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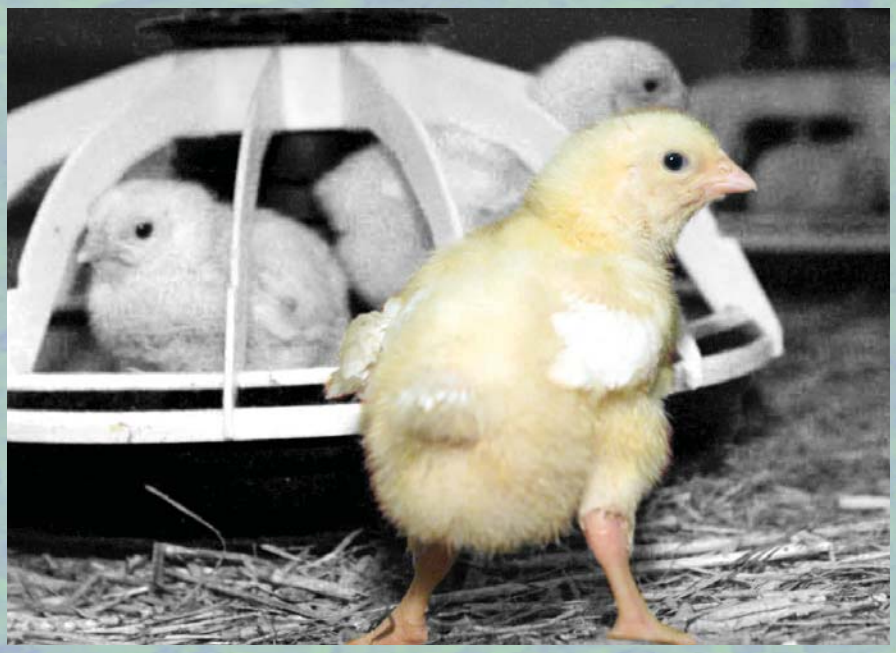

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The surveillance and control programme for *Campylobacter* spp. in broiler flocks in Norway

Merete Hofshagen, Attila Tarpai, Torkjel Bruheim

Introduction

Campylobacteriosis is currently the most commonly reported bacterial infectious disease in the Norwegian human population. In almost half of the cases, the infection is acquired in Norway. Consumption of poultry meat purchased raw has been identified as a significant risk factor together with drinking undisinfected water, eating at barbecues, occupational exposure to animals, and eating undercooked pork (1).

The action plan regarding *Campylobacter* spp. in Norwegian broilers has been running since spring 2001 (2, 3, 4). The action plan is a joint effort involving several stakeholder groups from "stable-to-table". The Norwegian Zoonosis Centre at the National Veterinary Institute coordinates the programme, and is responsible for the collection and analyses of data and the communication of results.

The action plan is updated regularly and the details for 2010 together with other information regarding the action plan can be found at www.vetinst.no.

Aim

The objective is to reduce the human exposure to thermophilic *Campylobacter* spp. through Norwegian broiler meat products.

Materials and methods

In 2010, all Norwegian broiler flocks that were slaughtered before 51 days of age between 1 May and 31 October were sampled by the owner maximum four days before slaughter. The sample consisted of ten pooled swabs from fresh faecal droppings. The samples were submitted to the National Veterinary Institute's laboratory in Trondheim, where they were analysed for *Campylobacter* spp. by real-time PCR. The carcasses from the positive flocks were either heat treated or frozen for a minimum of three weeks before being marketed.

In addition, flocks with unknown status at the time of slaughter, were sampled at the slaughter house.

Results

A total of 2,170 samples (approximately corresponding to number of flocks, although a few flocks might have been sampled more than once) were analysed from a total of 593 farms. A total of 110 (5.1%) of the samples were positive for *Campylobacter* spp. In addition, one flock with "unknown status" was sampled at slaughter and was negative.

The positive samples originated from 91 (15.3%) of the farms. Regional differences in the proportions of positive farms are shown in Table 1 and Figure 2.

The proportion of *Campylobacter* positive flocks and the proportion of flocks testing positive already at the pre-slaughter sample has varied substantially since the action plan was launched (Figure 1). For 2008 -2010, only pre-slaughter samples were analysed, and for 2009 and 2010 there's data only for six months per year. In Figure 2, the percentage of flocks (in 2008 - 2010 samples) positive for *Campylobacter* spp. at the pre-slaughter sample in May – October, are shown.

Table 1. Farms positive for Campylobacter spp. by county in May – October 2010.

County	N	No. Positive	(%)
Østfold	89	12	(13)
Akershus	13	0	(0)
Hedmark	118	23	(19)
Oppland	5	0	(0)
Buskerud	9	0	(0)
Vestfold	28	1	(4)
Telemark	4	1	(25)
Aust-Agder	5	0	(0)
Vest-Agder	2	1	(50)
Rogaland	111	12	(11)
Hordaland	9	1	(11)
Møre og Romsdal	1	0	(0)
Sør-Trøndelag	78	19	(24)
Nord-Trøndelag	121	21	(17)
Total	**593**	**91**	**(15.3)**

Figure 1. Monthly incidence of Campylobacter spp. in slaughtered Norwegian broiler flocks from May 2001 throughout 2010. The blue line represents flocks positive for Campylobacter spp. (up to and including 2007 these data are based on two samples; before slaughter and at slaughter). The green line represents flocks (from 2008 onwards: samples) positive for Campylobacter spp. at the sampling at farm before slaughter. No sampling occurred for flocks slaughtered in January – April and November – December in 2009 and 2010.

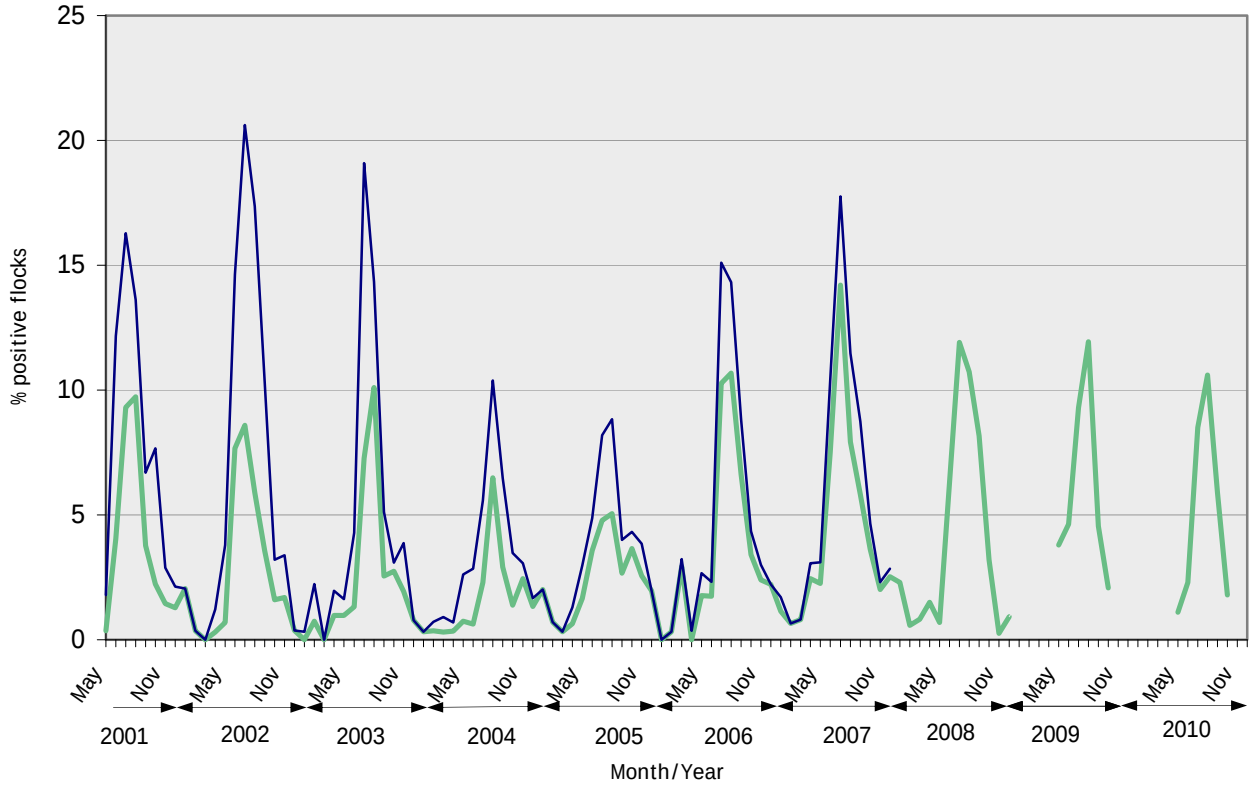
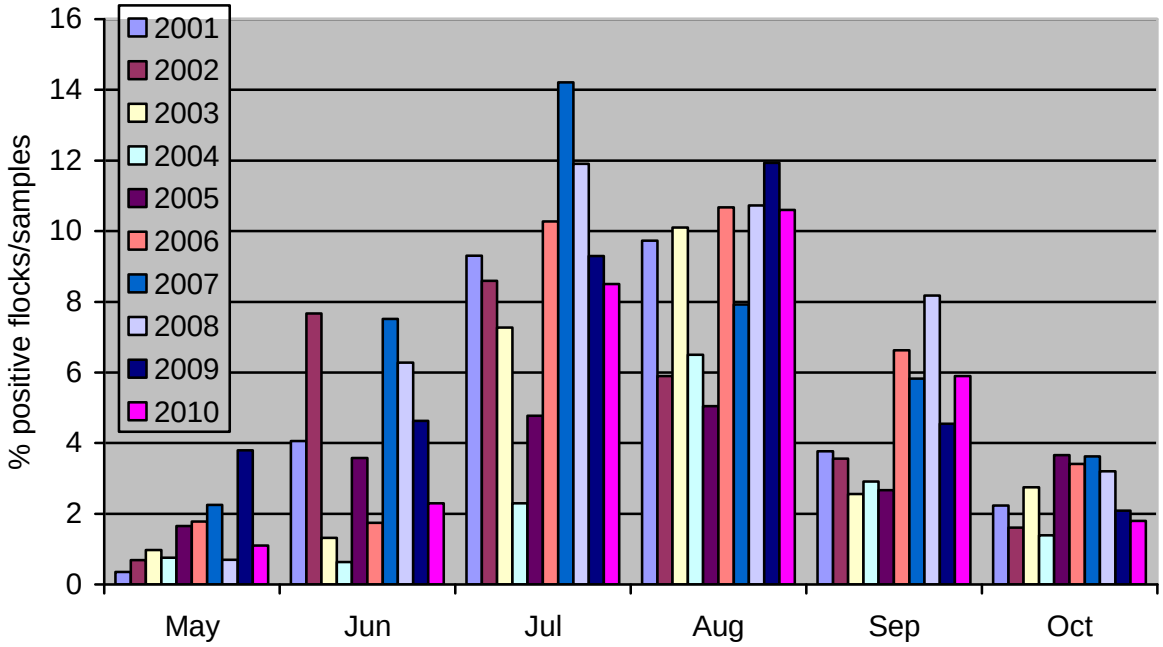


Figure 2. Percentage of flocks (in 2008 - 2010 samples) slaughtered May – October positive for *Campylobacter* spp. in the pre-slaughter sample. Up to and including 2004, this sample was taken approx. one week before slaughter, from 2005 onwards, approx. four days before slaughter.



Discussion

In the period 2002 – 2007, when all flocks were sampled twice, the results were as indicated in Table 2.

Table 2. Results from the Action Plan against *Campylobacter* spp. in broilers in the period 2002 - 2007.

Year	Number of sampled flocks	Number (%) of positive flocks	Number of positive flocks discovered at slaughter only*
2002	3627	228 (6.3)	127
2003	3550	175 (4.9)	85
2004	3626	118 (3.3)	58
2005	3652	132 (3.6)	42
2006	3908	190 (4.9)	48
2007	4145	237 (5.7)	58

* This is the maximum number of flocks positive for *Campylobacter* spp. which had the possibility to reach the market without previous freezing or heat treatment.

Up to and including February 2005, the pre-slaughter samples were taken approximately eight days before slaughter, and approximately 50 % of the positive flocks were detected only at slaughter. From 1 March 2005 onwards, all flocks were sampled maximum four days before slaughter, and in 2005, 31.8 % of the positive flocks were detected only at slaughter. In 2006 this was further reduced to 25.3 %, and in 2007 the corresponding figure was 24.5 %.

From 2008 onwards, the sampling at slaughter was terminated. Comparable data to evaluate the effect of the Action Plan, and to calculate how many flocks positive for *Campylobacter* spp. which were going on the market without freezing or heat treatment are therefore lacking. Still, if one anticipate that 2008 - 2010 were equal to 2007 in respect to the proportion of positive flocks being identified at the pre-slaughter sample (approx. 75%), the seasonal distribution (approx. 80% of positive flocks are sampled during the summer months) and that the number of samples equals the number of flocks, calculations can be made (Table 3):

- In 2008, when 193 pre-slaughter samples were positive, one can assume that a total of approximately 257 flocks were positive at slaughter. The number of flocks becoming positive the last four days before slaughter, and thereby had the possibility to reach the market without heat treatment or freezing, can be estimated to 64.
- In 2009, when 117 of 1924 investigated pre-slaughter samples were positive during May-October, one can assume that in 2009 as a whole, approx. 4000 flocks were slaughtered, approx. 146 flocks were positive pre-slaughter, and approx. 195 flocks were positive at slaughter. The number of flocks becoming positive during the winter months or during the last four days before slaughter in the summer months, and thereby had the possibility to reach the market without heat treatment or freezing, can then be estimated to 78.
- In 2010, when 110 of 2170 investigated pre-slaughter samples were positive during May – October, one can assume that in 2010 as a whole, approx. 4400 flocks were slaughtered, approx. 138 flocks were positive pre-salughter, and approx. 184 flocks were positive at slaughter. The number of flocks becoming positive during the winter months or during the last four days before slaughter in the summer months, and thereby had the possibility to reach the market without heat treatment or freezing, can then be estimated to 74.

Table 3. Estimated results from the Action Plan against Campylobacter spp. in broilers in the period 2008 - 2010.

Year	Number of samples*	Estimated number (%) of positive flocks	Estimated number of non-identified positive flocks**
2008	4675	257 (5.5)	64
2009	4000	195 (4.9)	78
2010	4400	184 (4.2)	74

* Equals approximately number of slaughtered flocks. In 2009 and 2010, this is an estimation for the whole year based upon number of salughtered flocks in the period May – October.
** This is the estimated maximum number of flocks positive for *Campylobacter* spp. which had the possibility to og out on the market without previous freezing or heat treatment.

Regarding the flock prevalence, one can conclude that after some years with a positive development (2002 – 2005), the situation again got worse (2006-2008), but there seem to be some improvement again in 2009 and 2010.

For the number of flocks positive for *Campylobacter* spp. reaching the market without freezing or heat treatment, improvement was seen 2002 – 2005, and thereafter a negative trend was seen 2006 - 2010.This is mainly due to the fact that no flocks were sampled during the six "winter months", and positive flocks in that period therefore had no possibility of being detected and could as a consequence not be scheduled for heat treatment or freezing.

References

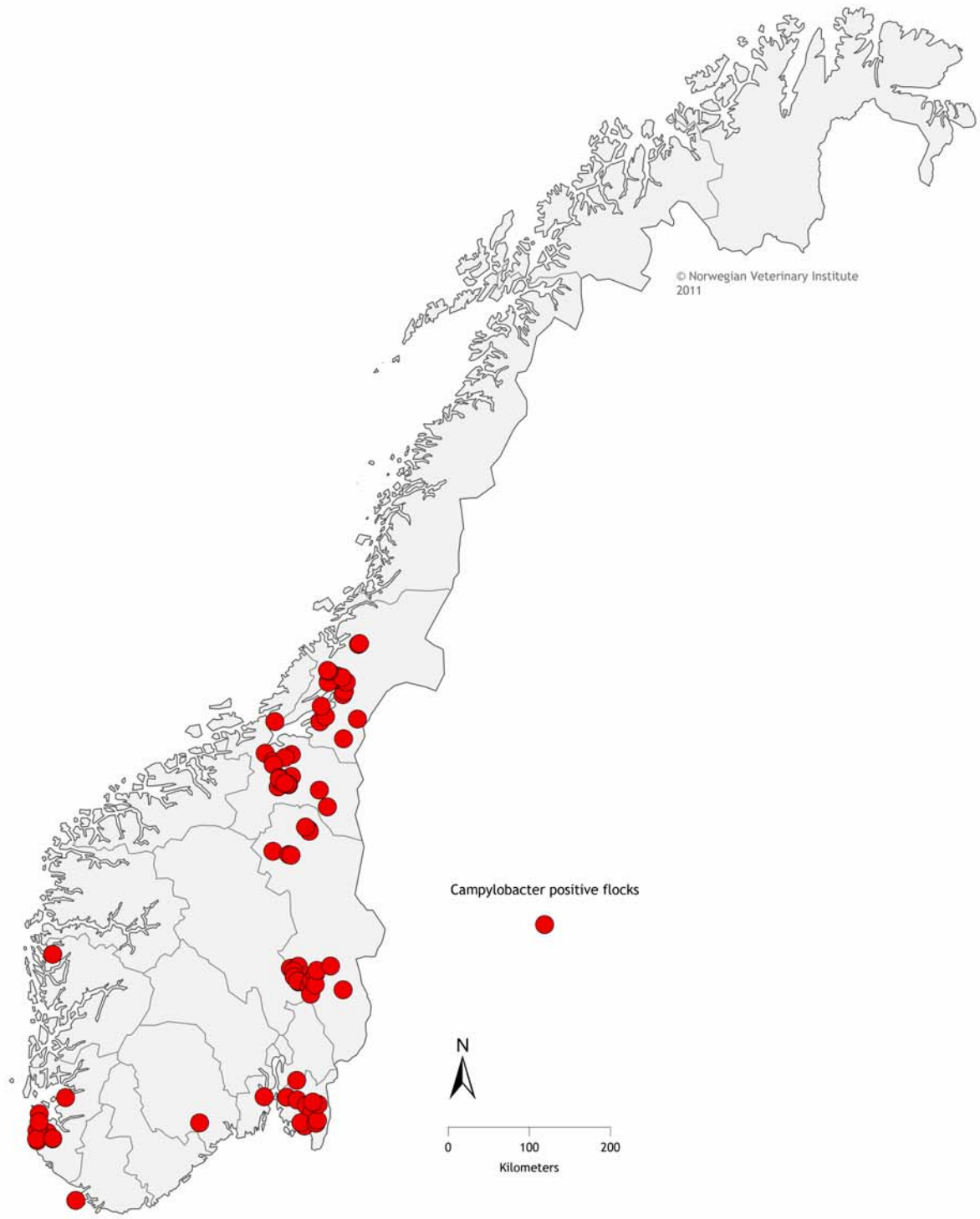
1. Kapperud G, Espeland G, Wahl E, Walde A, Herikstad H, Gustavsen S, Tveit I, Natås O, Bevanger L, Digranes A. Factors associated with increased and decreased risk for *Campylobacter* infection. A prospective case-control study in Norway. Am J Epidemiol 2003; 158 (3): 234-42.

2. Hofshagen M, Kruse H, Opheim M. The surveillance and control programme for *Campylobacter* in broiler flocks in Norway. In: Fredriksen B, Mørk T (editors). Surveillance and control programmes for terrestrial and aquatic animals in Norway. Annual report 2001. Oslo: National Veterinary Institute; 2002. p. 143-146.

3. Hofshagen M, Jonsson M, Opheim M. The surveillance and control programme for *Campylobacter* in broiler flocks in Norway. Annual report 2009. Oslo: National Veterinary Institute; 2010.

4. Hofshagen M, Kruse H. Reduction in flock prevalence of *Campylobacter* spp. in broilers in Norway after implementation of an action plan. J Food Prot 2005; 68: 2220-3.

Figure 3. Geographical distribution in 2010 of the location of farms with one or more flock positive for *Campylobacter* spp.



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The Norwegian Veterinary Institute has its main laboratory in Oslo, with regional laboratories in Sandnes, Bergen, Trondheim, Harstad og Tromsø, with about 360 employees in total.

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The NFSA comprises three administrative levels, and has some 1300 employees.

The NFSA advises and reports to the Ministry of Agriculture and Food, the Ministry of Fisheries and Coastal Affaires and the Ministry of Health and Care Services.

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