

# The surveillance programme for *Campylobacter* spp in broiler flocks in Norway 2017



Veterinærinstituttet  
Norwegian Veterinary Institute



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## Content

|                              |   |
|------------------------------|---|
| Summary .....                | 3 |
| Introduction .....           | 3 |
| Aims .....                   | 3 |
| Materials and methods .....  | 3 |
| Results and Discussion ..... | 3 |
| References .....             | 6 |

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## Summary

Surveillance in 2017 showed that a total of 136 flocks (7.1%) tested positive for *Campylobacter* spp. when all broiler flocks slaughtered before 51 days of age during the period May - October were tested. In total 1,919 flocks from 521 farms were sampled. There are regional differences in the proportions of positive farms. Of the positive flocks, 42.6% originated from 5.0% 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 nearly the same as in 2016, which was the least favourable since 2009. The prevalence is still very low though, 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 2017 together with reports and plans from previous years can be found at <https://www.vetinst.no/en/surveillance-programmes/campylobacter-in-broiler-flocks>.

## Aims

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

## Materials and methods

In 2017, all Norwegian broiler flocks slaughtered before 51 days of age during the period May - October were sampled by the owner. Due to reduced postal services the sampling in 2017 was performed a maximum of five 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 on mCCDA agar. When sampled at slaughter, caeca from 10 broilers per flock were pooled and sent to the Norwegian Veterinary Institute's laboratory in Oslo for cultivation. The carcasses from flocks with unknown status at the time of slaughter were treated as positive flocks.

## Results and Discussion

In total, 1,996 samples were taken before or at slaughter, representing 1,919 flocks from 521 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. Also seven of the samples were not analysed

due to poor quality of the sample. Totally 144 samples from 136 flocks (7.1%) tested positive for *Campylobacter* spp.

The positive samples originated from 104 (20.0%) of the farms. One farm had four positive flocks, four farms had three positive flocks and 21 farms had two positive flocks. This shows that 26 (25.0%) of the farms where *Campylobacter* was detected had more than one positive flock, and that 5.0% of the farms produced 42.6% of the positive flocks. There are regional differences in the proportions of positive farms (Table 1).

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

Table 1. Farms positive for *Campylobacter* spp. by county in May - October 2017.

| County          | N   | No. Positive | %    |
|-----------------|-----|--------------|------|
| Østfold         | 85  | 15           | 17.6 |
| Akershus        | 12  | 0            | 0    |
| Hedmark         | 102 | 17           | 15.9 |
| Oppland         | 6   | 0            | 0    |
| Buskerud        | 3   | 2            | 66.7 |
| Vestfold        | 13  | 2            | 15.4 |
| Telemark        | 1   | 0            | 0    |
| Vest-Agder      | 3   | 0            | 0    |
| Rogaland        | 119 | 29           | 24.4 |
| Hordaland       | 1   | 0            | 0    |
| Møre og Romsdal | 1   | 0            | 0    |
| Sør-Trøndelag   | 79  | 17           | 21.5 |
| Nord-Trøndelag  | 96  | 22           | 22.9 |
| Total           | 521 | 104          | 20.0 |

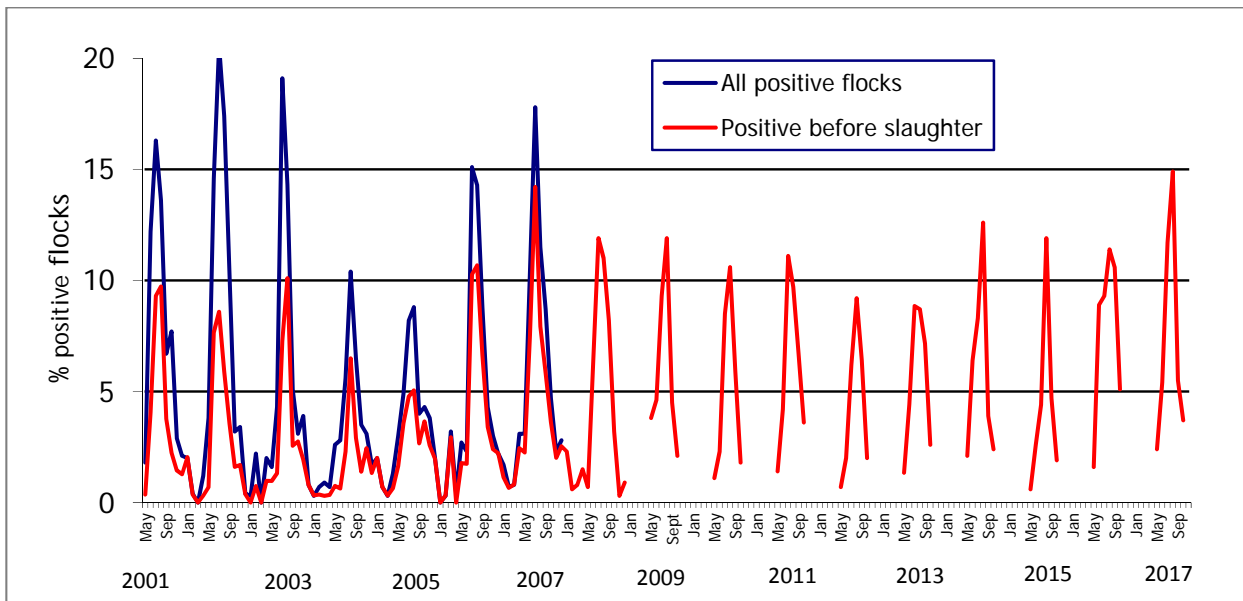


Figure 1. Monthly incidence of *Campylobacter* spp. in slaughtered Norwegian broiler flocks from May 2001 throughout 2017. The blue line represents flocks positive for *Campylobacter* spp., these data are based on two samples; before slaughter and at slaughter. The red line represents flocks positive for *Campylobacter* spp. at the sampling at farm before slaughter (from 2005 onwards: sampling approx. four days before slaughter). No sampling in January-April and November-December in 2009 - 2017.

The results for 2002 - 2007, when all flocks were sampled twice, are presented in Table 2.

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.

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%.

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 3. Estimated results from the Action Plan against *Campylobacter* spp. in broilers in the period 2009 - 2017.

| 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)                               |   |  |   |
| 2017**** | 1919^ / 136^ (7.1)                              |   |  |   |

\* Equals approximately number of slaughtered (positive) flocks. ^For 2017: 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.

\*\*\*\* No estimates made for 2016 and 2017.

Estimates of the whole year flock prevalence and the number of flocks positive for *Campylobacter* spp. reaching the market without freezing or heat treatment, has not been calculated for 2016 and 2017. Since no sampling has been done in the action plan during the six "winter months" November - April for the last eight years, and the number of positive flocks for 2016 and 2017 is the least favourable since 2009, we think such estimates would be hampered with too many uncertainties to be of great value. Also the fact that the sampling in 2016 and 2017 was performed a maximum of five days before slaughter and 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 and also a need for sampling at slaughter to be able to estimate the true prevalence of positive flocks and also estimate the number of non-identified flocks pre slaughter.

In spite of the rise in prevalence in 2016 and 2017 compared to earlier results, the prevalence is still very low compared to most other European countries (3).

## 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. Reduction in flock prevalence of *Campylobacter* spp. in broilers in Norway after implementation of an action plan. *J Food Prot* 2005; 68: 2220-3.
3. EFSA (European Food Safety Authority) and ECDC (European Centre for Disease Prevention and Control). The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2016. *EFSA Journal* 2017;15(12): 228 pp. doi: [10.2903/j.efsa.2017.5077](https://doi.org/10.2903/j.efsa.2017.5077)

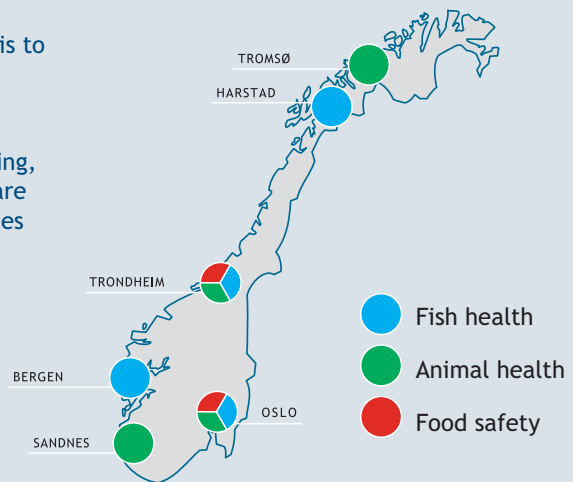
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