Control of zoonoses based on risk assessment

Example: *Salmonella* and *Campylobacter* in chicken

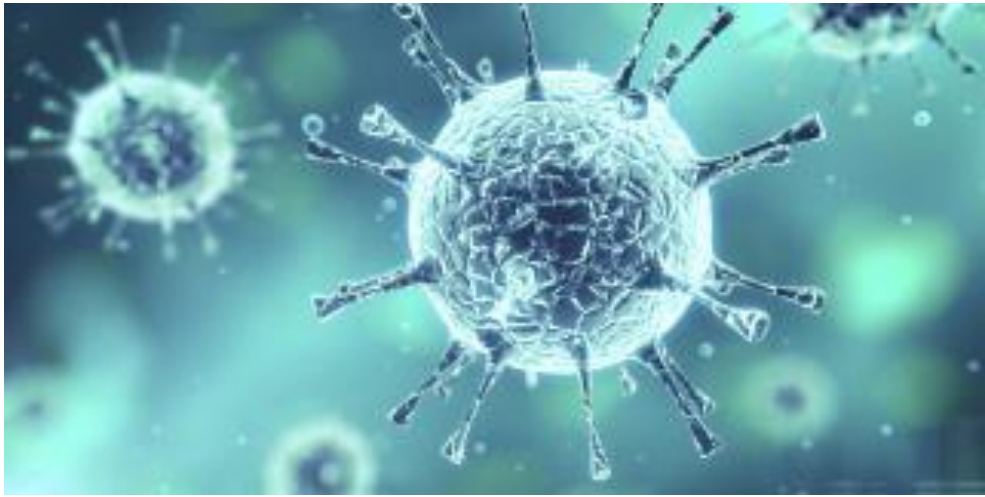
Winy Messens

"One world – one health. Zoonoses and good practice"; Vilnius, Lithuania

16 October 2018

efsa
European Food Safety Authority

EFSA's Scientific Process and the remit of the BIOHAZ Panel

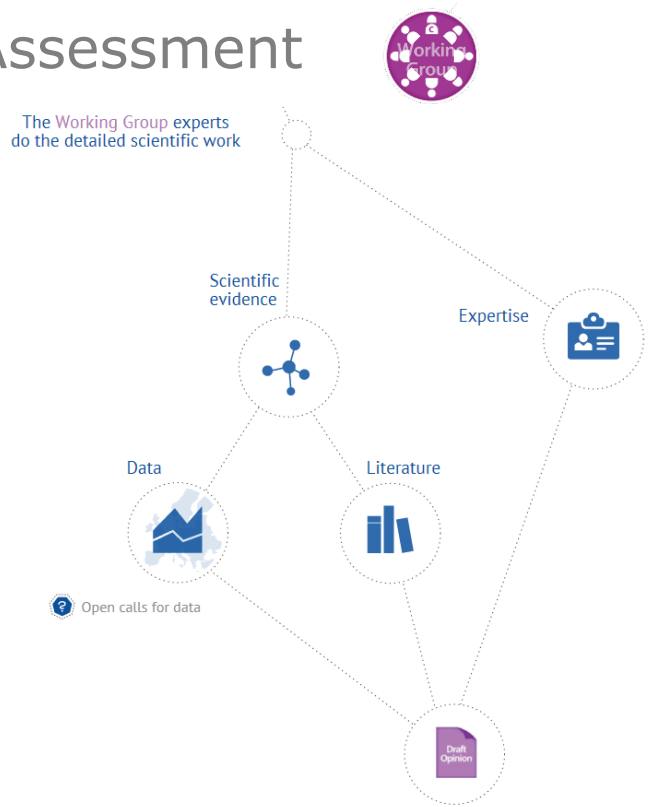


EFSA'S SCIENTIFIC PROCESS

- Request
  - from

  - outlines what is being asked of EFSA
    - e.g. the issue, the terms of reference, the timeframe

- Assessment



EFSA'S SCIENTIFIC PROCESS

- Adoption

The Scientific Committee or Panel **adopts the opinion** by consensus

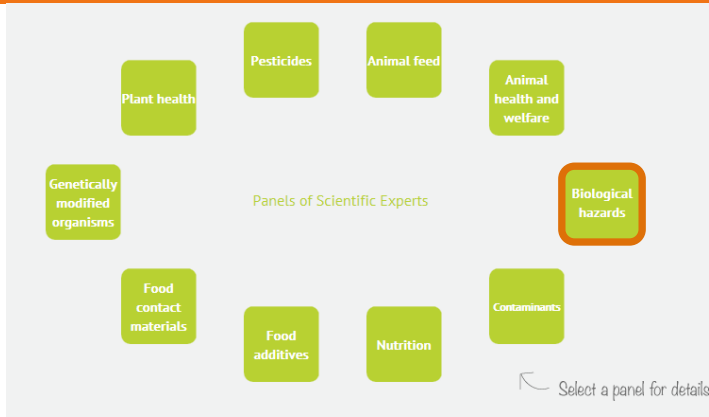
Possible minority opinions are recorded

- Publication

EFSA sends the opinion to the original requesters.

The Opinion is published in the EFSA Journal

REMIT BIOHAZ PANEL



- The BIOHAZ Panel provides scientific advice on biological hazards in relation to food safety and food-borne diseases
- This covers
  - animal diseases transmissible to humans
  - transmissible spongiform encephalopathies
  - food microbiology
  - food hygiene and associated waste management issues

Salmonella in chicken

HUMAN SALMONELLOSIS, EU

SCIENTIFIC REPORT

EFSA Journal

APPROVED: 13 November 2017

doi: 10.2903/j.efsa.2017.5077

The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2016

European Food Safety Authority
European Centre for Disease Prevention and Control

Abstract

This report of the European Food Safety Authority and the European Centre for Disease Prevention and Control presents the results of the zoonoses monitoring activities carried out in 2016 in 37 European countries (28 Member States (MS) and nine non-MS). Campylobacteriosis was the most commonly reported zoonosis and the increasing European Union (EU) trend for confirmed human cases since 2008 stabilised during 2012–2016. In food, the occurrence of *Campylobacter* remained high in broiler meat. The decreasing EU trend for confirmed human salmonellosis cases since 2008 ended during 2012–2016, and the proportion of human *Salmonella* Enteritidis cases increased. Most MS met their *Salmonella* reduction targets for poultry, except five MS for laying hens. At primary production level, the EU-level flock prevalence of target *Salmonella* serovars in breeding hens, broilers, breeding and fattening turkeys decreased or stabilised compared with previous years but the EU prevalence of *S.* Enteritidis in laying hens significantly increased. In foodstuffs, the EU-level *Salmonella* non-compliance for minced meat and meat preparations from poultry was low. The number of human listeriosis confirmed cases further increased in 2016, despite the fact that *Listeria* seldom exceeds the EU food safety limit in ready-to-eat foods. The decreasing EU trend for confirmed yersiniosis cases since 2008 stabilised during 2012–2016, and also the number of confirmed Shiga toxin-producing *Escherichia coli* (STEC) infections in humans was stable. In total, 4,786 food-borne outbreaks, including waterborne outbreaks, were reported. *Salmonella* was the most commonly detected causative agent – with one out of six outbreaks due to *S.* Enteritidis – followed by other bacteria, bacterial toxins and viruses. *Salmonella* in eggs continued to represent the highest risk agent/food combination. The report further summarises trends and sources for bovine tuberculosis, brucellosis, trichinellosis, echinococcosis, toxoplasmosis, rabies, Q fever, West Nile fever and tularaemia.

Salmonella cases no longer falling in the EU

The declining trend of salmonellosis cases in the EU has levelled off according to the annual report on zoonotic diseases published today.

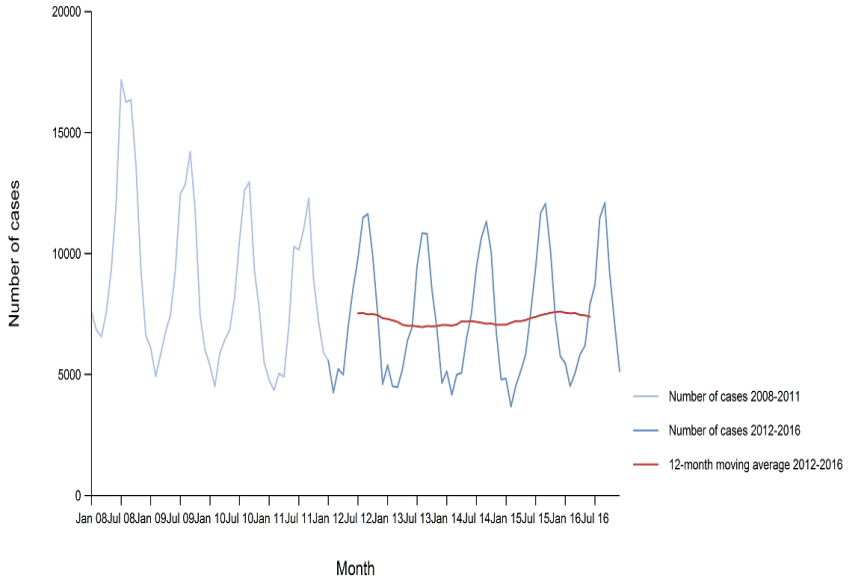
Cases of *Salmonella* Enteritidis acquired in the EU have increased in humans by 3% since 2014 says the report, which is compiled by the European Centre for Disease Prevention and Control (ECDC) and the European Food Safety Authority (EFSA). In laying hens, the prevalence increased from 0.7% to 1.21% over the same period.

"The increase shown by our surveillance data is worrying and a reminder that we have to stay vigilant," said Mike Catchpole, ECDC's Chief Scientist. "Even in a state of high awareness and with national control programmes for *S.* Enteritidis in place, there is a need for continuing risk management actions at the Member State and EU level," he added.

Marta Hugas, EFSA's Chief Scientist, said: "The decrease of *Salmonella* has been a success story in the EU food safety system in the last 10 years. Recent *S.* Enteritidis outbreaks contributed to a change in this trend in humans and poultry. Further investigations by competent authorities in the field of public health and food safety will be crucial to understand the reasons behind the increase."

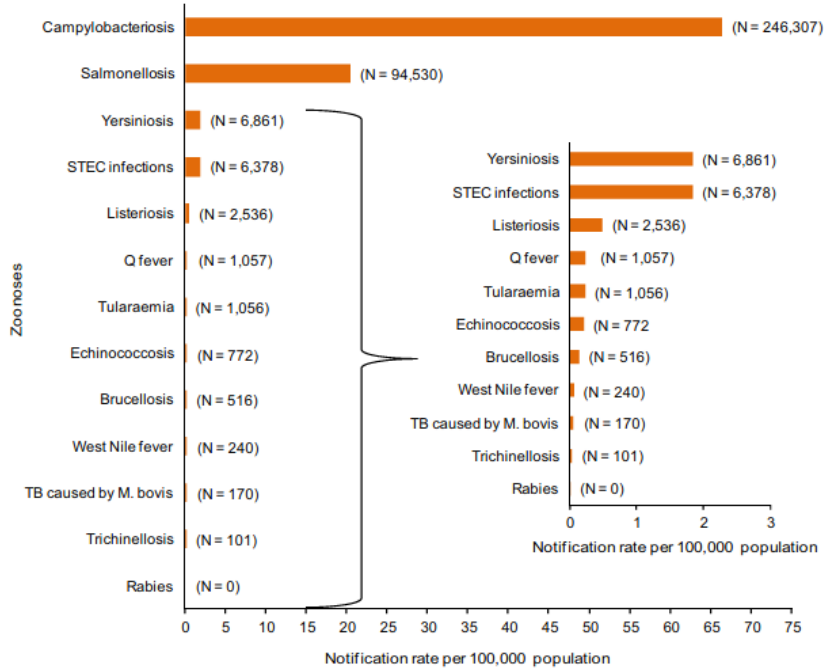
HUMAN SALMONELLOSIS, EU

- A statistically significant decreasing salmonellosis trend was observed between 2008 and 2016
- However the trend did not show significant increase or decrease during 2012-2016



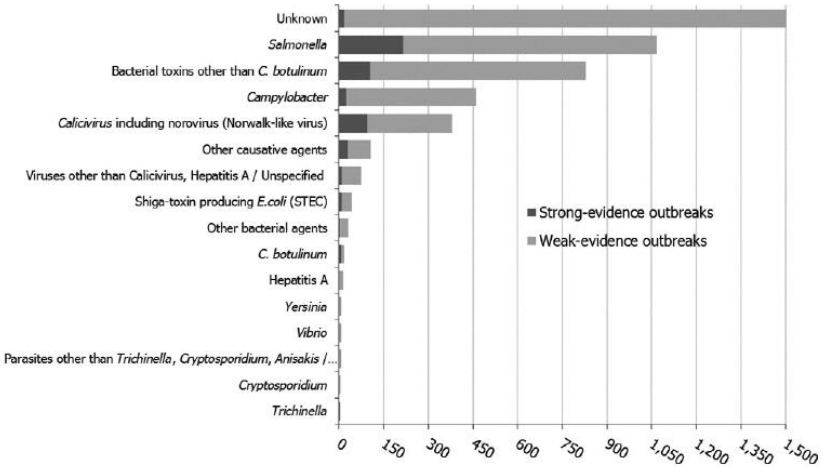
HUMAN SALMONELLOSIS, EU, 2016

- Salmonellosis was second most commonly reported zoonosis
- 20.4 cases per 100,000 population

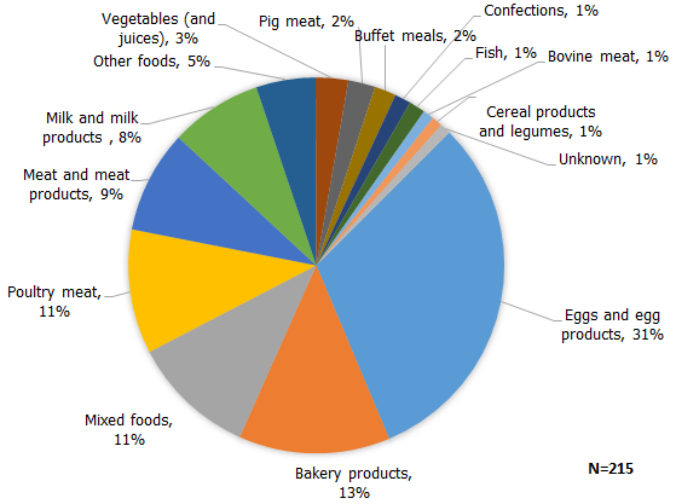


SALMONELLA OUTBREAKS, EU, 2016

- 1,067 food-borne *Salmonella* outbreaks reported (22.3 % of total): 215 strong evidence



- Distribution of food vehicles in strong-evidence outbreaks



TARGETS IN PRIMARY PRODUCTION

- In accordance with **Reg (EC) No 2160/2003** targets have been set for reduction of *Salmonella* in flocks of breeding hens, laying hens, broilers, breeding turkeys and fattening turkeys by several implementing Regs
- Targets are set on two serotypes (*S.* Enteritidis and *S.* Typhimurium, incl. monophasic *S.* Typhimurium with the antigenic formula 1,4,[5],12:i:-), except for breeding hens for which the target includes also *S.* Hadar, *S.* Virchow and *S.* Infantis

TARGETS IN PRIMARY PRODUCTION

Table 1. Timelines of setting *Salmonella* targets at the EU level in flocks of poultry populations and related regulatory instruments.

Zoonosis or zoonotic agent	Breeding flocks of *Gallus gallus*	Laying hens of *Gallus gallus*	Broilers of *Gallus gallus*	Breeding and fattening turkeys
Baseline survey				
Decision	NA [a]	**Decision No. 2004/665/EC**	**Decision No. 2005/636/EC**	**Decision No. 2006/662/EC**
Technical specifications	NA [a]	SANCO/34/2004 Rev.3	SANCO/1688/2005 Rev.1	SANCO/2083/2006
Time period	NA [a]	Oct. 2004–Sept. 2005	Oct. 2005–Sept. 2006	Oct. 2006–Sept. 2007
Report part A published	NA [a]	2007 [1]	2007 [2]	2008 [3]
Transitional EU target and *Salmonella* NCP [b] in EU MSs				
Regulation for EU target	**Reg. (EC) No. 1003/2005**	**Reg. (EC) No. 1168/2006**	**Reg. (EC) No. 646/2007**	**Reg. (EC) No. 584/2008**
Regulation for NCP	**Reg. (EC) No. 2160/2003**	**Reg. (EC) No. 2160/2003**	**Reg. (EC) No. 1177/2006**	**Reg. (EC) No. 2160/2003**
Salmonella target	≤1% *S.* Enteritidis, *S.* Hadar, *S.* Infantis, *S.* Typhimurium and/or *S.* Virchow	Annual reduction until ≤2% *S.* Enteritidis and/or *S.* Typhimurium	≤1% *S.* Enteritidis and/or *S.* Typhimurium	≤1% *S.* Enteritidis and/or *S.* Typhimurium
First year of harmonised monitoring and compulsory NCP	2007	2008	2009	2010
EFSA's risk assessment				
Regulation	**Reg. (EC) No. 2160/2003**	**Reg. (EC) No. 2160/2003**	**Reg. (EC) No. 2160/2003**	**Reg. (EC) No. 2160/2003**
Mandate received (EFSA's mandate number and question number)	7 Apr. 2008 (M-2008-0111; EFSA-Q-2010-291)	7 Apr. 2008 (M-2008-0111; EFSA-Q-2008-292)	7 Apr. 2008 (M-2008-0111; EFSA-Q-2008-293)	2 June 2010 (M-2010-0240; EFSA-Q-2010-00899)
Scientific opinion published	2009 [5]	2010 [6]	2011 [7]	2012 [8]
Final EU target				
Regulation	**Reg. (EC) No. 200/2010**	**Reg. (EC) No. 517/2011**	**Reg. (EC) No. 200/2012**	**Reg. (EC) No. 1190/2012**
Salmonella target	≤1% *S.* Enteritidis, *S.* Infantis, *S.* Hadar, *S.* Typhimurium [c] and/or *S.* Virchow	≤2% [d] *S.* Enteritidis and/or *S.* Typhimurium [c]	≤1% *S.* Enteritidis and/or *S.* Typhimurium [c]	≤1% *S.* Enteritidis and/or *S.* Typhimurium [c]

[a] NA = not applicable as for breeding hens a baseline survey was not carried out. Data was available from the European Summary Report from 2004 onwards; [b] NCP = National Control Programme; [c] Including monophasic *S.* Typhimurium with the antigenic formula 1,4,[5],12:i:-; [d] The annual targets are proportionate, depending on the prevalence in the preceding year, and the final EU target is defined as a maximum percentage of flocks remaining positive of 2%.

Int. J. Environ. Res. Public Health **2013**, *10*, 4836-4850; doi:10.3390/ijerph10104836

OPEN ACCESS

International Journal of Environmental Research and Public Health
ISSN 1660-4601
www.mdpi.com/journal/ijerph

Review

Estimating the Public Health Impact of Setting Targets at the European Level for the Reduction of Zoonotic *Salmonella* in Certain Poultry Populations

Winy Messens [1,*], Luis Vivas-Alegre [2], Saghir Bashir [2], Giusi Amore [3], Pablo Romero-Barrios [2] and Marta Hugas [2]

[1] Unit on Biological Hazards (BIOHAZ), European Food Safety Authority (EFSA), Via Carlo Magno 1A, Parma 43126, Italy; E-Mails: luis.vivas-alegre@efsa.europa.eu (L.V.-A.); pablo.romerobarrios@efsa.europa.eu (P.R.-B.); marta.hugas@efsa.europa.eu (M.H.)
[2] Unit on Scientific Assessment Support (SAS), European Food Safety Authority (EFSA), Via Carlo Magno 1A, Parma 43126, Italy; E-Mail: saghir.bashir@efsa.europa.eu
[3] Unit on Biological Monitoring (BIOMO), European Food Safety Authority (EFSA), Via Carlo Magno 1A, Parma 43126, Italy; E-Mail: giusi.amore@efsa.europa.eu

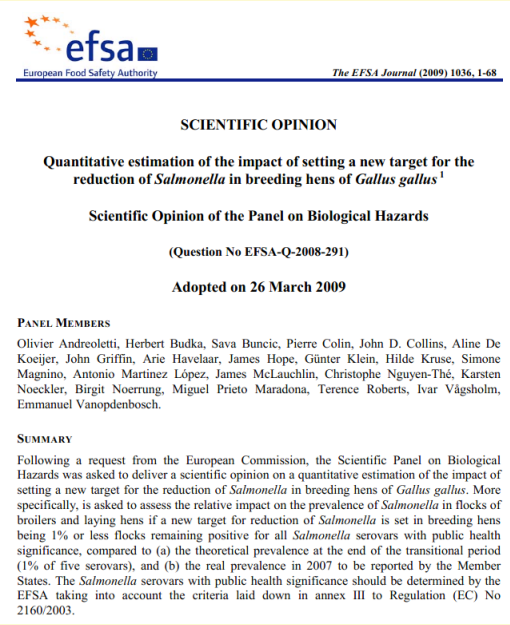
* Author to whom correspondence should be addressed; E-Mail: winy.messens@efsa.europa.eu; Tel.: +39-0521-036-922; Fax: +39-0521-036-0-922.

Received: 19 August 2013; in revised form: 25 September 2013 / Accepted: 28 September 2013 / Published: 11 October 2013

Abstract: In the European Union (EU), targets are being set for the reduction of certain zoonotic *Salmonella* serovars in different animal populations, including poultry populations, within the framework of Regulation (EC) No. 2160/2003 on the control of zoonoses. For a three-year transitional period, the EU targets were to cover only *Salmonella* Enteritidis and *S.* Typhimurium (and in addition *S.* Hadar, *S.* Infantis and *S.* Virchow for breeding flocks of *Gallus gallus*). Before the end of that transitional period, the revision of the EU targets was to be considered, including the potentially addition of other serovars with public health significance to the permanent EU targets. This review article aims at providing an overview of the assessments carried out by the Scientific Panel on Biological Hazards of the European Food Safety Authority in the field of setting targets for *Salmonella* in poultry populations (breeding flocks of *Gallus gallus*, laying flocks of *Gallus gallus*, broiler flocks of *Gallus gallus* and flocks of breeding and fattening turkeys) and their impact in subsequent changes in EU legislation.

EFSA OPINIONS ON TARGETS SETTING

Breeding hens



European Food Safety Authority — *The EFSA Journal* (2009) 1036, 1-68

SCIENTIFIC OPINION

Quantitative estimation of the impact of setting a new target for the reduction of *Salmonella* in breeding hens of *Gallus gallus* [1]

Scientific Opinion of the Panel on Biological Hazards

(Question No EFSA-Q-2008-291)

Adopted on 26 March 2009

PANEL MEMBERS

Olivier Andreoletti, Herbert Budka, Sava Buncic, Pierre Colin, John D. Collins, Aline De Koeijer, John Griffin, Arie Havelaar, James Hope, Günter Klein, Hilde Kruse, Simone Magnino, Antonio Martinez López, James McLauchlin, Christophe Nguyen-Thé, Karsten Noeckler, Birgit Noerrung, Miguel Prieto Maradona, Terence Roberts, Ivar Vågsholm, Emmanuel Vanopdenbosch.

SUMMARY

Following a request from the European Commission, the Scientific Panel on Biological Hazards was asked to deliver a scientific opinion on a quantitative estimation of the impact of setting a new target for the reduction of *Salmonella* in breeding hens of *Gallus gallus*. More specifically, is asked to assess the relative impact on the prevalence of *Salmonella* in flocks of broilers and laying hens if a new target for reduction of *Salmonella* is set in breeding hens being 1% or less flocks remaining positive for all *Salmonella* serovars with public health significance, compared to (a) the theoretical prevalence at the end of the transitional period (1% of five serovars), and (b) the real prevalence in 2007 to be reported by the Member States. The *Salmonella* serovars with public health significance should be determined by the EFSA taking into account the criteria laid down in annex III to Regulation (EC) No 2160/2003.

Laying hens

European Food Safety Authority — EFSA Journal 2010; 8(4):1546

SCIENTIFIC OPINION

Scientific Opinion on a quantitative estimation of the public health impact of setting a new target for the reduction of *Salmonella* in laying hens [1]

EFSA Panel on Biological Hazards (BIOHAZ)[2, 3]

European Food Safety Authority (EFSA), Parma, Italy

ABSTRACT

Public health risks of *Salmonella* infection in laying hens (*Gallus gallus*) can be associated with exposure through four different pathways: internally contaminated table eggs, externally contaminated table eggs, egg products and meat from spent hens. In relation to eggs, *Salmonella* Enteritidis is by far the serovar most frequently associated with human illness, and exposure through eggs that are internally contaminated with this serovar has a higher public health significance than exposure to externally contaminated eggs. A mathematical model, using reported field data from two EU Member States (MSs), suggests a linear relationship between the investigated scenarios of flock prevalence for *Salmonella* Enteritidis and the number of contaminated eggs that would be laid. However, the absolute public health impact of the assessed flock prevalence scenarios is highly uncertain due to lack of data on the number of contaminated eggs produced by infected flocks and on the true number of egg-related human salmonellosis cases. It is suggested that public health benefits, similar to those obtained reaching lower *Salmonella* flock prevalences, may be achieved by implementing controls based on more sensitive sampling protocols. Diversion of eggs from flocks that are tested positive in the EU *Salmonella* control programme to the production of egg products subjected to heat treatment may lead to increased health risks as heat treatment of egg products should not be considered an absolute barrier to *Salmonella* contamination. Fresh meat from spent laying hens might carry a higher prevalence of *Salmonella* than meat from broiler flocks, in particular if sourced from *Salmonella*-positive flocks. The quantification of under-ascertainment and underreporting of human salmonellosis cases, improving knowledge on within-flock dynamics of *Salmonella* and harvesting data on production of *Salmonella* contaminated eggs under field conditions would contribute to improving the accuracy of future quantitative estimates.

Broilers

European Food Safety Authority — EFSA Journal 2011;9(7):2106

SCIENTIFIC OPINION

Scientific Opinion on a quantitative estimation of the public health impact of setting a new target for the reduction of *Salmonella* in broilers [1]

EFSA Panel on Biological Hazards (BIOHAZ)[2, 3]

European Food Safety Authority (EFSA), Parma, Italy

ABSTRACT

This assessment relates the percentage of broiler-associated human salmonellosis cases to different *Salmonella* prevalences in broiler flocks in the European Union. It considers the contribution and relevance of different *Salmonella* serovars found in broilers to human salmonellosis. The model developed to provide quantitative estimates, which is based on the microbial-subtyping approach, considers 22 Member States, four animal-food sources of *Salmonella* (broilers, laying hens, pigs and turkeys) and 23 *Salmonella* serovars. The model (called the 'Broiler Target Salmonella Attribution Model' or BT-SAM model) employs data from the EU Baseline Surveys and EU statutory monitoring on *Salmonella* in animal-food sources, data on incidence of human salmonellosis and food availability data. It is estimated that around 2.4%, 65%, 28% and 4.5% of the human salmonellosis cases are attributable to broilers, laying hens (eggs), pigs and turkeys respectively. Of the broiler-associated human salmonellosis cases, around 42% and 23% are estimated to be due to the serovars *Salmonella* Enteritidis and *Salmonella* Infantis respectively, while other serovars individually contributed less than 5%. Different scenarios are presented showing changes in the percentage of broiler-associated human salmonellosis cases under different prevalences of *Salmonella* in broiler flocks. Compared to 2006, the 2009 *Salmonella* in broiler flocks prevalence has achieved a reduction of 69% in the number of broiler-associated human salmonellosis cases. When comparing the results of the adjusted prevalences for *Salmonella* Enteritidis and *Salmonella* Typhimurium as reported in 2009 with a theoretical combined prevalence of 1% for these two serovars, the difference between the percentages of broiler-associated cases is small. However, when adjusting the combined prevalence of all serovars to 1%, a large reduction in the percentage of broiler-associated cases compared to the one achieved with the two previous serovars only is expected. Uncertainty and data limitations are discussed, including recommendations on how these could be overcome.

TARGETS IN PRIMARY PRODUCTION

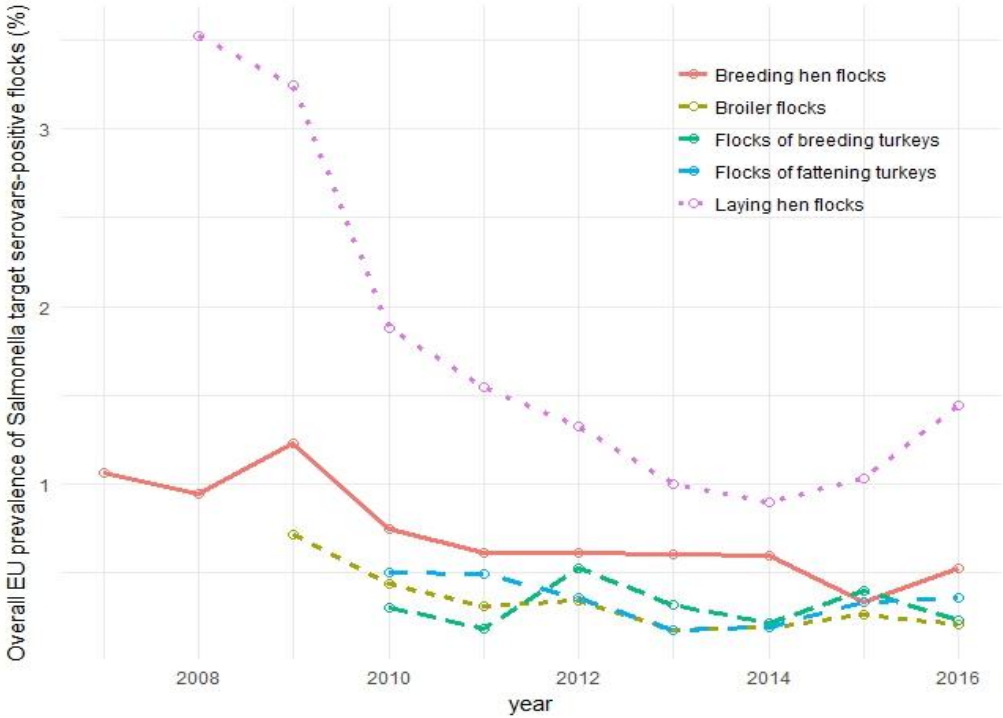
- To achieve the targets, MSs have introduced *Salmonella* control programmes
- A number of trade restrictions have been introduced in case these populations were still infected with *S.* Enteritidis or *S.* Typhimurium

Population	Target serotypes	Maximum % remaining positive	Trade restrictions*
Adult breeding hens (*Gallus gallus*)	*S.* Enteritidis, *S.* Typhimurium *S.* Hadar, *S.* Virchow and *S.* Infantis.	1%	Destruction or safe disposal of (hatching) eggs and birds (Annex II C of Regulation (EC) No 2160/2003)
Adult laying hens (*Gallus gallus*)	*S.* Enteritidis, *S.* Typhimurium	2%	Destruction or safe disposal of hens birds, marketing of eggs as class B (only for heat treated egg products) (Annex II D of Regulation (EC) No 2160/2003)
Broilers (*Gallus gallus*)		1%	Absence in 25 gr of fresh meat (Point 1.28 of Annex I to Regulation (EC) No 2073/2005)
Adult breeding turkeys		1%	Destruction or safe disposal of (hatching) eggs and birds (Annex II C of Regulation (EC) No 2160/2003)
Fattening turkeys		1%	Absence in 25 gr of fresh meat (Point 1.28 of Annex I to Regulation (EC) No 2073/2005)

* only in case of detection of *S.* Enteritidis or *S.* Typhimurium

TARGETS IN PRIMARY PRODUCTION

- **Reg (EC) No 2160/2004** and the implementing Regs also lay down testing schemes. Their outcome is reported to EFSA
- The data illustrated the success of the control programmes primarily in the earlier years



NEW MANDATE

- EFSA is asked to provide a scientific opinion on *Salmonella* control in poultry flocks and its public health impact

Ref. Ares(2017)4808225 - 03/10/2017

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR HEALTH AND FOOD SAFETY

Deputy Director General for the Food chain

Brussels,
Sante.ddg2.g.4/KDS/md (2017) 5133234

Dear Mr Url,

Subject: **Request for an opinion on *Salmonella* control in poultry flocks and its public health impact**

Targets for the reduction of *Salmonella* have been set in different poultry populations over the last decade. In order to achieve these targets and to avoid trade restrictions, Member States developed national control programmes for these populations.

This *Salmonella* control strategy has been very effective and resulted in a substantial reduction of the number of reported human cases since the start of the programme.

Based on recent data on reported human salmonellosis cases, a need has been identified to re-evaluate certain programmes or to consider additional steps. This should be based on the estimated reduction in human salmonellosis cases.

In accordance with Article 29 of Regulation (EC) No 178/2002, I would like to submit a formal request to EFSA for a scientific opinion on *Salmonella* control in poultry flocks and its public health impact.

I would request EFSA to finalise its opinion by 31 January 2019. If appropriate, EFSA should consult the European Centre for Disease Prevention and Control (ECDC) on this mandate.

My services remain at your disposal for further information. On this matter, you can contact Mr. Kris De Smet, responsible in SANTE Unit G4, Food Hygiene, for this dossier, and Ms Marina Marini, SANTE Unit D1, Science, Stakeholders, Enforcement. Their respective phone numbers and e-mail addresses are indicated below.

Yours sincerely,

Ladislav Miko

Contact persons:
Mr Bernhard Url
Executive Director
European Food Safety Authority
Via Carlo Magno 1A
I-43126 PARMA
e-mail: mandate@efsa.europa.eu

Commission européenne/Europese Commissie, 1049 Bruxelles/Brussel, BELGIQUE/BELGIË - Tel. +32 22991111
Contact: Kris DE-SMET@ec.europa.eu

TERMS OF REFERENCE NEW MANDATE

In particular, EFSA is requested

- **ToR 1 -** To estimate the public health (PH) impact if the target serotypes in flocks of **breeding hens of *Gallus gallus*** are changed, maintaining the current Union target (1%), testing scheme and trade restrictions unchanged
- **ToR 2 -** To estimate the PH impact expressed as relative reduction of reported human salmonellosis cases if the target set for adult flocks of **laying hens of *Gallus gallus*** is reduced from 2 to 1% for the current target serotypes

TERMS OF REFERENCE NEW MANDATE

- **ToR 3 -** To review the **risk factors for the occurrence of *Salmonella* in laying hens** for which targets have been set, in relation to the farming methods (ban unenriched cages)
- **ToR 4 -** To review the risk factors for the occurrence of *Salmonella*
  - in broilers, in relation to the type of farming
  - in broilers/laying hens in relation to other animal welfare indicators
- **ToR 5 -** To indicate if there is scientific evidence on a possible negative or positive impact of ***Salmonella*** control programmes on the prevalence of ***Campylobacter*** in **broiler flocks** at the holding and on broiler meat at the end of the slaughter process

Campylobacter in chicken

What are the *Campylobacter* contamination levels in broilers and broiler meat ?

CAMPYLOBACTER BASELINE SURVEYS

Part A

European Food Safety Authority

EFSA Journal 2010; 8(03):1503

SCIENTIFIC REPORT OF EFSA

Analysis of the baseline survey on the prevalence of *Campylobacter* in broiler batches and of *Campylobacter* and *Salmonella* on broiler carcasses in the EU, 2008[1]

Part A: *Campylobacter* and *Salmonella* prevalence estimates

European Food Safety Authority[2, 3]

European Food Safety Authority (EFSA), Parma, Italy

This scientific output, published 16 September 2011, replaces the earlier version published on 7 March 2011[4].

ABSTRACT

A European Union-wide baseline survey on *Campylobacter* in broiler batches and on *Campylobacter* and *Salmonella* on broiler carcasses was carried out in 2008. A total of 10,132 broiler batches were sampled from 561 slaughterhouses in 26 European Union Member States and two countries not belonging to the European Union. From each randomly selected batch the caecal contents of 10 slaughtered broilers were collected, pooled and examined for *Campylobacter*. From the same batch one carcass was collected after chilling and the neck skin together with the breast skin was examined for the presence of *Campylobacter* and *Salmonella*, in addition to the determination of the *Campylobacter* counts. *Campylobacter* was detected in pooled caecal contents of broilers and on broiler carcasses in all participating countries. At Community level the prevalence of *Campylobacter*-colonised broiler batches was 71.2% and that of *Campylobacter*-contaminated broiler carcasses was 75.8%. The Member State prevalence varied from 2.0% to 100.0% and from 4.9% to 100.0%, for caecal contents and carcasses, respectively. The results of the counts of *Campylobacter* on broiler carcasses showed substantial variation among the countries in contamination levels. About two-thirds of the *Campylobacter* isolates from the pooled caecal contents as well as from the broiler carcasses were identified as *Campylobacter jejuni*, while one-third was *Campylobacter coli*. Twenty-two Member States and one non-Member State isolated *Salmonella* on the broiler carcasses, with a Community prevalence of 15.6%. This prevalence varied widely among the Member States, from 0.0% to 26.6%. However, one Member State had an exceptionally high prevalence of 85.6% with the majority of isolates being *S.* Infantis. The Community prevalence of *Salmonella* Enteritidis or *Salmonella* Typhimurium-contaminated broiler carcasses was 3.6%. *Salmonella* Infantis and *Salmonella* Enteritidis were the two most frequently isolated serovars on broiler carcasses in the EU and accounted for about one-third and one-sixth of the *Salmonella* isolates, respectively.

Part B

European Food Safety Authority

EFSA Journal 2011;9(2):2017

SCIENTIFIC REPORT OF EFSA

Analysis of the baseline survey on the prevalence of *Campylobacter* in broiler batches and of *Campylobacter* and *Salmonella* on broiler carcasses, in the EU, 2008[1]

Part B: Analysis of factors associated with *Salmonella* contamination of broiler carcasses

This scientific output, published 18 April 2011, replaces the earlier version published on 18 February 2011[2]

European Food Safety Authority[3, 4]

European Food Safety Authority (EFSA), Parma, Italy

ABSTRACT

A European Union-wide baseline survey on *Campylobacter* in broiler batches and on *Campylobacter* and *Salmonella* on broiler carcasses was carried out in 2008. In the *Salmonella* sub-survey a total of 10,035 broiler batches were sampled from 561 slaughterhouses in 26 European Union Member States and two countries not belonging to the European Union. From each randomly selected batch one carcass was collected after chilling and the neck skin together with the breast skin was examined for the presence of *Salmonella*. Multivariable regression analysis showed that the risk for *Salmonella*-contaminated carcasses increased with the slaughter capacity of the slaughterhouse and with processing of the carcass later during the day. The risk for contamination of carcasses with *Salmonella* varied significantly between countries and between slaughterhouses within a country, even when other associated factors were accounted for. The *Salmonella* serovar distribution varied among Member States, many of them having a specific distribution pattern of their own and no specific serovar was predominant in all countries in the survey. The most commonly reported serovars were *S.* Infantis, *S.* Enteritidis and *S.* Typhimurium. Many of the reported serovars seem to have become well-established in broiler production.

EU harmonised BLS

- 10,132 broiler batches were sampled from 561 slaughterhouses in 2008
- EU prevalence of *Campylobacter*-contaminated batches was 71.2%; carcasses (post-chill) was 75.8%
- The MS-specific prevalence varied greatly
- By species: 2/3 *C. jejuni* and 1/3 *C. coli*

EU harmonised BLS

- Distribution of *Campylobacter* counts on broiler carcasses:
  - 0-10 CFU/g: 47.0%
  - 10-99 CFU/g: 12.2%
  - 100-999 CFU/g: 19.3%
  - 1,000-10,000 CFU/g: 15.8%
  - >10,000 CFU/g: 5.8%
- Counts varied widely between MSs

Monitoring data, EU, 2016

- EU-level (aggregation)
  - At EU-level only descriptive summaries are possible; no EU trend watching (trend monitoring) nor trend analysis
- Comparability of data across countries
  - Results from different countries are not directly comparable
  - The proportion of positive samples observed could have been influenced by the sampling season
- From 2020: more harmonised data reported to EFSA (*Campylobacter* process hygiene criteria)

CAMPYLOBACTER IN BROILERS / BROILER MEAT

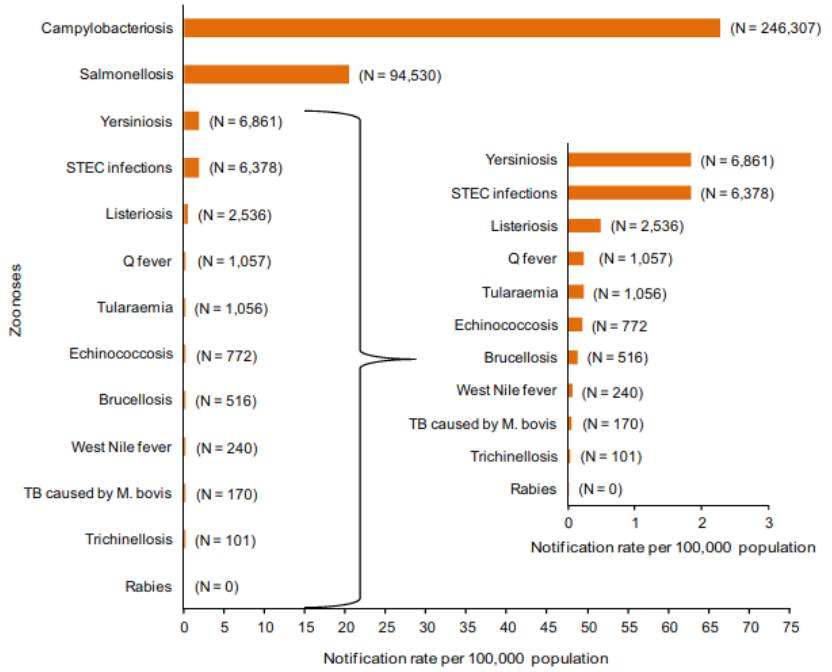
Table 5: Summary of *Campylobacter* statistics related to major food categories and animal species, reporting EU MS and non-MS, 2016

		Number of reporting MS/non-MS	Number of tested units, EU	Proportion (%) of positive units, EU
Fresh meat	Broilers	14/0	11,495	36.7
	Turkey	7/0	1,505	11.0
	Pig	6/0	554	2.9
	Bovine	7/0	1,220	1.0
Meat products, RTE	Broilers	1/0	54	1.9
	Turkey	1/0	16	0
	Pig	4/0	44	0
	Bovine	2/0	64	1.6
	Unspecified	7/0	116	0.9
Milk and milk products	Milk	9/0	1,327	1.2
	Cheese	5/0	289	1.0
Animals	Broilers	14/0	13,558	27.3
	Turkeys	5/1	2,894	65.3
	Pigs	1/0	50	0.7
	Bovine animals	6/0	6,469	1.1
	Cats and dogs	5/2	1,196	5.5
	Other animals[(a)]	3/0	1,031	12.4

What is the risk posed by broiler meat to human campylobacteriosis ?

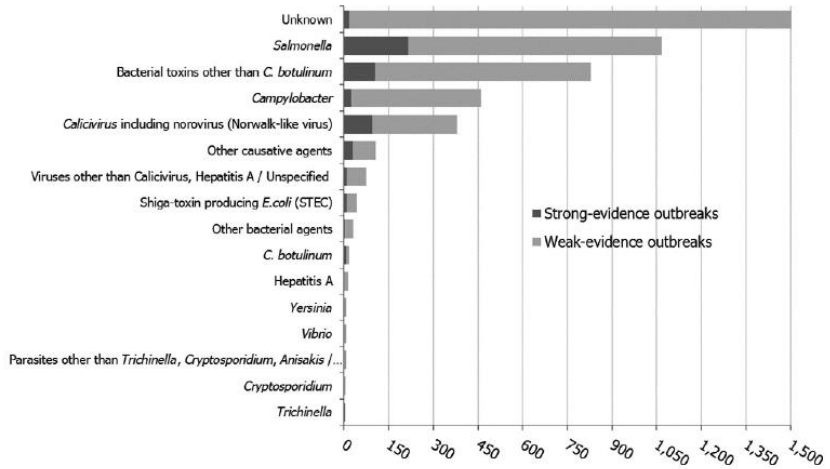
HUMAN CAMPYLOBACTERIOSIS, EU

- Campylobacteriosis has been most commonly reported zoonosis since 2005
- In 2016: 66.3 cases per 100,000 population



CAMPYLOBACTER OUTBREAKS, EU, 2016

- 461 food-borne *Campylobacter* outbreaks reported (9.6% of total): 24 strong evidence



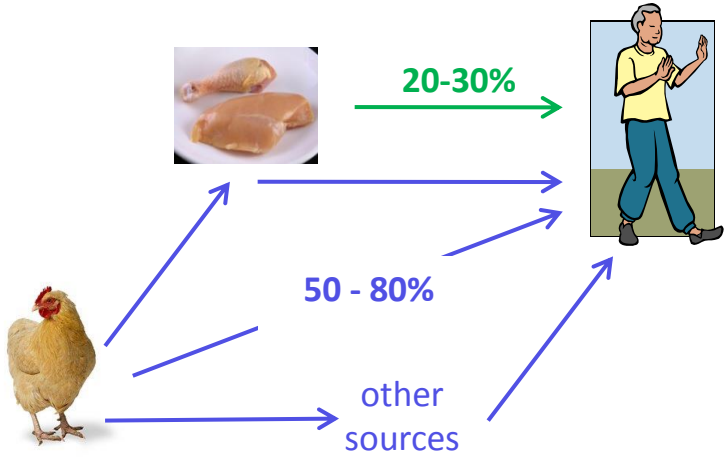
- Poultry meat associated with 9/24 of strong-evidence outbreaks

cases

Causative agent	Food vehicle	2016				
		Rank	Number of outbreaks	Cases		
				Number	Hospitalised	Deaths
Campylobacter	Poultry meat	1	9	3,231	1	0

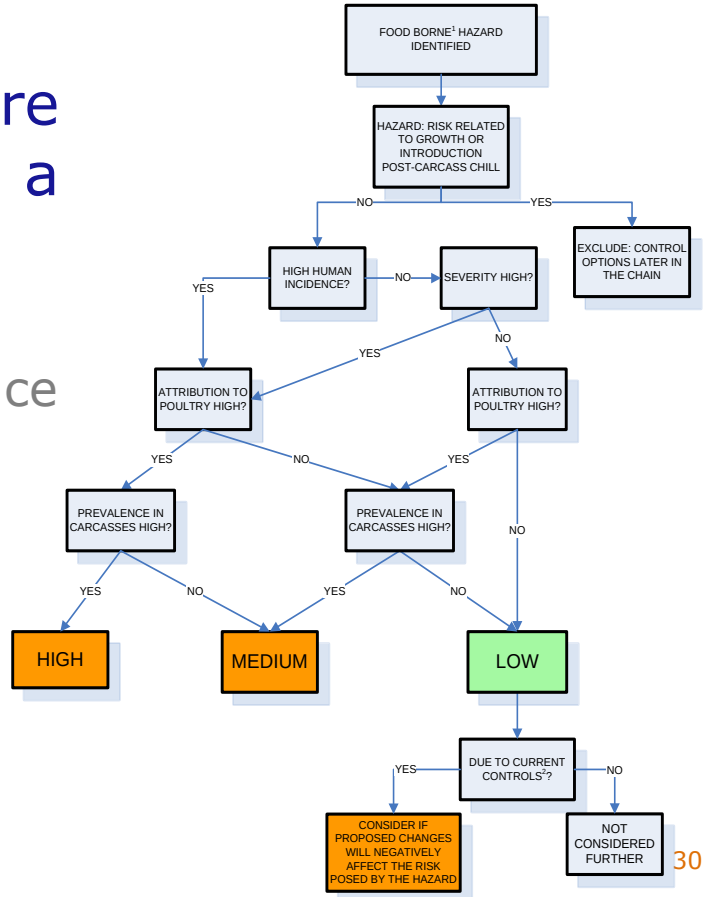
HUMAN CAMPYLOBACTERIOSIS AND BROILERS

- The BIOHAZ Panel estimated in 2011 ~ 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 €
- Handling, preparation and consumption of broiler meat may account for 20-30% of campylobacteriosis cases
- 50-80% may be attributed to the chicken reservoir



MAIN RISKS FOR PH; POULTRY MEAT INSPECTION

- 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



What are control options and what is effect of targets and microbiological criteria ?

EU harmonised BLS

- The risk for colonisation of broilers by *Campylobacter*
  - increases two-fold for every 10 days the birds get older
  - is higher for batches originating from thinned flocks
  - depends on the season (July-September)
- A *Campylobacter*-colonised broiler batch
  - was 30 times more likely to yield a contaminated carcass
  - yielded carcasses with higher *Campylobacter* counts
- The risk of *Campylobacter* contamination of carcasses
  - is higher when processed later during the day

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 ★

Directly available intervention (technical point of view) ★

Post-slaughter

- Irradiation/cooking
- *Freezing for 2-3 weeks*
- *↓ conc in intestines at slaughter by > 3 log_{10} units*
- Freezing for 2-3 days
- Hot water decontamination
- Chemical carcass decontamination

100% PH risk reduction

90% PH risk reduction

50-90% PH risk reduction

Hierarchy of control methods, considering pathways and food hygiene principles

- Prevent *Campylobacter* entering broiler houses at primary production
  - biosecurity, incl. hygiene measures during thinning and reduced slaughter age
- Increase resistance of broiler chickens to colonization
  - additives to drinking water/feed, vaccination, and/or selective breeding

CONTROL OPTIONS

- Reduce the *Campylobacter* concentration in chicken intestines before slaughter
  - e.g. bacteriophages or bacteriocins
- Enhance hygienic measures during slaughter
  - e.g. improved equipment design, slaughter practices, prevention of faecal leakage, training of personnel
- Apply decontamination of carcasses
  - Chemical or physical treatment
- Educate food handlers in hygienic practices
  - Catering/household setting, prevention of cross-contamination

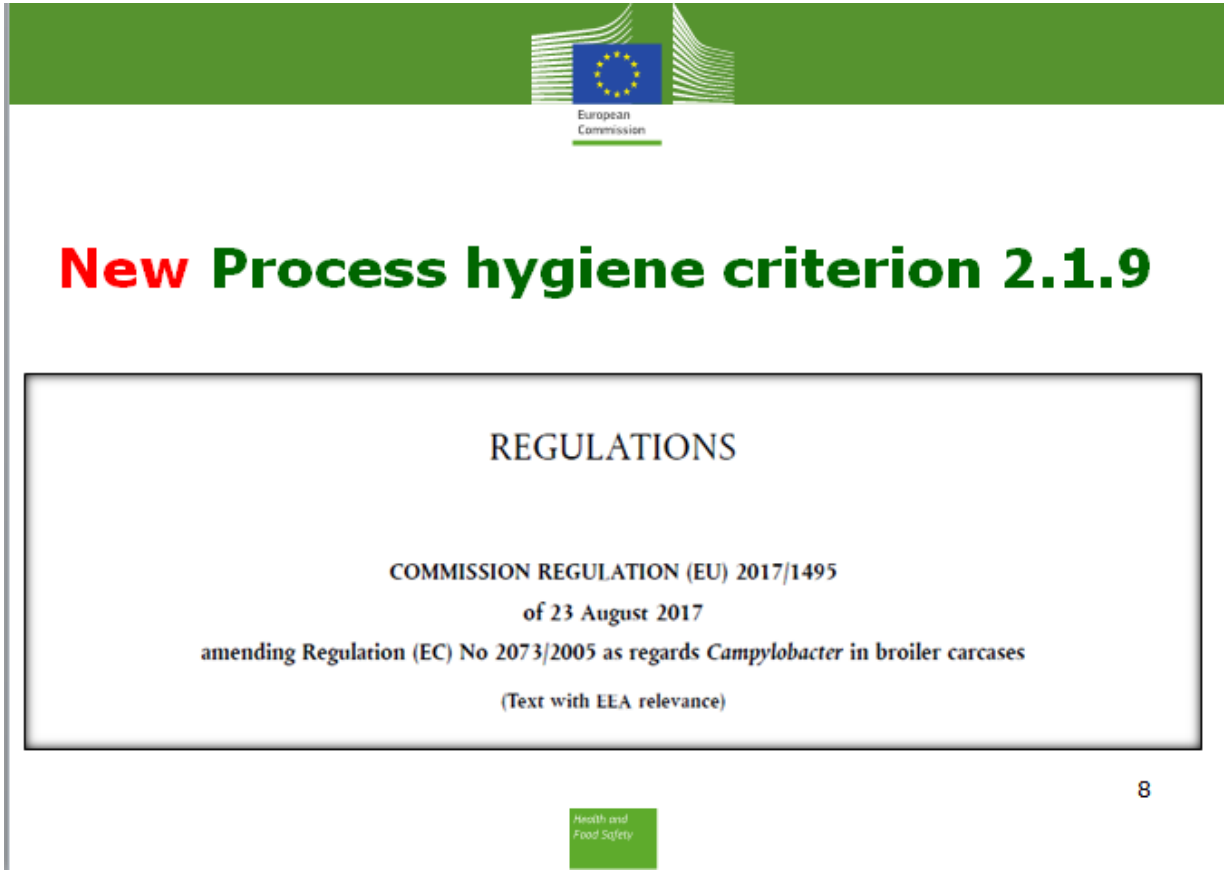
Targets in primary production

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

Microbiological criteria

- 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 a MC with a critical limit of **1000** or **500** **CFU/gram** of neck and breast skin
- 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

LEGISLATION



LEGISLATION

Campylobacer PH criterion

European Commission

Food category	Micro-organ-isms	Sampling plan		Limits		Analytical reference method	Stage where the criterion applies	Action in case of unsatisfactory results
		n	c	m	M			
'2.1.9 Carcases of broilers	*Campylobacter* spp.	50 (5)	c = 20 From 1.1.2020 c = 15; From 1.1.2025 c = 10	1 000 cfu/g		EN ISO 10272-2	Carcases after chilling	Improvements in slaughter hygiene, review of process controls, of animals' origin and of the biosecurity measures in the farms of origin'

The 50 samples shall be derived from **10 consecutive sampling sessions** in accordance with the sampling rules and frequencies laid down in this Regulation

Interpretation of the test results - *Campylobacter* spp. in poultry carcases of broilers:

— satisfactory, if a maximum of c/n values are > m,

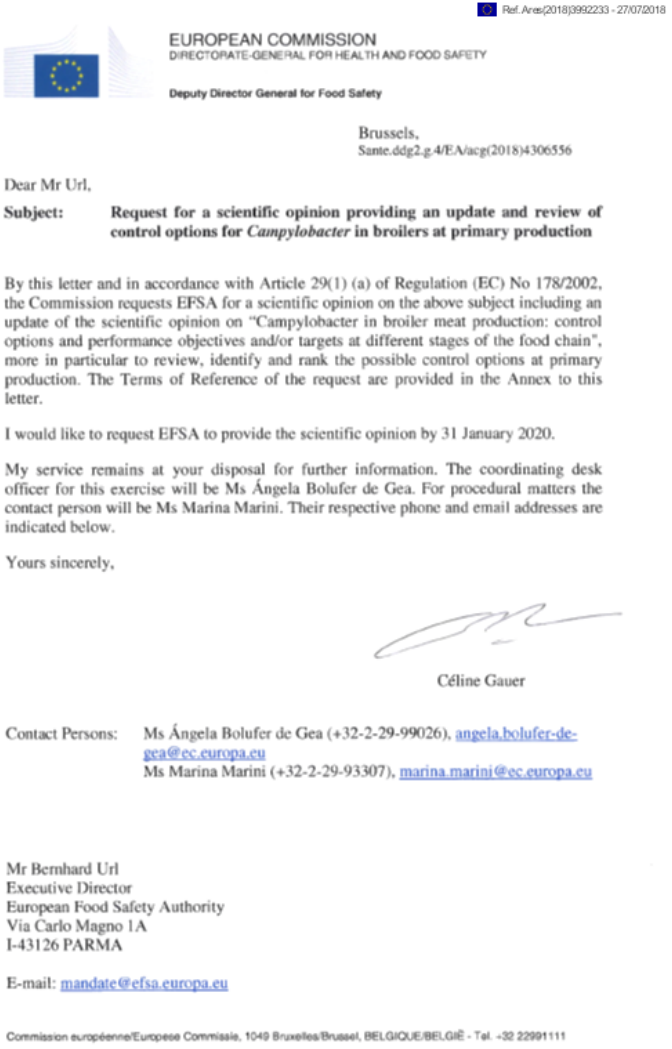
— unsatisfactory, if more than c/n values are > m.';

10

Health and Food Safety

NEW MANDATE

- EFSA is asked to provide a scientific opinion providing an update and review of control options for *Campylobacter* in broilers at primary production
- More specific: To review, identify and rank the possible control options at primary production level, taking into account, and if possible quantifying, the expected efficiency in reducing human campylobacteriosis cases.
- Advantages and disadvantages of different options at primary production should be assessed, as well as the possible synergic effect of combined control options.



Ref. Ares(2018)3992233 - 27/07/2018

EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR HEALTH AND FOOD SAFETY

Deputy Director General for Food Safety

Brussels,
Sante.ddg2.g.4/EA/acg(2018)4306556

Dear Mr Url,

Subject: **Request for a scientific opinion providing an update and review of control options for *Campylobacter* in broilers at primary production**

By this letter and in accordance with Article 29(1) (a) of Regulation (EC) No 178/2002, the Commission requests EFSA for a scientific opinion on the above subject including an update of the scientific opinion on "Campylobacter in broiler meat production: control options and performance objectives and/or targets at different stages of the food chain", more in particular to review, identify and rank the possible control options at primary production. The Terms of Reference of the request are provided in the Annex to this letter.

I would like to request EFSA to provide the scientific opinion by 31 January 2020.

My service remains at your disposal for further information. The coordinating desk officer for this exercise will be Ms Ángela Bolufer de Gea. For procedural matters the contact person will be Ms Marina Marini. Their respective phone and email addresses are indicated below.

Yours sincerely,

Céline Gauer

Contact Persons: Ms Ángela Bolufer de Gea (+32-2-29-99026), angela.bolufer-de-gea@ec.europa.eu
Ms Marina Marini (+32-2-29-93307), marina.marini@ec.europa.eu

Mr Bernhard Url
Executive Director
European Food Safety Authority
Via Carlo Magno 1A
I-43126 PARMA

E-mail: mandate@efsa.europa.eu

Commission européenne/Europese Commissie, 1049 Bruxelles/Brussel, BELGIQUE/BELGIË - Tel. +32 22991111

Subscribe to

www.efsa.europa.eu/en/news/newsletters
www.efsa.europa.eu/en/rss

Engage with careers

www.efsa.europa.eu/en/engage/careers

Follow us on Twitter

@efsa_eu
@plants_efsa
@methods_efsa