Report on Campylobacteriosis in Ireland, 2000

Barbara Foley and Paul McKeown

National Disease Surveillance Centre
25-27 Middle Gardiner Street, Dublin 1

Introduction

Infections due to *Campylobacter spp* are the most commonly isolated bacterial cause of human gastrointestinal illness, and reports of campylobacteriosis in Ireland, UK, and other countries with temperate climates have been increasing since the organism was first recognised as a human pathogen in 1972. *Campylobacter jejuni* is the predominant species associated with human illness, with the remainder mostly being *C. coli.*

Campylobacteriosis presents as a diarrhoeal illness. The diarrhoea is often bloody and is frequently associated with acute abdominal pain. Symptoms may subside after a number of days or may persist for weeks. Rarely, some long-term sequelae may develop such as arthritis and approximately one in every 1000 cases leads to a severe neurological disorder called Guillain-Barré Syndrome (GBS).

In 2000, NDSC conducted the first national survey of the incidence of human campylobacteriosis in Ireland.[1] Valuable information was derived from that study regarding the epidemiology of laboratory-confirmed campylobacteriosis which supplemented further investigations in this field by the Food Safety Authority of Ireland and other partners in infectious disease surveillance and control. This review presents the data from the second year of this laboratory survey.

Methods

NDSC requested laboratories and/or public health doctors to provide disaggregated information on all laboratory-confirmed cases of campylobacteriosis diagnosed in 2000.

The following minimum dataset was requested: identifier, date of birth/age, sex, address and date of onset/isolation/reporting. In regions where laboratory surveillance systems were in place, this information was requested from their databases. Duplicates were removed where detected. Data were assigned a health board and a county where address was supplied. Analyses were carried out using MS Excel and Access.

Direct methods of standardisation were applied using the Irish population as the standard population. Population data were taken from the 1996 census. Species differentiation of isolates was not requested.

Results

Information on *Campylobacter* was obtained from all Health Boards. Information on age was missing in 11% of cases and information on sex was incomplete in 0.2% of cases. Data on age were not available on many cases in two health board areas (Midland, 40% and Western 21%). Those without age were not presented in age standardised charts.

Incidence

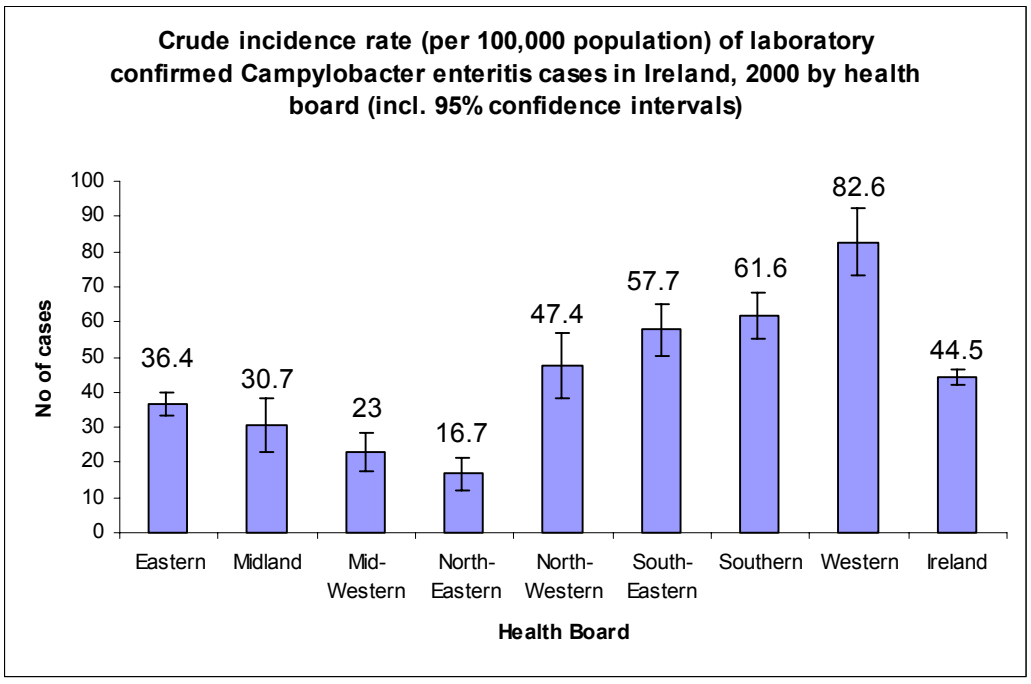
In total, 1613 cases of laboratory-confirmed campylobacteriosis were reported in 2000 in Ireland. This gives a crude incidence rate (CIR) of 44.5 per 100,000 population. This compared with a CIR of 57.5 per 100,000 in 1999 (Table 1).

A comparison with the results found in 1999 is shown in Table 1 below.

Table 1*:* Number of cases and CIR by health board in Ireland for 1999 and 2000.

Health Board	2000		1999	
	No of cases	CIR – (incl. 95% C.I.)	No of cases	CIR – (incl. 95% C.I.)
ERHA	472	36.4 [33.1-39.7]	591	45.6 [41.9-49.3]
Midland	63	30.7 [23.1-38.2]	83	40.4 [31.7-49.1]
Mid-Western	73	23.0 [17.7-28.3]	103	32.5 [26.2-38.8]
North Eastern	51	16.7 [12.1-21.2]	74	24.2 [18.7-29.7]
North Western	100	47.4 [38.1-56.7]	118	56.0 [45.9-66.1]
South Eastern	226	57.7 [50.2-65.3]	219	55.9 [48.5-63.3]
Southern	337	61.6 [55.1-68.2]	507	92.7 [84.7-101.0]
Western	291	82.6 [73.1-92.1]	390	110.7 [99.7-122.0]
IRELAND	1613	44.5	2085	57.5

Figure 1 illustrates crude rates (cases/100,000 population) for each health board in Ireland.



Sex

Males accounted for 56% of cases and females 44%, where gender data were given (see Table 2). This showed an overall male: female ratio of 1.29:1. A very similar result was found in 1999, with a ratio of male: female of 1.28:1.

Table 2. Number of cases by health board and sex, in 2000

Health Board	Total	Males	Females
ERHA	472	270	202
Midland	63	39	24
Mid-Western	73	45	28
North Eastern	51	26	25
North Western	100	57	43
South Eastern	226	121	105
Southern	337	172	164
Western	291	172	116
IRELAND	1613	902	707

Seasonality

Campylobacter has a well characterised seasonal distribution, with a peak in late spring/early summer seen each year and this is evident when the trend over time is examined. Table 3 shows the cases as they occurred in each health board by month. Figure 2 shows the occurrence of cases by week for Ireland in 2000. In 1999, a peak was seen in week 25, however a sharp peak in week 23 is noted for 2000.

Table 3. Cases by month (2000) for each health board in Ireland

	E	M	MW	NE	NW	SE	S	W	Total
Jan	43	1	5	2	7	21	26	12	117
Feb	18	2	4	9	7	18	37	15	110
Mar	51	5	9	6	12	28	47	33	191
Apr	61	3	4	7	9	13	30	19	146
May	55	6	16	4	6	30	45	40	202
Jun	49	9	5	4	18	22	44	15	166
Jul	47	0	4	4	13	28	34	15	145
Aug	25	2	7	2	7	7	23	18	91
Sept	40	5	7	4	6	22	9	21	114
Oct	42	1	3	5	3	7	8	24	93
Nov	18	3	6	1	7	20	20	18	93
Dec	23	1	3	3	5	10	14	0	59
N/K		25						61	
Total	472	63	73	51	100	226	337	291	1613

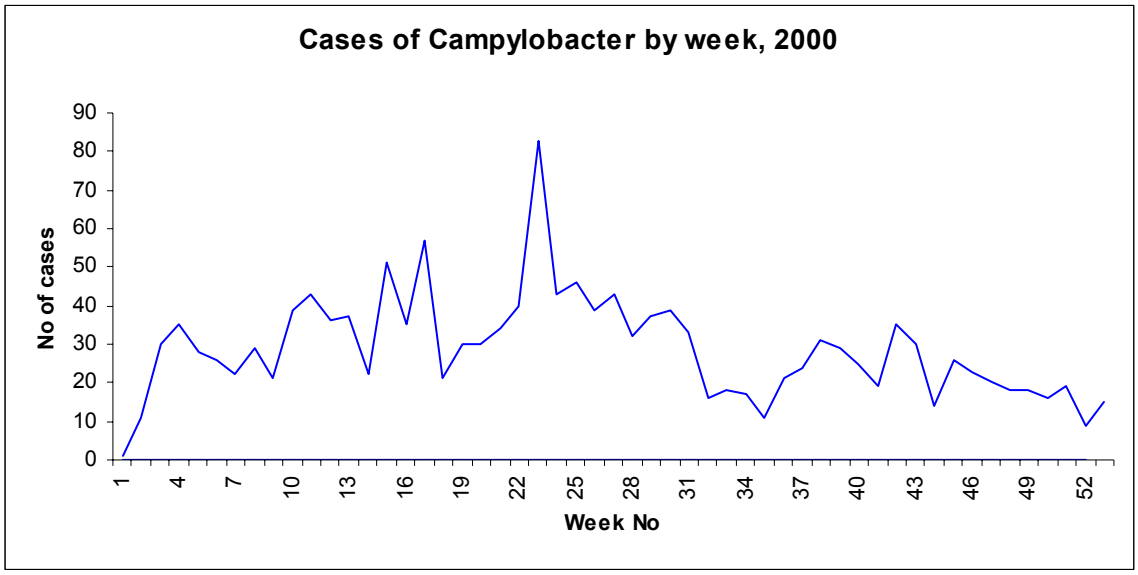


Figure 2: Total cases of campylobacteriosis by week (2000) in Ireland

Age standardised rates were then calculated to allow comparisons between areas to be made without the confounding effects of age (Figure 3). In 2000, the highest incidence was recorded in the Western region of the country, with the lowest incidence seen in the North Eastern region. A similar pattern was observed in 1999.

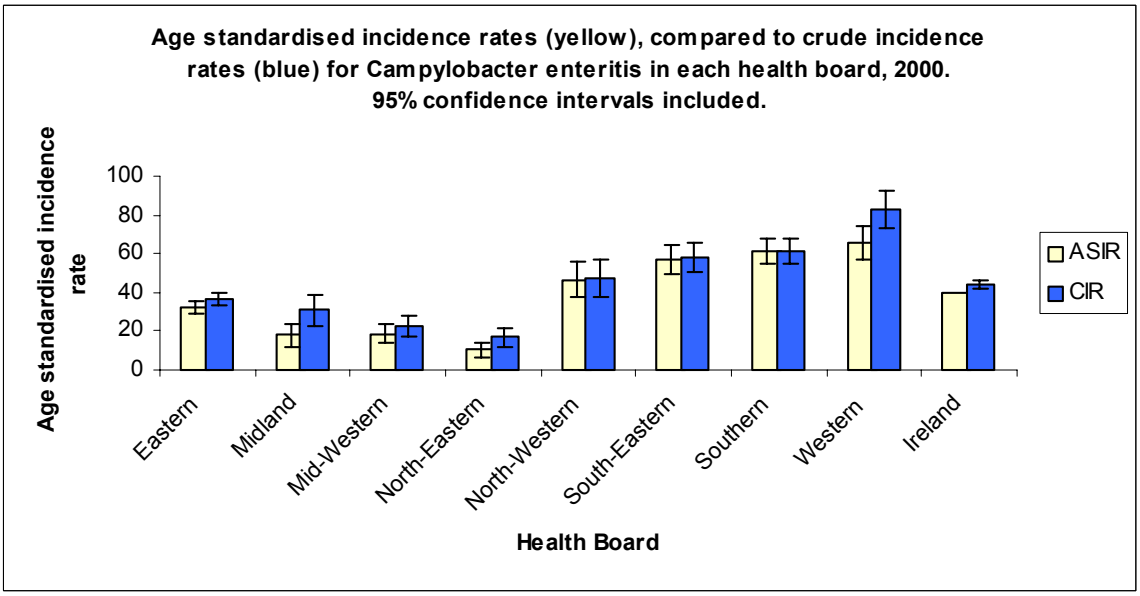


Figure 3: Age standardised incidence rates (ASIR) compared to crude incidence rates (CIR) in each health board, 2000.

Table 4 depicts crude incidence rates (CIR) and age standardised incidence rates (ASIR) (per 100,000 population) by health board in 2000.

Table 4. Crude incidence rates (CIR) and Age standardised incidence rates (ASIR) (per 100,000 population) by health board in 2000

Health Board	CIR [95% CI]	ASIR [95% CI]
ERHA	36.4 [33.1-39.7]	32.4 [29.3-35.3]
Midland	30.7 [23.1-38.2]	18.0 [12.2-23.9]
Mid-Western	23.0 [17.7-28.3]	18.4 [13.7-23.2]
North Eastern	16.7 [12.1-21.2]	10.3 [6.7-13.8]
North Western	47.4 [38.1-56.7]	46.5 [37.2-55.7]
South Eastern	57.7 [50.2-65.3]	56.9 [49.4-64.3]
Southern	61.6 [55.1-68.2]	61.6 [55.0-68.2]
Western	82.6 [73.1-92.1]	65.7 [57.1-74.3]
IRELAND	44.5	

The age-standardised data is mapped and presented in Figure 4 below.

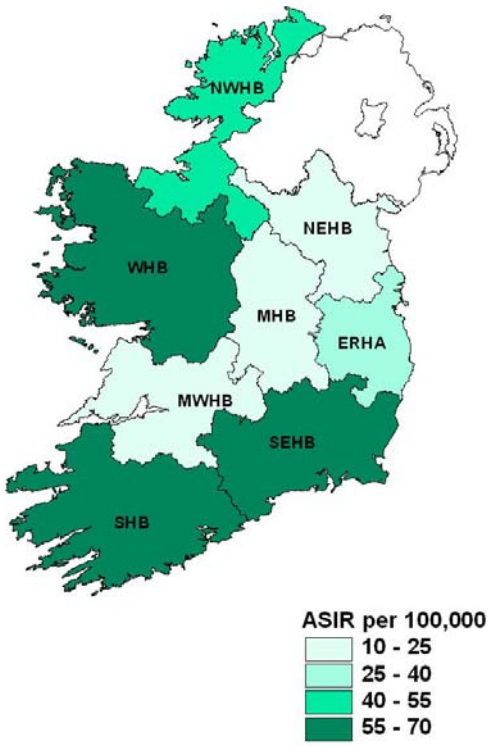


Figure 4. Age-standardised rates of Campylobacteriosis in Ireland by health board, 2000.

Table 5 below shows the age distribution of cases by health board.

Table 5. Age-distribution by health board

Age group	E	M	MW	NE	NW	SE	S	W	Total
0-4	92	8	17	12	35	87	140	95	486
5-9	24	1	7	4	12	16	21	20	105
10-14	17	1	2	2	3	20	11	12	68
15-19	16	4	2	0	5	7	11	5	50
20-24	27	0	4	1	6	18	21	19	96
25-34	91	11	8	2	8	25	45	18	208
35-44	79	3	6	4	9	17	27	16	161
45-54	30	2	3	3	4	6	22	15	85
55-64	23	1	3	2	5	10	17	8	69
65+	28	6	6	2	11	16	18	18	105
NK	45	26	15	19	2	4	4	65	180
Total	472	63	73	51	100	226	337	291	1613

Below, Figure 5 shows the breakdown of cases in each age group for Ireland.

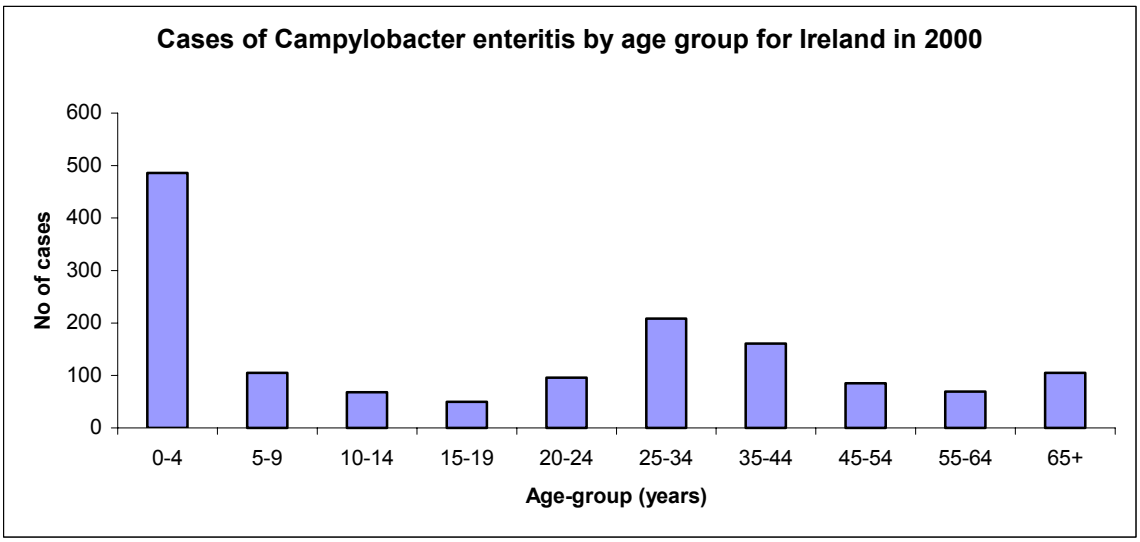


Figure 5. Cases of campylobacteriosis by age group for Ireland in 2000

This demonstrates that there is a large burden of illness in children under 5 years of age, and mirrors the results found in 1999. When we examine age specific incidence rates for each age group, the burden of illness in this age group is even more evident (Figure 6)

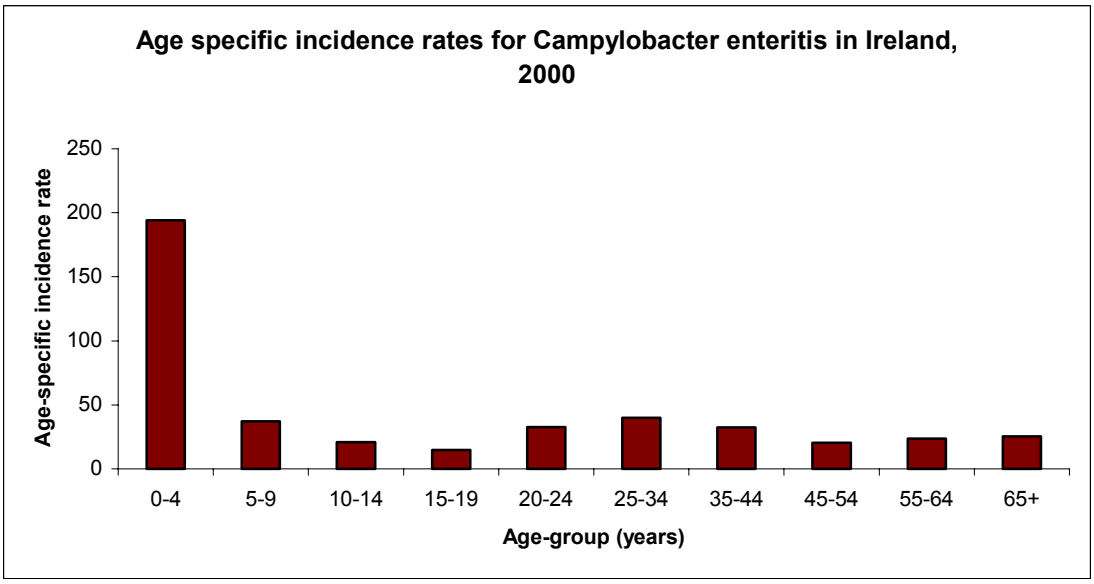


Figure 6. Age specific incidence rates for campylobacteriosis in Ireland, 2000

Looking more closely at those cases, the age distribution for children under 5 years is illustrated in figure 7.

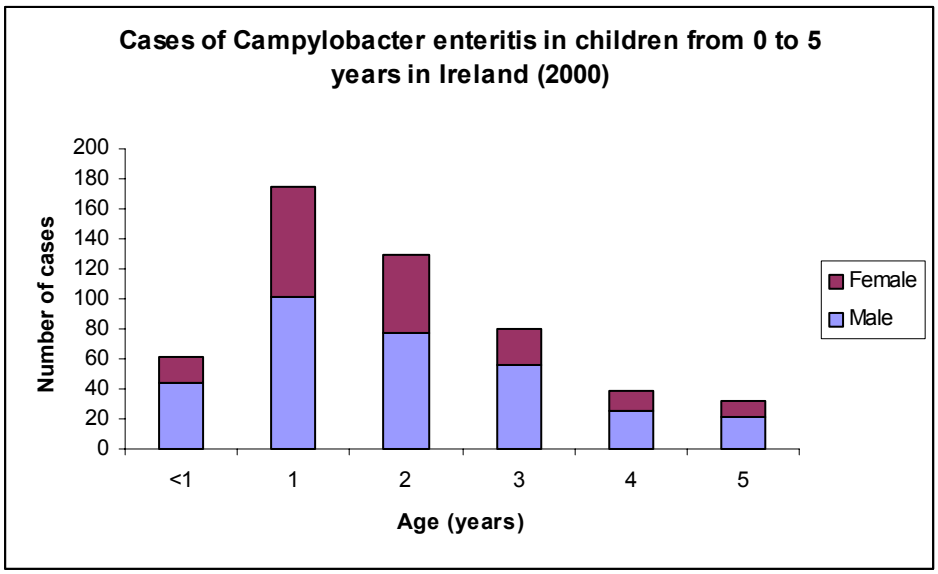


Figure 7: Cases of campylobacteriosis in children under 5 years in Ireland (2000)

Gender distribution

The variance in gender distribution that was first noted in 1999 was again evident from analysis of the data in 2000. In every age-group, except the 25-35 and 65+ age groups, there was a predominance of male cases. This is shown in Figure 8 when the data are adjusted for age and sex.

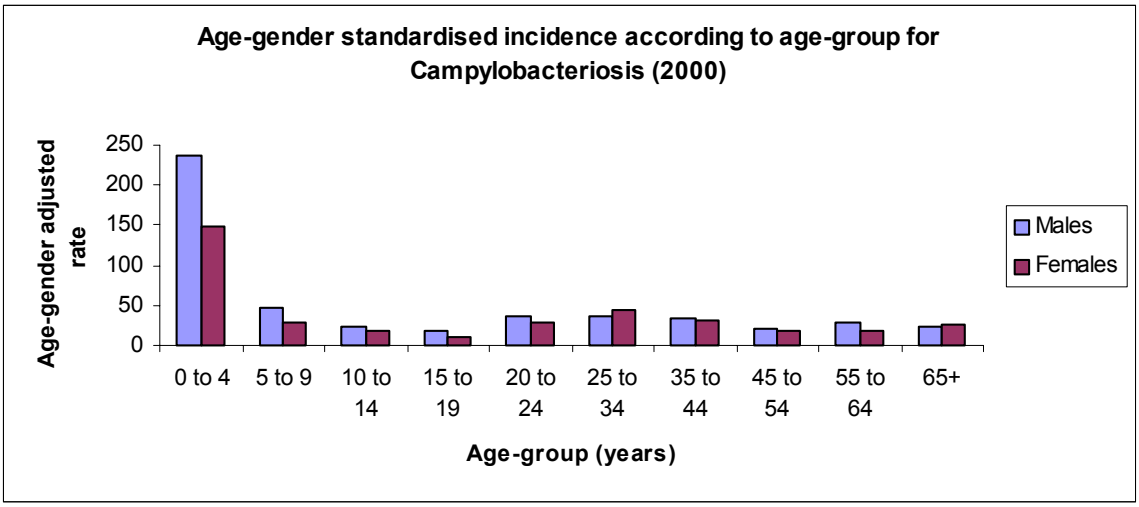


Figure 8: Age-gender adjusted incidence according to age-group in 2000.

Discussion

These data reveal a crude incidence rate of 44.5 cases per 100,000 persons in Ireland in 2000. Overall a decrease in the crude incidence rate was seen in Ireland in 2000 when compared with 1999 (57.5/100,000). This decrease was most notable in three health board regions, viz. Eastern, Western, and Southern. Despite the decrease, however, campylobacteriosis remains the single biggest cause of bacterial gastroenteric infection in Ireland. It should be noted that these are laboratory confirmed cases and the real burden of illness is even higher.

Higher rates were seen for the same period in Northern Ireland (59.75/100,000), England and Wales (101.7/100,000) and Scotland (126.7/100,000). These data also represented a decrease from 1999 figures for England and Wales, however the rates in Northern Ireland and Scotland increased.

Most cases of *Campylobacter* infection are sporadic and suggested risk factors for infection have included ingestion of undercooked poultry meats and handling raw poultry, contact with pets, especially puppies, consumption of unpasteurised milk or dairy products and drinking water from contaminated/ untreated supplies. Recent evidence suggesting that *Campylobacter* has a low infectious dose, implies that cross-contamination of ready-to-eat foods by raw meats may be an important source of infection.

C. jejuni and *C. coli* can be isolated from the intestines of healthy farm animals, poultry, pets and wild birds. These organisms rarely cause disease in these animals and the carriage rate is believed to be quite high, particularly in poultry. On-farm control measures such as bio-security have not been as effective in controlling *Campylobacter* infections, compared to the success rate with *Salmonella.* Clear messages must be given that thorough cooking of meat and good personal hygiene will help to prevent illness in the home.

In this study, details of speciation and further sub-typing information were not available for many of the health board regions. In order to fully understand the epidemiology and virulence of this organism, it is necessary to be able to accurately identify the isolates that are causing illness in humans compared to animals.

Improved detection methods and developments in the area of molecular typing of isolates are also required. A national laboratory study on methodologies employed for detection of Campylobacter was carried out in 2001 as part of a larger European survey on Campylobacter surveillance and diagnostics. The findings of that study clearly demonstrated that there is a need for a European-wide Campylobacter surveillance network, possibly in combination with the EU-funded working group 'Campy-net'.

Much work is needed to help to reduce the burden of illness caused by this zoonotic agent. The Food Safety Authority of Ireland identified prevention and control of foodborne illness due to *Campylobacter* as a key priority and to this end, a multi-disciplinary group was established by FSAI to identify control measures to combat *Campylobacter* infections from farm to fork. The report from this working group is due to be published later this year.

Additional investigations are needed in Ireland to examine the epidemiology of this organism and attempt to provide answers to the questions that the data presented in this report pose, such as, the high incidence in very young children, the bias towards male cases and the geographical distribution of cases. A recent publication from Australia [3] describes a matched case-control study conducted to identify risk factors for Campylobacter infection in infants and young children. Ownership of pet puppies and pet chickens and consumption of mayonnaise were identified as being independently associated with illness.

Campylobacter is a major cause of human gastrointestinal illness. Work towards its control must be a priority if the burden of human infectious intestinal disease is to be reduced.

References

1. Whyte D. and Igoe D. *Campylobacter* enteritis in Ireland in 1999. *Epi-Insight* 2000; **1**(3): 2-3. Available at http://www.ndsc.ie/Publications/EPI-Insight
2. Tam CC. *Campylobacter* reporting at its peak year of 1998: don't count your chickens yet. *Commun Dis Public Health* 2001 **4**(3): 194-199.
3. Tenkate TD & Stafford RJ. Risk factors for Campylobacter infection in infants and young children: a matched case-control study. *Epidemiol Infect* 2001 **127**(3):399-404.

Acknowledgements

NDSC sincerely thanks and acknowledges all those who provided information for the second year of this report on the epidemiology of campylobacteriosis in Ireland. As was the case last year, many medical microbiologists, public health doctors and medical laboratory scientists made special efforts to obtain their data for this period to allow NDSC complete an accurate and relatively complete database of laboratory-confirmed cases of campylobacteriosis.
We are particularly grateful for the availability of quality information from INFOSCAN (Southern, South Eastern and Mid-Western Health Boards) and LSS (Eastern Health Board) which made data collection very efficient.