

# The surveillance programme for *Campylobacter* spp in broiler flocks in Norway 2019



Veterinærinstituttet  
Norwegian Veterinary Institute



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## Content

Summary .....	3
Introduction .....	3
Aims .....	3
Materials and methods .....	3
Results and Discussion .....	4
References .....	7

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## Summary

Surveillance in 2019 showed that a total of 103 flocks (5.1%) tested positive for *Campylobacter* spp. when all broiler flocks slaughtered before 51 days of age during the period May - October were tested. In total 2,018 flocks from 500 farms were sampled. There are regional differences in the proportions of positive farms. Of the positive flocks, 30.1% originated from 14 (2.8%) of the farms. The carcasses from the positive flocks were either heat treated or frozen for a minimum of three weeks before being marketed. This year's result is somewhat more favourable than the results from 2016 - 2018 with 7.7%, 7.1% and 6.3% positive flocks, respectively. The prevalence is still very low, compared to most other European countries.

## Introduction

Campylobacteriosis is currently the most commonly reported bacterial infectious disease in the Norwegian human population ([www.fhi.no](http://www.fhi.no)). 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). The action plan is a joint effort involving several stakeholder groups from "stable-to-table". The Norwegian Food Safety Authority is responsible for implementing the surveillance programme, while the Norwegian Veterinary Institute coordinates the programme, performs the laboratory investigations, analyses the data and communicates the results.

The action plan is updated regularly and the details for 2019 together with reports and plans from previous years can be found at <https://www.vetinst.no/overvaking/campylobacter-fjorfe>

## Aims

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

## Materials and methods

In 2019, all Norwegian broiler flocks slaughtered before 51 days of age during the period May - October were sampled by the owner. Due to a gradually reduced postal services in Norway the last few years, the sampling in 2019 was performed a maximum of six (seven when slaughtering on Thursdays) days before slaughter, while the sampling had been a maximum of four days before slaughter until 2016. One sample consisted of ten pooled swabs from fresh faecal/caecal droppings. The samples were submitted to the Norwegian 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 slaughterhouse and analysed by cultivation. When sampled at slaughter, caeca from 10 broilers per flock were pooled and sent to the Norwegian Veterinary Institute's laboratory in Oslo. Caecal contents were plated directly onto mCCDA agar and the agar plates were incubated in microaerophilic conditions at  $41.5 \pm 1^\circ\text{C}$  for  $44 \pm 4$  h. Species were confirmed using MALDI-TOF. Carcasses from the flocks with unknown status at the time of slaughter were treated as positive flocks.

## Results and Discussion

In total, 2,022 samples were taken before or at slaughter, representing 2,018 flocks from 500 farms. The discrepancy between number of flocks and number of samples was due to problems with the postal services being delayed but also to split slaughter of flocks. Totally 103 flocks (5.1%) tested positive for *Campylobacter* spp.

The positive samples originated from 86 (17.2%) of the farms. Three farms had three positive flocks and 11 farms had two positive flocks. This shows that 14 (16.3%) of the farms where *Campylobacter* was detected had more than one positive flock, and that 2.8% of all the tested farms produced 30.1% of the positive flocks. There are regional differences in the proportions of positive farms (Table 1).

Table 1. Farms positive for *Campylobacter* spp. by county in May - October 2018.

County	N	No. Positive	%
Østfold	82	9	11.0
Akershus	10	1	10.0
Hedmark	93	14	15.1
Oppland	6	1	16.7
Buskerud	5	1	20.0
Vestfold	14	0	0
Telemark	1	0	0
Vest-Agder	3	1	33.3
Rogaland	118	23	19.5
Møre og Romsdal	1	0	0
Trøndelag	167	36	21.6
Total	500	86	17.2

The proportion of *Campylobacter* positive flocks has varied substantially since the action plan was launched (Figure 1 and 2).

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 at slaughter only. In 2006 this was further reduced to 25.3%, and in 2007 the corresponding figure was 24.5%.

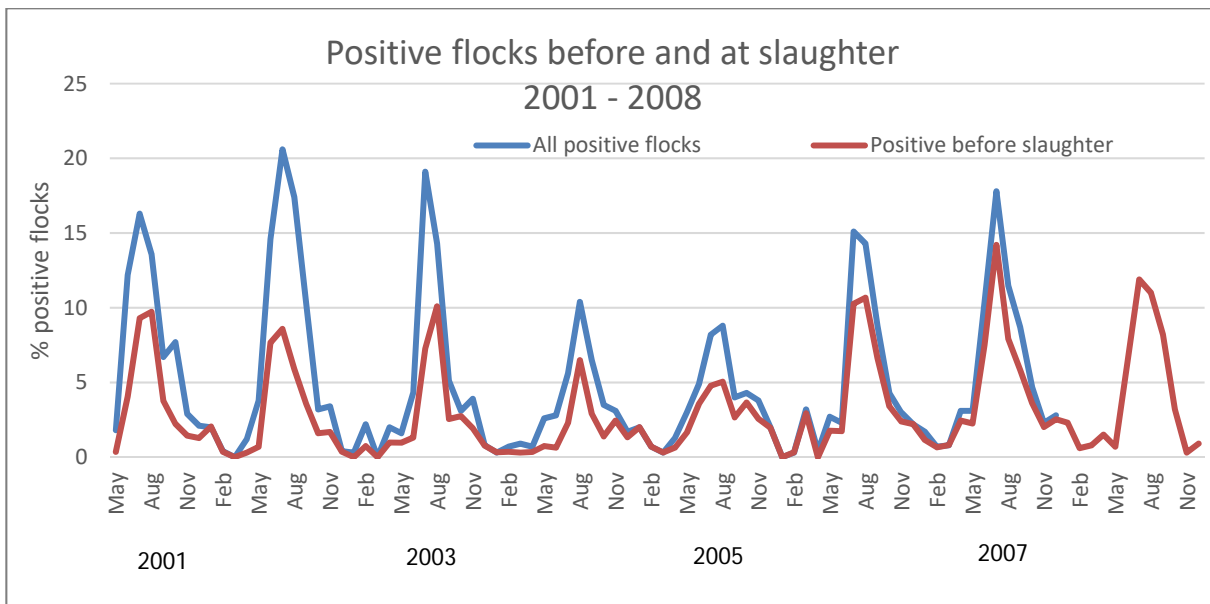


Figure 1. Monthly incidence of *Campylobacter* spp. in slaughtered Norwegian broiler flocks from May 2001 throughout 2008. The blue line represents flocks positive for *Campylobacter* spp., these data are based on two samples; before slaughter and at slaughter. The red line represents flocks positive for *Campylobacter* spp. at the sampling at farm before slaughter (from 2005 onwards: sampling approx. four days before slaughter).

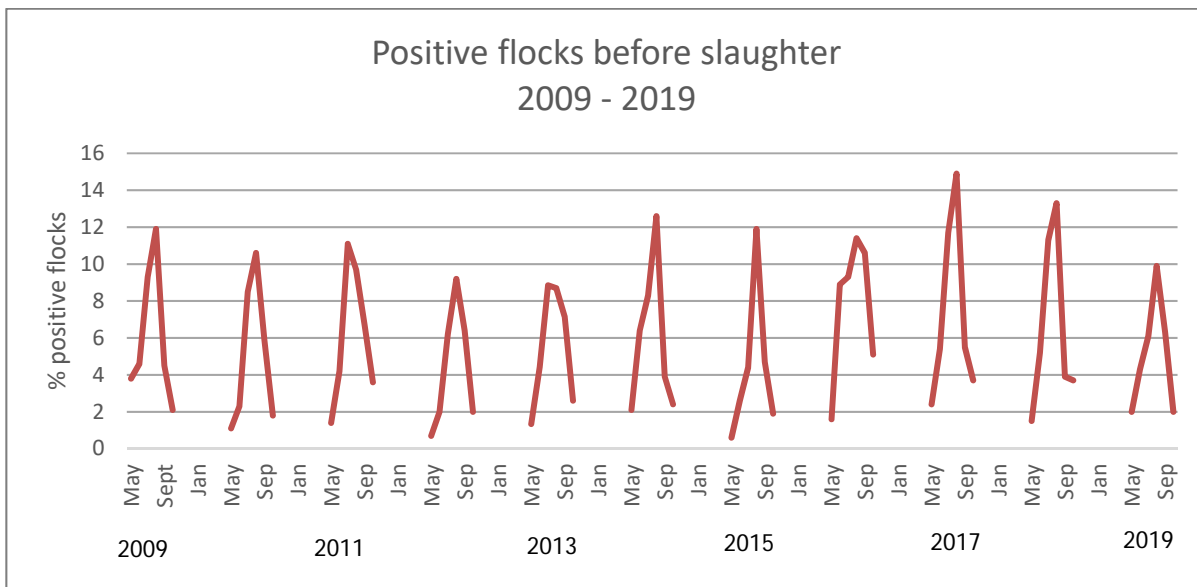


Figure 2. Monthly incidence of *Campylobacter* spp. in Norwegian broiler flocks from May throughout October 2009 - 2019. The red line represents flocks positive for *Campylobacter* spp. when sampling at farm before slaughter.

The results for 2002 - 2007, when all flocks were sampled twice, are presented in Table 2. along with the results of 2008 when the sampling was performed all year but only pre-slaughter.

From 2008, the sampling at slaughter was terminated, and more recent data to calculate the number of flocks which were going on the market positive for *Campylobacter* without being frozen or heat treated are therefore lacking. Assuming that 2008 - 2015 equals 2007 with 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 slaughtered during the six summer months) and that the number of samples equals the number of flocks, calculations was made for the years 2008 - 2015 (Table 2 and 3).

Table 2. Results from the Action Plan against *Campylobacter* spp. in broilers in the period 2002 - 2008.

Year	Number of sampled flocks	Number (%) of positive flocks	Number of positive flocks discovered at slaughter only*
2002	3 627	228 (6.3)	127
2003	3 550	175 (4.9)	85
2004	3 626	118 (3.3)	58
2005	3 652	132 (3.6)	42
2006	3 908	190 (4.9)	48
2007	4 145	237 (5.7)	58
2008	4 675	193 (4.1)	64**

\* 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.

\*\* For 2008 this is the estimated maximum number of flocks positive for *Campylobacter* spp. which had the possibility to reach the market without previous freezing or heat treatment.

Table 3. Results and estimated results from the Action Plan against *Campylobacter* spp. in broilers in the period 2009 - 2019.

Year	Number. of investigated / positive (%) samples*	Estimated number of flocks the whole year**	Estimated number (%) of positive flocks per year	Estimated number of non-identified positive flocks***
2009	1 924 / 117 (6.1)	4 000	195 (4.9)	78
2010	2 170 / 110 (5.1)	4 400	184 (4.2)	74
2011	2 282 / 139 (6.1)	4 560	232 (5.1)	93
2012	2 417 / 106 (4.4)	4 830	177 (3.7)	71
2013	2 710 / 149 (5.5)	5 420	248 (4.6)	99
2014	2 685 / 160 (6.0)	5 370	267 (5.0)	107
2015	2 133 / 93 (4.4)	4 260	155 (3.6)	62
2016	2 262 / 175 (7.7)	ND	ND	ND
2017	1 919 / 136 (7.1)	ND	ND	ND
2018	1 986 / 126 (6.3)	ND	ND	ND
2019	2 018 / 103 (5.1)	ND	ND	ND

\* Equals (for 2009-2016 approximately) number of slaughtered / positive flocks.

\*\* In 2009 - 2015, the estimate for the whole year is based upon number of slaughtered flocks in May - October.

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

ND: Not done.

Estimates of the whole year flock prevalence and the number of flocks positive for *Campylobacter* spp. reaching the market without freezing or heat treatment, have not been calculated since 2015- because no sampling has been done in the action plan during the six "winter months" November - April for the last eleven years, so estimates would probably be hampered with too many uncertainties to be of great value. Also the fact that the sampling since 2016 was performed a maximum of five to six (seven) days before slaughter, not four days as previous years, adds to the uncertainty of such estimates.

Therefore, to make proper estimates for the effect of the Action plan on human exposure to thermophilic *Campylobacter* spp. through Norwegian broiler meat products, there is again a need for sampling the whole year. There is also a need for sampling at slaughter to be able to estimate the true prevalence of positive flocks and to estimate the number of non-identified flocks pre slaughter.

This year's result is somewhat more favourable than the results from 2016 - 2018 with 7.7%, 7.1% and 6.3% positive flocks, respectively. The prevalence is also still very low, compared to most other European countries (3).

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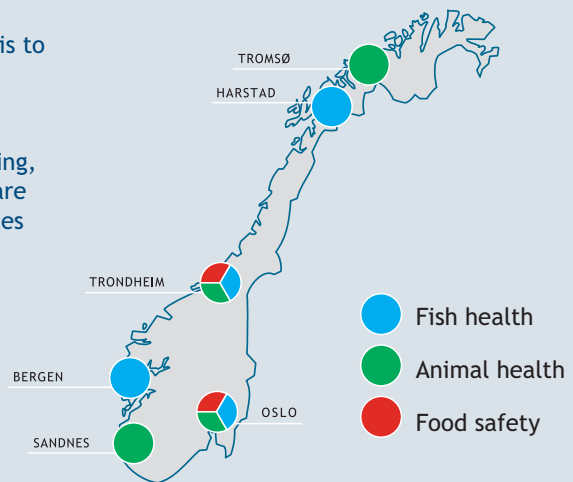
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