

- replaced by establishment of **targets** for the main hazards on the carcass and by verification of the FBO's own hygiene management through the use of **PHC**.
- elimination of abnormalities on aesthetic/meat quality grounds can be ensured through meat quality assurance systems.

ACKNOWLEDGEMENTS

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  - WG experts: Rob Davies, Arie Havelaar, Tine Hald, Coralie Lupo, Birgit Noerrung and Antonia Ricci
- The BIOHAZ Panel members:
  - Olivier Andreoletti, Dorte Lau Baggesen, Declan Bolton, Patrick Butaye, Paul Cook, Robert Davies, Pablo S. Fernandez Escamez, John Griffin, Tine Hald, Arie Havelaar, Kostas Koutsoumanis, Roland Lindqvist, James McLauchlin, Truls Nesbakken, Miguel Prieto Maradona, Antonia Ricci, Giuseppe Ru, Moez Sanaa, Marion Simmons, John Sofos and John Threlfall
- The EFSA staff:
  - Amore Giusi, Boelaert Frank, Liebana Ernesto, Hempen Michaela, Messens Winy, Romero-Barrios Pablo, Stella Pietro

USEFUL INFORMATION

- Questions on this presentation:

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- Questions on EFSA activities:
  www.efsa.europa.eu/askefsa