Are the birds feeding you
Campylobacter?

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SUMMARY
During May and June 1992 there was a marked increase in reports of campylobacter infections compared with other years. Several affected patients mentioned they had been drinking milk from bottles previously pecked by birds. A case control study was initiated to investigate whether there was any significant association. It was concluded that drinking milk pecked by birds was associated significantly with subsequent campylobacter infection.

INTRODUCTION
During May and June 1992 the Department of Public Health Medicine received 58 reports of campylobacter infection, compared with 27 reports in the same months in 1991. Six of the cases, when first contacted by a local clinical medical officer or health visitor had consumed doorstep milk pecked by birds. An investigation was therefore initiated to test the hypothesis that consumption of doorstep milk was associated with subsequent campylobacter infection.

Throughout Northern Ireland the incidence of laboratory reported campylobacter infections has been increasing (Table 1). A seasonal increase is normally noted in spring and autumn; the incidence in Northern Ireland remains lower than that of the rest of the UK.

| Year | No. of Notifications |
|------|----------------------|
| 1985 | 90                   |
| 1986 | 73                   |
| 1987 | 122                  |
| 1988 | 173                  |
| 1989 | 192                  |
| 1990 | 244                  |
| 1991 | 306                  |

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METHODS
Each case of reported *campylobacter* infection is investigated by a clinical medical officer or health visitor to ascertain risk factors and give advice on minimizing the impact of infection in the household and at work. Following comments that some people with *campylobacter* infection had been drinking milk previously pecked by birds 15 cases (22% of the total) were re-interviewed by telephone as part of a case/control study. A case was defined as someone with a laboratory confirmed *campylobacter* infection reported during May and June 1992, with no history of foreign travel within the previous three months, no pre-existing gastrointestinal pathology and who was easily contactable by telephone (maximum of two calls). Each case was asked to nominate one or two controls who were matched for age (within 5 years for children, 10 years for adults), sex and postcode area and who had not had any gastrointestinal symptoms in the preceding month.

Cases and controls were asked whether they received and consumed doorstep milk and whether this milk had been pecked by birds. They were also asked whether they had identified any particular species of birds pecking their milk. Households receiving two colours of milk top were noted and asked if the birds seemed to favour pecking one colour of top in preference to another. Enquiry was made about foodstuffs associated with *campylobacter* infection (poultry, raw milk, barbecued meat) (Table 3). They were also asked about farmyard visits and contact with gastroenteritis cases.

Local hospital laboratories routinely inform the NHSSB Department of Public Health Medicine of any confirmed cases of *campylobacter* infection. The laboratories do not routinely type *campylobacter* isolates and report that "*campylobacter species*" have been identified.

RESULTS
All cases were originally interviewed by a clinical medical officer or health visitor. Fifteen cases and 20 controls were re-interviewed. Two of the cases had been admitted to hospital. The most common symptoms were diarrhoea (100%), fever (93%) and abdominal pain (80%). Enquiry into perceived risk factors revealed that seven controls and eight cases had noted that their milk bottles had been pecked (p=0.285). Four of the seven controls discarded the entire contents of the bottle so that none was consumed. Consumption of the pecked milk was significantly associated with subsequent development of *campylobacter* infection (p=0.027). By the time the infection was reported, several days after milk consumption, samples of the pecked milk were no longer available.

**Table II**

| CASE                     | CONTROL                     | Significance |
|--------------------------|-----------------------------|--------------|
| Noted pecked milk        | Yes 8 7                     | No 7 13      | N/S          |
| Drank pecked milk        | Yes 8 7                     | No 3 17      | p=0.027      |

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Campylobacter

Farmyard visits, sick animals and contact with other gastroenteritis cases were not significantly associated with illness.

Enquiry into consumption of various foodstuffs demonstrated that none were significantly associated with campylobacter infection (Table 3).

| Foodstuffs             | No. eating food | No. NOT eating food | Unsure | Significance |
|------------------------|-----------------|----------------------|-------|--------------|
|                        | Case     | Control  | Case | Control | Case | Control |            |
| Hamburgers             | 4        | 13       | 11   | 7       | 0    | 0       | N/S*         |
| Takeaways              | 5        | 12       | 10   | 8       | 0    | 0       | N/S          |
| Barbecued food         | 2        | 9        | 13   | 11      | 0    | 0       | N/S          |
| Soft cheese            | 0        | 9        | 15   | 11      | 0    | 0       | N/S          |
| Poultry/               | 13       | 20       | 2    | 0       | 0    | 0       | N/S          |
| poultry products       | 13       | 20       | 2    | 0       | 0    | 0       | N/S          |
| Raw milk               | 0        | 1        | 0    | 19      | 0    | 0       | N/S          |
| Ice lollies            | 8        | 9        | 7    | 11      | 0    | 0       | N/S          |
| Ice cream              | 13       | 13       | 2    | 7       | 0    | 0       | N/S          |
| Custard                | 3        | 2        | 12   | 17      | 0    | 1       | N/S          |
| Gateaux                | 2        | 6        | 13   | 14      | 0    | 0       | N/S          |
| Eggs                   | 8        | 14       | 5    | 5       | 1    | 1       | N/S          |
| Yoghurt                | 7        | 10       | 7    | 10      | 1    | 0       | N/S          |
| Cold meats             | 12       | 18       | 2    | 2       | 1    | 0       | N/S          |
| Meat pies              | 1        | 8        | 12   | 1       | 2    | 11      | N/S          |
| Mayonnaise             | 7        | 15       | 4    | 5       | 4    | 0       | N/S          |
| Sandwich spread        | 5        | 7        | 8    | 13      | 2    | 0       | N/S          |
| Pate                   | 0        | 3        | 14   | 17      | 1    | 0       | N/S          |

* N/S denotes 'not significant'.

Six households (2 cases and 4 controls) received two colours of milk top — silver (fullcream milk) or silver/red (semi-skimmed milk). All six households reported the silver milk tops being pecked more frequently. Seven of those interviewed (20%) were able to name the species of birds pecking their milk — corvids (crow family, including magpies) were named as the culprits by four households. Many milk deliveries took place before the households had arisen and therefore pecking was unwitnessed. Several interviewees spontaneously mentioned that they had noticed an increase in the number of magpies in their area around this time.
DISCUSSION

Campylobacter is now the commonest bacterial cause of diarrhoea in Britain, the peak incidence being in spring and autumn. The epidemiology is not yet fully understood, most cases are isolated, and outbreaks, clusters and secondary cases are rare. One explanation suggested for this is that many of the population have immunity to campylobacter infection.\(^2\) Several studies have linked campylobacter infection to consumption of milk by the crow (corvid) family\(^3,4,5\), but none has so far confirmed this association in Northern Ireland. The present study is small, and the sample size was limited by unavailability of cases and contacts by telephone over the holiday period and by difficulty in nominating appropriate controls. The corvids are carrion eaters and are much more likely to transmit campylobacter infection than members of the seed eating tit family. Interestingly, six households reported the birds’ apparent preference for silver top milk. In the past birds have been shown to favour pecking red colours\(^6\). Perhaps some birds have learned that the silver top milk is more nutritious?

One study\(^4\) has mentioned the increase in this infection in new housing developments in the north of England which was an area of rapid population expansion. Many of these were in close proximity to the countryside and there was easy access for the local corvid population. The authors sampled the local bird population and corvids were found to be significant campylobacter carriers. Capture of local milk-pecking birds was not attempted in our study.

Many households in Northern Ireland still receive doorstep milk and sometimes milkmen cover bottles with upturned cartons to try and prevent pecking. Other households have made boxes for storage and protection of milk. The dairy industry in Northern Ireland has already recognized the potential dangers of milk pecking and in early 1992 one dairy supplied its customers with cartons printed with information about the dangers of drinking pecked milk. In January 1991 the Richmond Committee\(^9\), in its report on the microbiological safety of food, recommended that the government and dairy industry prepare guidelines to minimize risk from doorstep deliveries of food and milk. The Ministry of Agriculture, Fisheries and Food, the Department of Health and the dairy industry established guidelines recommending that doorstep milk should be discarded if tampered with and it should be taken indoors and refrigerated as soon as possible. If this is impracticable householders should leave something out for their milkman to use to protect the bottle tops.\(^7\)

In 1986 the overall cost of a single human case of campylobacter infection was estimated to be £587.\(^8\) Allowing for inflation this will now have risen to well over £600. The cost, in financial terms alone, of the 58 cases in the Northern Board area during May and June would have been over £35,000.

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