# An outbreak of *Campylobacter jejuni* infection among conference delegates

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## Abstract

***Campylobacter* infection is one of the most commonly reported foodborne diseases in Australia however, reported *Campylobacter* outbreaks are rare. This report describes such an outbreak among delegates attending a 10 day international academic meeting in South Australia during May 2001. A retrospective cohort study of the 29 delegates who attended the conference was conducted. A questionnaire was sent by email with a response rate of 93 per cent. Ten cases (onset of diarrhoea while attending the conference) were identified. Two were culture positive for *Campylobacter jejuni*. There was a significant association between the illness and eating a number of food items from two restaurants however, environmental investigation of the two venues did not identify a definitive source for the outbreak. This investigation demonstrates the usefulness of email in the distribution of questionnaires among specific cohorts. *Commun Dis Intell* 2003;27:380–383.**

*Keywords: campylobacteriosis,* Campylobacter jejuni, *disease outbreak*

## *Introduction*

*Campylobacter* infection is one of the most commonly reported foodborne diseases in Australia and overseas. The majority of cases are reported to be sporadic, with outbreaks rarely detected.[1,2,3] Factors contributing to the relative infrequency of *Campylobacter* outbreaks have been discussed elsewhere and include the nature of the organism and its epidemiology, lack of follow-up of *campylobacter* infections and lack of detailed strain characterisation.[4] Reported outbreaks have been associated with a point source such as contaminated drinking water, raw milk and chicken.[5–11] This article describes the epidemiological, microbiological and environmental investigation of an outbreak of *Campylobacter jejuni* among delegates attending an international meeting in South Australia during May 2001.

## *Methods*

On 18 May 2001, the Communicable Disease Control Branch of the South Australian Department of Human Services received notification of several cases of gastrointestinal illness among delegates attending an international academic meeting at a large hotel in metropolitan Adelaide. Thirty delegates attended the meeting between 9 and 18 May 2001. Of these, 29 delegates (13 international and 16 interstate visitors) were staying at the hotel. The 13 international delegates were from 10 different countries on five continents (Australia, Asia, North America, Africa and Europe).

Hypothesis-generating interviews were conducted with seven known cases, prior to their departure on the evening of 18 May. Cases were also requested to provide a faecal specimen for testing, prior to their departure. From the hypothesis-generating interviews seven different premises were identified where cases had consumed food at the meeting and prior to illness onset (between 9 and 13 May). Frequency of attendance at these premises indicated that apart from the conference hotel, only three venues were common amongst all seven cases interviewed. These were a bakery, a regional restaurant and a metropolitan Chinese restaurant. On 12 May a group of delegates attended a day tour of local wineries. During the winery tour, morning tea was provided at a bakery and lunch (with a choice of kangaroo fillet or baked chicken fillet) was provided at a regional restaurant. On the evening of 12 May most delegates from the winery tour shared an evening banquet meal of 11 dishes at a Chinese restaurant in metropolitan Adelaide.

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A retrospective cohort study was undertaken using email to distribute the questionnaires. The cohort was defined as persons who attended the conference between 9 and 18 May with a date of arrival between 9 May and 13 May. One delegate did not arrive until 14 May and so was excluded from the cohort. A case was defined as a person who had onset of diarrhoea while attending the conference between 9 and 18 May. A cohort study was selected because the conference delegates represented a well-defined population, and contact details for all individuals including phone numbers and email addresses were readily available.

A questionnaire was developed and included items about attendance at the winery tour, the Chinese restaurant, and exposure to menu foods at these venues. The questionnaire was sent to 27 delegates from 10 different countries by email as a word attachment. Respondents were asked to return the questionnaire either by fax or email and a reminder email was sent after five days. Two other delegates were interviewed in person: an overseas resident who was hospitalised in South Australia and a local South Australian resident. Data were entered and analysed using Epi Info Version 6.0 statistical software.

A search of the South Australian Notifiable Diseases Database was conducted for additional *Campylobacter jejuni* cases that were potentially related to the same source but not associated with the meeting delegates. This search aimed to identify notified cases that indicated eating at a Chinese restaurant or at a winery prior to their illness.

## *Results*

### Cohort study

Twenty-seven responses to the questionnaire were received with a final response rate of 93 per cent. Fifteen (56%) of the 27 responses were returned via email, 10 (37%) were returned via fax and two (7%) were face to face interviews. The median age of respondents was 46 years (range 29–72 years) and 23 (85%) were male.

Ten cases were identified among the cohort of 29 delegates. The median age of cases was 50 years (range 37–72 years) and 9 (90%) cases were male. Onset of nine cases occurred over a three day period between 13 and 15 May (Figure). A further case had an onset of 17 May 2001. Other symptoms, apart from diarrhoea, included abdominal pain (seven cases), fever/chills (four cases), headache (four cases), nausea (four cases) and vomiting (one case). Duration of the illness (where known) ranged from one to seven days, with a mean of four days. One case was hospitalised for six days.

Thirteen respondents had attended the winery tour and 11 respondents had attended the Chinese restaurant. All 11 had also attended the winery tour. Risk ratio (RR) for attendance at the Chinese banquet was 13.1 (95% confidence interval (CI) 1.9–89.1) and for the winery tour was 9.7 (95% CI 1.4–66.3). Attack rates among those attending the Chinese restaurant and those attending the winery tour were 81 per cent and 69 per cent respectively (Table).

Dishes at the Chinese restaurant with the highest risk ratios (RR) were: spring rolls, fried chicken and fried rice, RR = 13.1 (95% CI 1.9–89.1) with an attack rate of 82 per cent, followed by sizzling prawns, smoked duck, and vegetable dishes with RR of 6.8 (95% CI 1.8–25.9) and an attack rate of 80 per cent. Two respondents noted that the sizzling prawns were undercooked and another observed that the smoked duck was pink.

For food on the winery tour, the highest risk ratio was for the kangaroo, RR = 11.3 (95%CI 1.1.7–76.9) followed by vegetables, RR = 9.7 (95%CI 1.4–66.3). The attack rates for the kangaroo and vegetables were 75 per cent and 69 per cent respectively. No delegate reported eating chicken breast on the winery tour. The risk ratio for one other restaurant was lower and not statistically significant. A further restaurant was attended by all cases on 10 May but the attack rate was much lower (48%).

No additional *Campylobacter jejuni* cases linked to a winery or Chinese restaurant were identified through a search of the South Australian Notifiable Diseases Database between January and March 2001.

### Microbiological investigation

Faecal specimens were obtained from three cases. Two were positive for *Campylobacter jejuni* on culture and of these, one specimen also showed large numbers of *Blastocystis hominis* on microscopy.

**Figure. Cases of diarrhoeal illness among conference delegates, Adelaide, 9 to 13 May 2001, by date and time of onset**

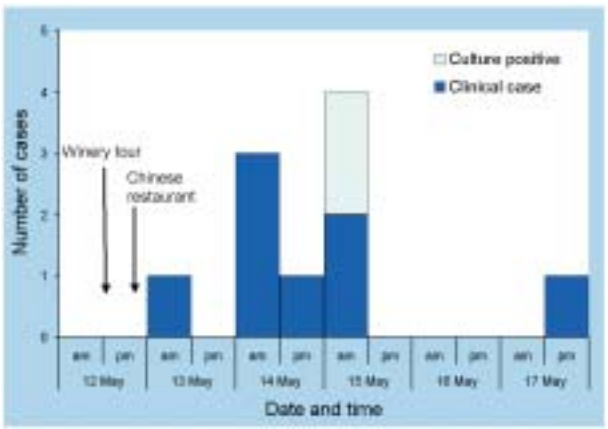

**Table. Attendance at the winery and Chinese restaurant, and exposure to specific foods eaten, by attack rates and relative risk**

| Exposure | Exposed | | Attack rate (% exposed) | Not exposed | | Attack rate (% not exposed) | Relative risk | 95% confidence Interval |
|---|---|---|---|---|---|---|---|---|
| | Ill | Total | | Ill | Total | | | |
| **Attended winery tour** | 9 | 13 | 69.0 | 1 | 14 | 7.1 | 9.7 | 1.4–66.3 |
| Bee sting (morning tea) | 8 | 11 | 73.0 | 2 | 16 | 13.0 | 5.8 | 1.5–22.4 |
| Kangaroo fillet | 9 | 12 | 75.0 | 1 | 15 | 6.7 | 11.3 | 1.7–76.9 |
| Vegetables | 9 | 13 | 69.0 | 1 | 14 | 7.1 | 9.7 | 1.4–66.3 |
| Date pudding | 6 | 8 | 75.0 | 4 | 19 | 21.0 | 3.6 | 1.4–9.3 |
| Water | 6 | 9 | 67.0 | 4 | 18 | 22.0 | 3.0 | 1.1–8.0 |
| Cream | 3 | 4 | 75.0 | 7 | 23 | 30.0 | 2.5 | 1.1–5.7 |
| Caramel sauce | 5 | 8 | 62.5 | 5 | 19 | 26.0 | 2.4 | 0.9–6.0 |
| Chicken | 0 | 1 | 0.0 | 10 | 26 | 38.0 | 0.0 | undefined |
| **Attended Chinese restaurant** | 9 | 11 | 82.0 | 1 | 16 | 6.3 | 13.1 | 1.9–89.1 |
| Spring rolls | 9 | 11 | 82.0 | 1 | 16 | 6.3 | 13.1 | 1.9–89.1 |
| Chicken | 9 | 11 | 82.0 | 1 | 16 | 6.3 | 13.1 | 1.9–89.1 |
| Fried rice | 9 | 11 | 82.0 | 1 | 16 | 6.3 | 13.1 | 1.9–89.1 |
| Sizzling prawns | 8 | 10 | 80.0 | 2 | 17 | 12.0 | 6.8 | 1.8–25.9 |
| Smoked duck | 8 | 10 | 80.0 | 2 | 17 | 12.0 | 6.8 | 1.8–25.9 |
| Vegetables | 8 | 10 | 80.0 | 2 | 17 | 12.0 | 6.8 | 1.8–25.9 |
| Dim sim | 7 | 9 | 78.0 | 3 | 18 | 17.0 | 4.7 | 1.6–13.9 |
| Satay beef | 7 | 9 | 78.0 | 3 | 18 | 17.0 | 4.7 | 1.6–13.9 |
| Seafood soup | 7 | 9 | 78.0 | 3 | 18 | 17.0 | 4.7 | 1.6–13.9 |
| Sweet and sour sauce | 7 | 9 | 78.0 | 3 | 18 | 17.0 | 4.7 | 1.6–13.9 |
| Beef with lemon grass | 6 | 8 | 75.0 | 4 | 19 | 21.0 | 3.6 | 1.4–9.3 |
| Fried ice cream | 6 | 8 | 75.0 | 4 | 19 | 21.0 | 3.6 | 1.4–9.3 |

### Environmental investigation

An environmental investigation of the Chinese restaurant was conducted by the local environmental health officer. Problems with food handling were detected. A mop and bucket were stored in the hand basin and there was no hand towel or soap. Frozen meats were thawed in the sink overnight and foods including meat were kept uncovered on the cool room floor. All food on the banquet menu at the Chinese restaurant was prepared in the wok. Environmental investigation of the winery restaurant did not identify any problems with food handling or storage. No food or other microbiological specimens were obtained from either of the premises.

## *Discussion*

Only a small number of *Campylobacter* outbreaks have been recognised in South Australia over the past 5 years and most reports of *Campylobacter* infection in South Australia appear sporadic. In 2000, 1,883 notifications of *Campylobacter* infection were received but only nine notifications were attributed to a single outbreak. This outbreak was associated with the consumption of raw milk purchased from a dairy.[12]

Chicken and other poultry are common vehicles for *Campylobacter* and are often associated with infection in humans.[4,13] Recognised outbreaks are frequently related to the handling and consumption of chicken and to cross contamination and poor food handling practices.[1,11,14] Other *Campylobacter* outbreaks have been associated with the consumption of cucumber, tuna salad, gravy, and pineapple, all consumed on commercial premises. All of these are unusual vehicles for *Campylobacter* and all of these outbreaks were attributed to cross contamination or poor food handling practices in the kitchen.[2,15,16]

In this outbreak of *Campylobacter jejuni* among people attending an international academic meeting in Adelaide, a definitive source could not be determined. The most likely source was one of the banquet dishes served at the Chinese restaurant, in view of the high risk ratios combined with high attack

rates for several banquet food items. Delegates eating at the restaurant noted that undercooked meat was served and a subsequent environmental inspection revealed inadequate food handling practices. The highest risk ratios were for the chicken dish, as well as spring rolls and fried rice at the Chinese restaurant. As poultry are a natural reservoir for *Campylobacter jejuni*, chicken or duck may have been a possible source. In addition, cross contamination of several banquet dishes may have occurred. Another possible source was the kangaroo meat served on the winery tour. However environmental inspection of the winery restaurant did not identify any inadequacies.

The protozoan *Blastocystis hominis* was detected on faecal microscopy from a culture positive *Campylobacter* case, who was a resident of northern Australia. While *Blastocystis hominis* may occasionally cause gastrointestinal symptoms, it has limited pathogenicity and is common in asymptomatic patients.[17] The presence of *Blastocystis hominis* in the faeces of a patient with gastrointestinal symptoms does not necessarily signify that it is the cause. It is considered unlikely that *Blastocystis hominis* contributed to this outbreak.

A limitation of the investigation was the high level of exposure by cases to a limited menu of food items. This resulted in a number of food items with similar and high relative risks for illness. While a quantitative (dose-response) analysis can sometimes be helpful in these circumstances, it could not be used in this investigation.

Finally this investigation was conducted using email as the main method for distribution of questionnaires. This method was chosen as a feasible means of contacting a group of professional people, who were from three continents with varying time zones, over a short period. The response rate of 93 per cent indicated a high level of acceptance of survey administration by email among a cohort of delegates attending an international academic conference.

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