The challenge of tackling *Campylobacter* in Belgium

May 7th 2014

DG SANCO workshop on the control of *Campylobacter* in poultry

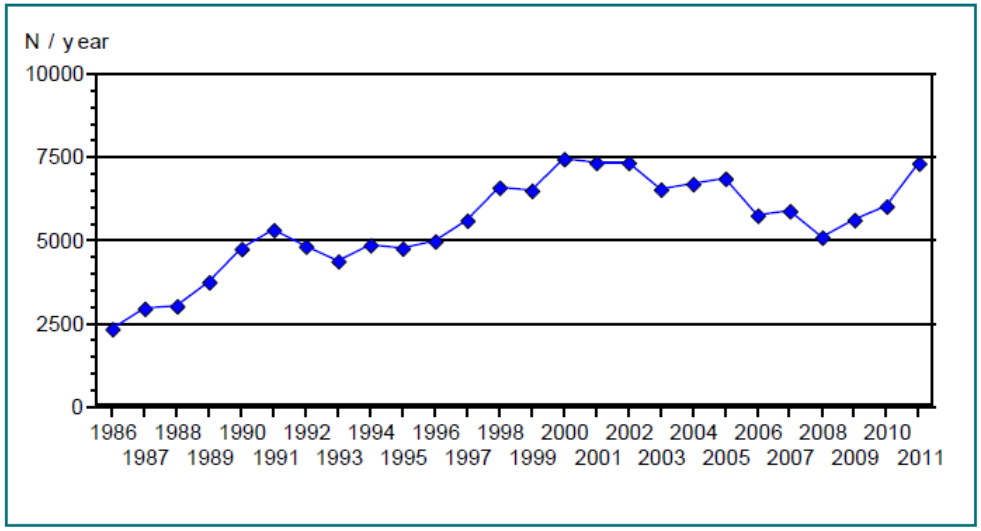
Isabel De Boosere

Content

- Background
- National risk assessment
- National legislation on microbiological criteria for *Campylobacter*
- Further research
- Future perspectives

Background

- *Campylobacter* is most commonly reported gastrointestinal bacterial pathogen in humans in Belgium since 2005.
- Monitored by the FASFC since 2000. The incidence of positive poultry samples is high and remains stable.

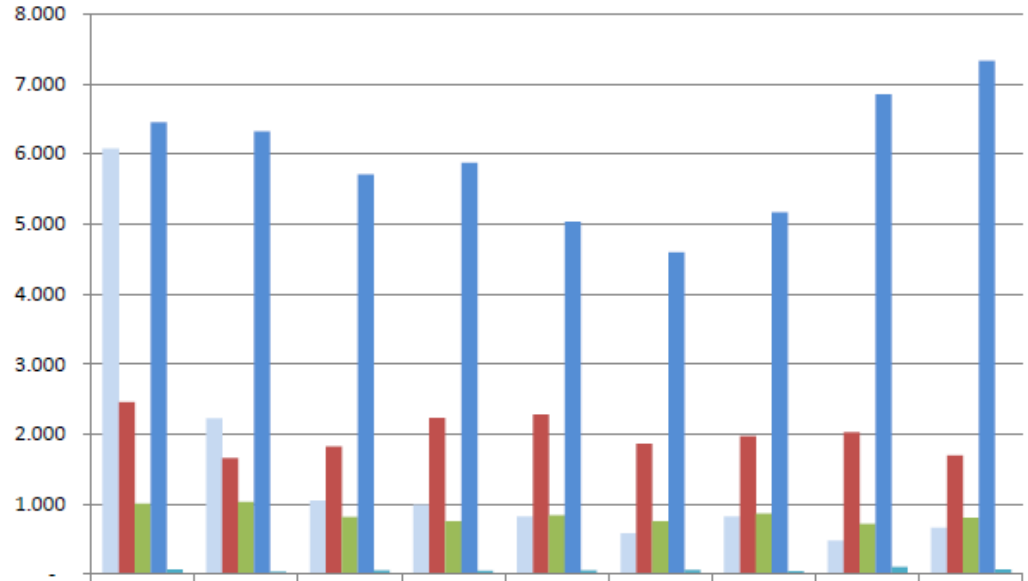


Number of Campylobacter infections in humans by year (1986-2011). Source: Sentinel Laboratory Network

Trends & Sources 2010-2011, FASFC

Background

Number of reported human cases of the 3 most important food bacterial pathogens (source: IPH)



	2004	2005	2006	2007	2008	2009	2010	2011	2012
S. Enteritidis	6.075	2.226	1.052	987	824	587	823	481	662
S. Typhimurium	2.459	1.659	1.826	2.233	2.279	1.862	1.969	2.030	1.699
Andere Salmonella	1.009	1.031	815	755	841	759	868	720	803
Campylobacter	6.454	6.324	5.711	5.876	5.034	4.597	5.170	6.850	7.332
Listeria monocytogenes	68	40	56	52	53	64	43	103	65

Annual report
FASFC, 2012

Background

European legislation

- General Food Law, R 178/2002
- Since 2004: European hygiene package (R 852/2004 & R 853/2004) & R 2073/2005 ⇨ *necessity to review national legislation*

Belgian legislation

- Law of 24 Jan 1977 concerning the health protection of consumers regarding food and other products

Art. 5 obligation of risk assessment by Superior health Council before setting legislation on contaminants

National risk assessment


Conseil Supérieur d'Hygiène Hoge Gezondheidsraad

Advies van de Hoge Gezondheidsraad
April 2005

BIJDRAGE TOT EEN RISICOBEOORDELING
VAN *CAMPYLOBACTER* SPECIES IN VLEESBEREIDINGEN
OP BASIS VAN PLUIMVEEGEHAKT IN BELGIË

HGR n° 7947

Contribution to a risk assessment - *Campylobacter* spp. in meat preparations on the basis of poultry minced meat in Belgium

http://www.gezondheid.belgie.be/eportal/Aboutus/relatedinstitutions/SuperiorHealthCouncil/publications/4492397?ie2Term=&ie2section=9744

National risk assessment

Why MC at retail level?

Primary production

Biosecurity on farms: no guarantee, difficult to maintain during long period

Vaccination, probiotics: no options

Research was initiated

Slaughter

Drastic reduction is not possible, only limited reduction

Retail

Often contaminated (67 %). Contamination levels are mostly unknown. Estimated that 9 % is contaminated with > 100 cfu/g

National risk assessment

Preliminary probabilistic approach

6 scenario's, e.g.

Scenario 1 (estimated current situation)

9 % > 100/g , 24 % > 1/25 g & 67 % < 1/25 g

Scenario 3

0 % > 100/g , 9% > 10/g , 24 % > 1/25 g and < 10/g , & 67 % < 1/25g

Scenario 5

0 % > 10/g , 9% > 1/g , 24 % > 1/25 g and <1/g , & 67 % < 1/25g

National risk assessment

Preliminary probabilistic approach

	Normal distribution of the contamination level (%)					Maximal probability of infection			
	> 1/g	>10/g	>100/g	>1000/g	Mean	P50	P75	P95	Max
Scenario 1	19.99	12.66	7.45	4.06	1.33 e-02	4.17 e-08	9.28 e-06	2.16 e-02	0.942
Scenario 3	11.47	5.15	1.97	0.64	2.22 e-03 *:6*	4.41 e-08 *=*	2.06 e-06 *:5*	6.27 e-04 *:35*	0.861 *:1.1*
Scenario 5	6.3	1.89	0.44	0.08	4.49 e-04 *:30*	4.09 e-08 *=*	9.79 e-07 *:10*	1.31 e-04 *:165*	0.392 *:2.4*

National risk assessment

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Quantitative risk assessment of *Campylobacter* spp. in poultry based meat preparations as one of the factors to support the development of risk-based microbiological criteria in Belgium

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National risk assessment

Superior Health Council

Table 5
Overview of the results (exposure, probability of infection, % infected) for the different tested situations

Situation	Exposure (cfu per 100 g serving)			Approach 2 (probability of infection)			Approach 3 (% infected)
	Mean	95% percentile	100% percentile	Mean	95% percentile	100% percentile	
1[a]	2.02E+ 07	7.75E− 01	1.63E+ 13	2.38E− 03	7.55E− 05	3.66E− 01	0.0353
1[a] (raw)	1.45E+ 10 (sit 1×718)[b]	4.35E+ 04 (sit 1×56180)	1.30E+ 16 (sit 1×802)	4.98E− 02 (sit 1×21)	4.14E− 01 (sit 1×548)		1.0155 (sit 1×29)
2	1.83E+ 05 (sit 1:110)	2.63E− 01 (sit 1:3)	1.35E+ 11 (sit 1:120)	1.38E− 03 (sit 1:2)	2.74E− 05 (sit 1:3)	3.55E− 01 (sit 1:1)	0.0089 (sit 1:4)
3	1.77E+ 03 (sit 1:11390)	9.47E− 02 (sit 1:8)	1.12E+ 09 (sit 1:14469)	6.72E− 04 (sit 1:4)	1.07E− 05 (sit 1:7)	3.38E− 01 (sit 1:1)	0.0016 (sit 1:22)
4	1.98E+ 01 (sit $1:1.0\times10^{6}$)	3.70E− 02 (sit 1:21)	9.35E+ 06 (sit $1:1.7\times10^{6}$)	2.42E− 04 (sit 1:10)	4.42E− 06 (sit 1:17)	3.16E− 01 (sit 1:1)	0.0003 (sit 1 : 118)
5	3.26E− 01 (sit $1:6.2\times10^{7}$)	1.62E− 02 (sit 1:48)	7.77E+ 04 (sit $1:2.1\times10^{8}$)	5.50E− 05 (sit 1:43)	2.00E− 06 (sit 1:38)	2.87E− 01 (sit 1:1)	0
6	1.23E− 02 (sit $1:1.6\times10^{9}$)	8.11E− 03 (sit 1:95)	6.46E+ 02 (sit $1:2.5\times10^{10}$)	6.33E− 06 (sit 1:376)	9.76E− 07 (sit 1:77)	1.78E− 01 (sit 1:2)	0
7	1.63E− 03 (sit $1:1.2\times10^{10}$)	4.93E− 03 (sit 1:157)	8.67E+ 00 (sit $1:1.9\times10^{12}$)	6.75E− 07 (sit 1:3525)	5.11E− 07 sit 1:148)	6.91E− 03 (sit 1:53)	0
8	2.02E+ 06 (sit 1:10)	7.77E− 02 (sit 1:10)	1.63E+ 12 (sit 1:10)	9.32E− 04 (sit 1:3)	5.62E− 06 (sit 1:13)	2.73E− 01 (sit 1:1)	0.0143 (sit 1:2)
9	1.84E+ 04 (sit 1:1098)	2.63E− 02 (sit 1:29)	1.36E+ 10 (sit 1:1200)	4.44E− 04 (sit 1:5)	1.92E− 06 (sit 1:39)	2.48E− 01 (sit 1:1)	0.0024 (sit 1:15)
10	1.78E+ 02 (sit 1:113603)	9.49E− 03 (sit 1:82)	1.13E+ 08 (sit 1:144312)	1.60E− 04 (sit 1:15)	6.88E− 07 (sit 1:110)	2.18E− 01 (sit 1:2)	0.0004 (sit 1:88)

(raw) Indicates raw consumption of the product (no effect of cross-contamination or cooking included in the model).

[a] Situation 1 is the original situation in Belgium with regard to the distribution of the *Campylobacter* contamination level (19.68%>1 cfu/g; 12.44%>10 cfu/g; 7.28>100 cfu/g; 5%>1000 cfu/g).

[b] (sit 1×718) indicates that the exposure is 718 times higher for sit 1 (raw) than for sit 1.

National risk assessment

- Risk of human infection and disease ↓ when level of *Campylobacter* are better controlled and presence of high contamination levels is limited

- When elimination of preparations with > 1000/g (<1 %) and reduction of > 100/g (max. 2 %) & > 10/g (max. 5 %)
  ⟹ reduction of probability of infection by a factor 6

- When elimination of preparations with > 100/g (<1 %) and reduction of > 10/g (max. 2 %)
  ⟹ reduction of probability of infection by a factor 30

- Communication needed to point out hazards of consumption of raw meat and necessity to heat thoroughly

National legislation on microbiological criteria for *Campylobacter*

RD of 26 April 2009

Annexe à l'arrêté royal du 26 avril 2009 concernant des critères microbiologiques applicables aux denrées alimentaires

Critères d'hygiène des procédés

Catégorie de denrées alimentaires	Micro-organisme/ Métabolite	Limites (1)		Plan d'échantil-lonnage (2)		Point d'application du critère	Actions correctives
		m	M	n	c		
1. Viandes hachées de volaille et préparations de viande à base de viande de volailles, destinées à être consommées cuites (3)	*Campylobacter spp.* thermotolérants	100 ufc/g		5	0	Fin du processus de production	Améliorations de l'hygiène de la production, de la sélection et/ou de l'origine des matières premières

Further research

- EFSA's analysis of the baseline survey (2008), conclusions:

"These findings indicate that certain slaughterhouses are more capable than others in preventing Campylobacter contamination and in controlling the contamination and/or the Campylobacter counts on the carcasses. This implies that slaughterhouse processing offers an opportunity for Campylobacter risk mitigation."

- Analysis of Belgian data confirmed the EFSA observation

→ CAMPYVAR, CAMPYTRACE

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Campylobacter contamination in broiler carcasses and correlation with slaughterhouses operational hygiene inspection

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Further research: CAMPYVAR & CAMPYTRACE

Some preliminary results

Slaughterhouses operate high risk raw material – almost 60 % of batches are *Campylobacter* positive and usually broilers are colonised with high numbers (> 7,5 log cfu/g)

Both *Campylobacter* colonisation level in the caecal content and especially the carriage of *Campylobacter* on feathers differs between batches.

Breast skin can be highly contaminated with *Campylobacter*.

Campylobacter contamination on feathers and on breast skin mostly increased significantly during transport and holding time.

Further research: CAMPYVAR & CAMPYTRACE

High variability in *Campylobacter* carcass contamination
- within batches
- between batches in slaughterhouse
- between slaughterhouses

High risk material – *Campylobacter* colonisation level in the caecal content and the carriage of *Campylobacter* on feathers

Certain slaughterhouses are able to produce lower numbers of highly contaminated carcasses than others

Campylobacter contamination is mainly influenced by the following processes:
- Plucking and evisceration ↑
- Washing and chilling (combined effect) ↓ (BUT water immersion)

Further research: CAMPYVAR & CAMPYTRACE

If only *Campylobacter* negative batches are slaughtered: non-contaminated carcasses (i.e. no enumerable levels of > 10 cfu/g)

The slaughter of positive batches results in immediate contamination of carcasses across the slaughter line.

When only positive flocks are slaughtered, *Campylobacter* carcass contamination remains at the same level during the process day.

Campylobacter is transmitted from a positive to a subsequent negative batch, but the transmission is restricted and decreases quickly to non-enumerable numbers over time.

If the proceeding positive batch is colonised at a low level no carcass contamination occurs in the following negative batch.

Further research

This resulted in a change of the action limits for broiler & laying hen carcasses & fresh meat with skin at slaughterhouse, cutting & processing plants & retail to a level of 1000 cfu/g

Advice 10-2012 The evaluation of the document "Action limits for microbiological contaminants in food" (dossier Sci Com 2011/21)

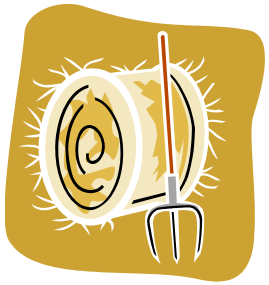
http://www.favv.be/thematischepublicaties/actiegrenzenvoormicrobiologischecontaminanteninlevensmiddelen.asp (NL)

http://www.favv.be/publicationsthematiques/Limitesdactionpourlescontaminantsmicrobiologiquesdanslesdenreesalimentaires.asp (FR)

Future perspectives

Further research at primary production level

- CAMPYNANOCURE



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www.health.belgium.be