



The surveillance programme for *Campylobacter* spp. in broiler flocks in Norway 2020



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Summary

Surveillance in 2020 showed that a total of 115 flocks (6.1%) tested positive for *Campylobacter* spp. when all broiler flocks slaughtered before 51 days of age during the period May - October were tested. In total 1 893 flocks from 490 farms were sampled. Of all farms sampled, 86 (17.6%) had positive flocks and of these, 24 (4.9% of all farms) had two or more positive flocks. This means that almost 50% of the positive flocks originated from less than 5% 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%, 6.3% respectively and a bit worse than the result from 2019 with 5.1% positive flocks. 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). Unlike previous years, most of the infections in 2020 were 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 2020 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. from Norwegian broiler meat products.

Materials and methods

In 2020, 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 2020 was performed as in 2019 with 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. In contrast to 2019 where the samples were sent to Trondheim, the samples in 2020 were submitted to the Norwegian Veterinary Institute's laboratory in Oslo, 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 ± 1 °C for 44 ± 4 h. Species were confirmed using MALDI-TOF.

Results and Discussion

In total, 1 893 samples were taken before or at slaughter, representing 1 893 flocks from 490 farms. Totally 115 flocks (6.1%) tested positive for *Campylobacter* spp.

The positive samples originated from 86 (17.6%) of the farms. Six farms had three positive flocks and 18 farms had two positive flocks. This shows that 24 (27.9%) of the farms where *Campylobacter* was detected had more than one positive flock. Even though these farms only represent 4.9% (24/490) of all farms tested, they contributed with 47% (54/115) of all positive flocks tested in 2020. There are also regional differences in the proportions of positive farms (Table 1). However, as some Food Safety Authority districts are represented with only a limited number of samples, results cannot be directly compared across different districts.

Table 1: Farms positive for *Campylobacter* spp. by Food Safety Authority district in May - October 2020.

Food Safety Authority district	N	No. Positive	%
Agder	3	0	0.0
Gauldal	59	17	28.8
Glåmdal og Østerdal	36	6	16.7
Gudbrandsdal	1	0	0.0
Innherred og Fosen	45	9	20.0
Mjøsområdet	59	8	13.6
Namdal	3	2	66.7
Nordmøre og Romsdal	1	0	0.0
Nordre Buskerud, Hadeland og Valdres	1	0	0.0
Romerike	10	0	0.0
Søndre Buskerud	4	0	0.0
Sør-Innherred	41	6	14.6
Sør-Rogaland, Sirdal og Flekkefjord	120	27	22.5
Telemark	1	0	0.0
Trondheim og Omland	17	2	11.8
Vestfold	10	0	0.0
Østfold og Follo	79	9	11.4
Total	490	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 1st of March 2005 and 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%. This confirms the importance of sampling close to the slaughter date, to detect *Campylobacter* positive flocks.

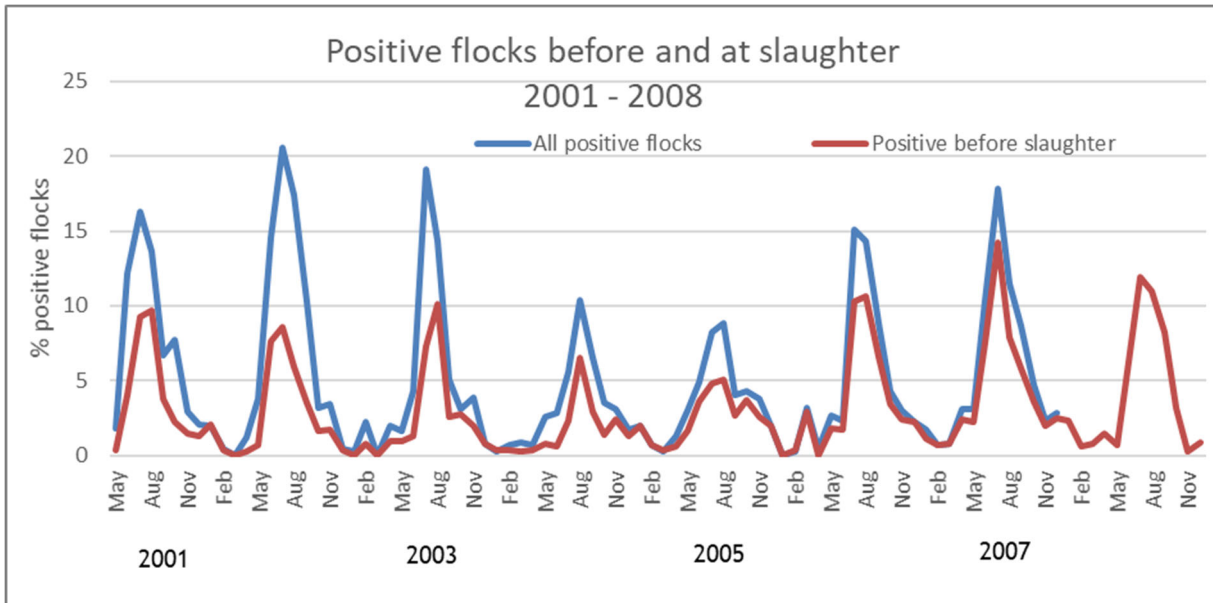


Figure 1: Monthly incidence of *Campylobacter* spp. in slaughtered Norwegian broiler flocks from May 2001 throughout 2008. The blue line represents flocks positive for *Campylobacter* spp., these data are based on two samples; before slaughter and at slaughter. The red line represents flocks positive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

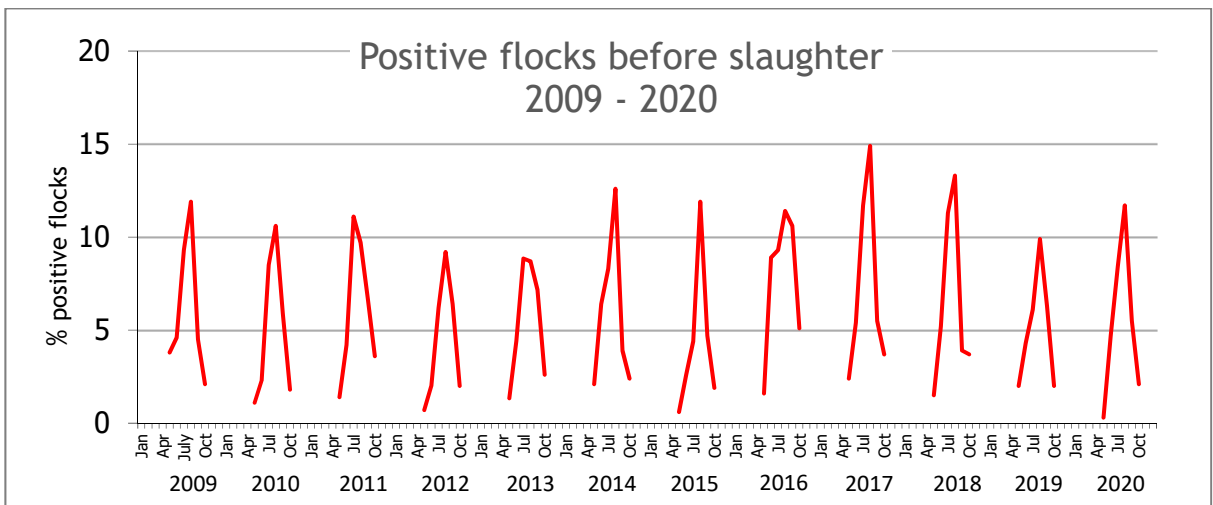


Figure 2: Monthly incidence of *Campylobacter* spp. in Norwegian broiler flocks from May throughout October 2009 - 2020. The red line represents flocks positive for *Campylobacter* spp. when sampling at farm before slaughter.

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 - 2020.

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
2020	1 893 / 115 (6.1)	ND	ND	ND

* Equals (for 2009-2020 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 determined.

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. 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 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%, 6.3% respectively and a bit higher than the result from 2019 with 5.1% positive flocks. The prevalence is still very low, compared to most other European countries (3).

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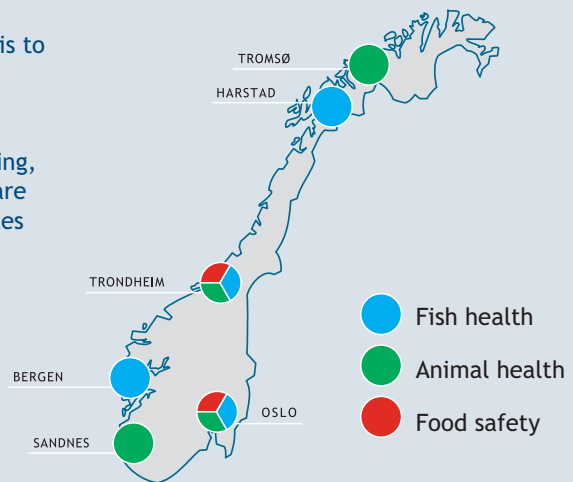
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