



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive



2006

EPIDEMIOLOGY OF CAMPYLOBACTER IN IRELAND



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Further information:

For further information on campylobacter in Ireland, please see:

<http://www.ndsc.ie/hpsc/A-Z/Gastroenteric/Campylobacter/>

Summary

- Campylobacter remains the commonest cause of gastroenteritis of bacterial aetiology in Ireland
- In 2006, there were 1815 cases of campylobacteriosis notified (CIR 42.8/100,000)
- The highest burden of illness was in children under 5 years of age
- In 2006, the highest incidence rates were reported from the Western and Midland health board regions

Introduction

Campylobacteriosis is the commonest reported bacterial cause of infectious intestinal disease in Ireland. Two species account for the majority of infections: *C. jejuni* and *C. coli*. Illness is characterised by severe diarrhoea and abdominal pain. Symptoms may subside after a number of days or may persist for weeks. Rarely, more severe sequelae may develop such as reactive arthritis, Reiter's syndrome, or HUS and approximately 1 in every 1000 cases leads to a severe neurological disorder called Guillain-Barré Syndrome (GBS).

Undercooked meat especially poultry is often associated with illness as is unpasteurised milk and untreated water. The majority of infections, however, remain largely unexplained by recognised risk factors for disease.

Case Definitions

Clinical description

Clinical picture compatible with campylobacter infection e.g. an illness with diarrhoea and / or vomiting of variable severity which may be accompanied by abdominal cramps and fever. Cases may also be asymptomatic.

Laboratory criteria for diagnosis

Isolation of *Campylobacter sp.* from any clinical specimen.

Case classification

Possible: N/A

Probable: A clinically compatible case with an epidemiological link

Confirmed: A clinically compatible case (symptomatic or asymptomatic) that is laboratory confirmed

Taken from Case Definitions for Notifiable Diseases. Infectious Diseases (Amendment No. 3) Regulations 2003 (SI No. 707 of 2003). Available at <http://www.hpsc.ie>

Materials and Methods

Human campylobacter infection became a statutorily notifiable disease for the first time in January 2004 under the Amendment to the Infectious Diseases Regulations.¹

Therefore since then, the data on campylobacteriosis has been collated directly from the notifiable disease data on CIDR and not as part of the EU Zoonoses Directive data collection (as had been the case since 1999).

Data analysis for this report was performed using Business Objects Reporting in CIDR and MS Excel. Census of Population 2006 figures were used as denominator data in the calculation of incidence rates. The salmonellosis data from CIDR presented in this report are based on data extracted from the CIDR system on 23rd July 2007. These figures may differ from those published previously, due to ongoing updating of notification data on CIDR.

Results

Incidence

In total, 1815 notifications of human campylobacteriosis were notified in 2006 in Ireland. This gives a crude incidence rate (CIR) of 42.8 cases per 100,000 population (Table 1). This compared with a CIR of 42.5 cases per 100,000 in 2005 (based on 2006 census data). The annual number of cases by year since 1999 is shown in Figure 1.

Table 1: Number of cases and CIR per 100,000 population of human campylobacteriosis in Ireland by health board, 2006.

Region	No. of cases	CIR (95% CI)	ASIR (95% CI)
HSE-ER	670	44.7 [41.3 - 48.1]	43.2 [39.9–46.5]
HSE-M	127	50.5 [41.7 - 59.2]	49.4 [40.8-58.0]
HSE-MW	132	36.6 [30.3 - 42.8]	37.0 [30.7–43.3]
HSE-NE	123	31.2 [25.7 - 36.7]	30.8 [25.4-36.3]
HSE-NW	105	44.3 [35.8 - 52.7]	44.6 [36.0-53.2]
HSE-SE	197	42.7 [36.8 - 48.7]	42.8 [36.8–48.8]
HSE-S	256	41.2 [36.2 - 42.3]	41.8 [36.6-46.9]
HSE-W	205	49.5 [42.7 - 56.3]	50.1 [43.2-57.0]
Ireland	1815	42.8 [40.8 - 44.8]	42.6 [40.6-44.6]

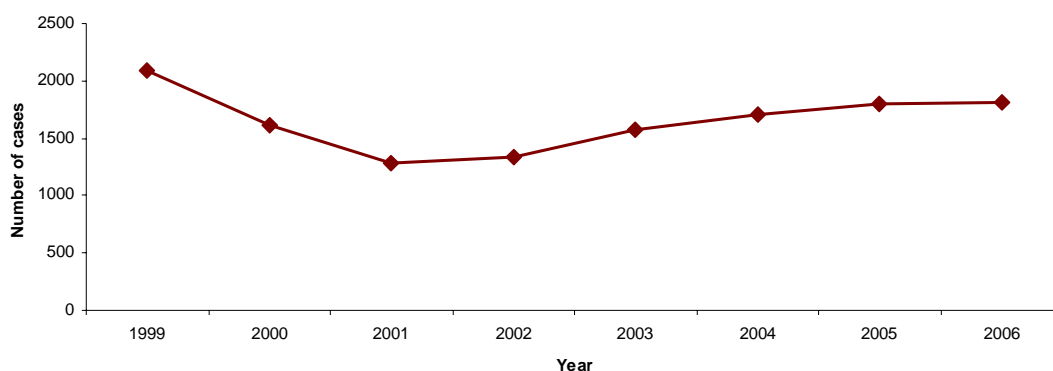


Figure 1. Annual number of cases of campylobacteriosis in Ireland, 1999-2006

Age standardised rates were calculated to allow comparisons to be made between health board regions without the confounding effects of age (Figure 2). In 2006, the highest incidence was reported from the HSE-W region followed by the HSE-M region. The lowest rate was reported from the HSE-NE region (see Figure 2 and corresponding data in Table 1).

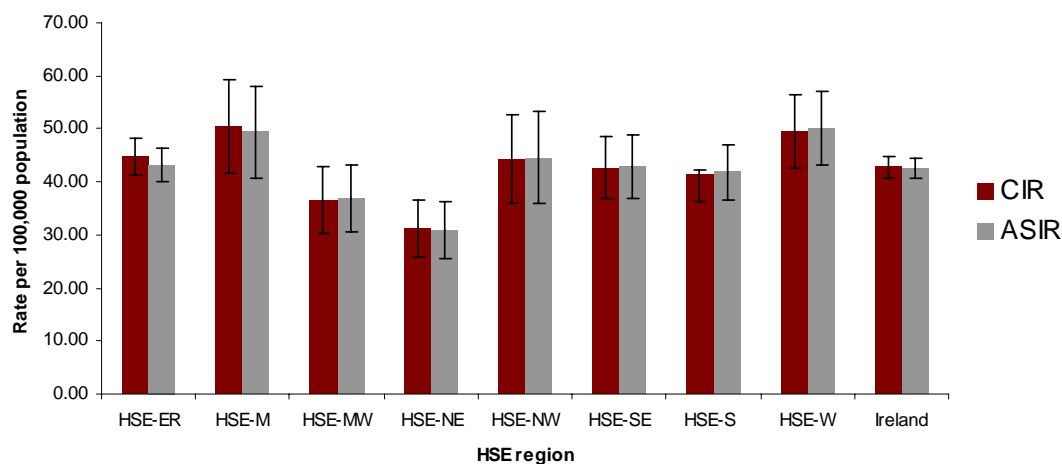


Figure 2. Age standardised incidence rates (ASIR) of human campylobacteriosis in Ireland, compared to crude incidence rates (CIR) in each health board, 2006.

Seasonal distribution

Campylobacter has a well documented seasonal distribution with a peak in cases seen every year in early summer. In 2006, a rise in cases was observed from week 21 to week 26 (Figure 3). This was not as definite a peak as seen in previous years.

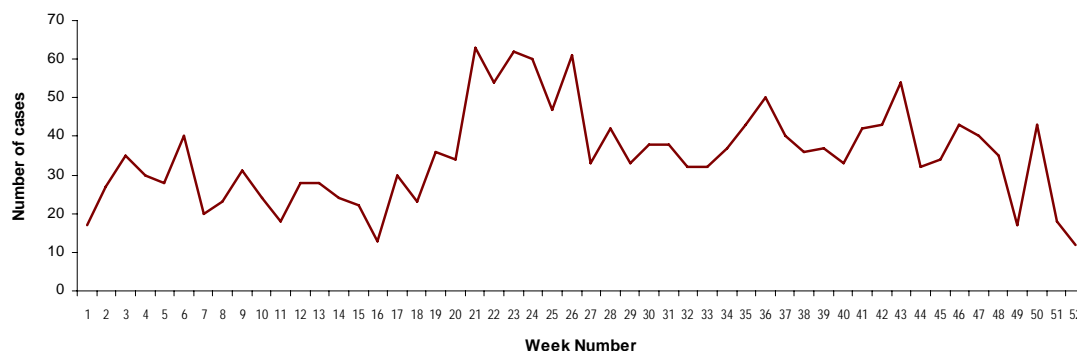


Figure 3. Total cases of campylobacteriosis events by week, 2006

Age

When the distribution of cases for each age group is examined, it is evident that by far the highest burden of illness is seen in children less than five years (Figure 4). This was also noted in previous years and is a well-reported feature of campylobacteriosis.

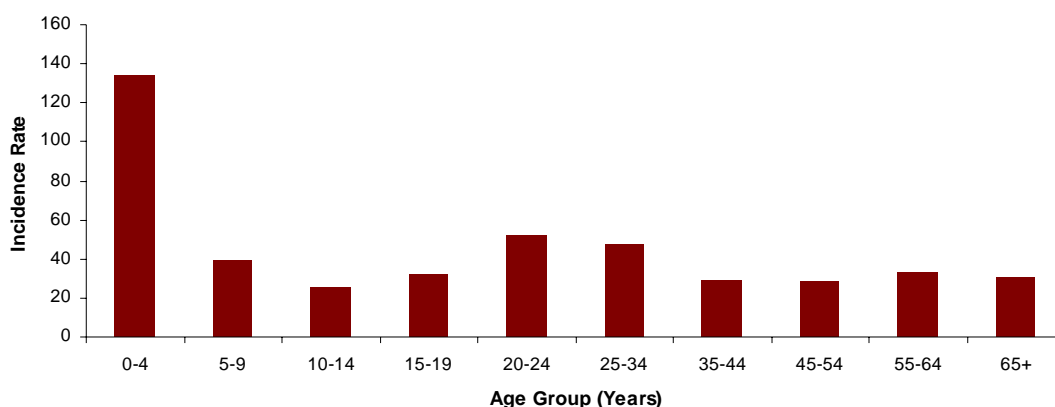


Figure 4: Age specific incidence rates for campylobacteriosis in Ireland, 2006

Gender distribution

Females accounted for 44.4% of all cases notified; males 55.2% (unknown 0.4%) (Table 2). However the variance in gender distribution that has been noted since 1999 was again evident when the data was adjusted for age and sex. In almost all age-groups there is a predominance of male cases (Figure 5).

Table 2. Gender distribution of campylobacter cases by health board region, 2006.

Region	Female	Male	Unknown	Total
HSE-ER	305	360	5	670
HSE-M	49	78	0	127
HSE-MW	59	73	0	132
HSE-NE	69	54	0	123
HSE-NW	46	59	0	105
HSE-SE	90	107	0	197
HSE-S	103	151	2	256
HSE-W	84	119	2	205
Total	805	1001	9	1815

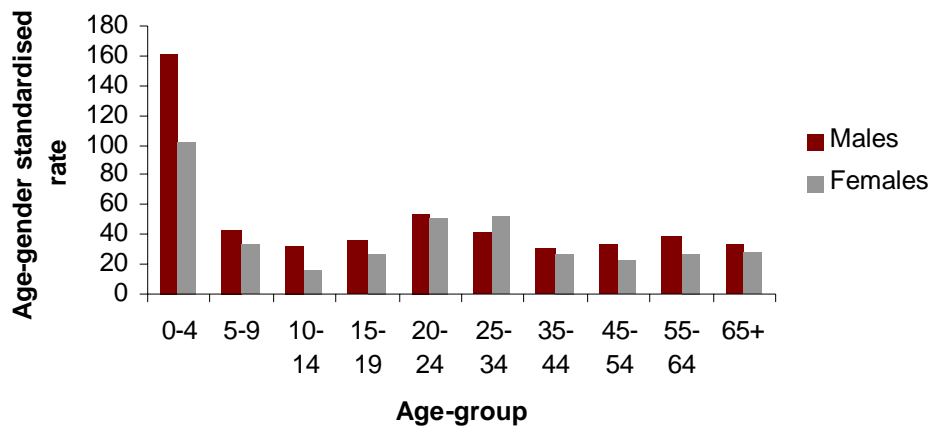


Figure 5. Age-gender adjusted incidence of campylobacteriosis according to age group in 2006.

Typing data

Campylobacter typing data was available for 38% (692/1815) of isolates. Of these, 629 (91%) were reported as *C. jejuni*; 58 (8%) as *C. coli*; 3 cases as *C. lari*, and one case each of *C. laridis* and *C. fetus*.

Country of infection

Information on country of infection was available for 12% (218/1815) of cases of campylobacteriosis. Of these 198 (91%) were noted to have been acquired within Ireland, with just 9% associated with travel outside of Ireland. Spain and India were the most commonly reported countries (4 cases each).

Outbreak data

There were eleven family outbreaks of campylobacteriosis notified resulting in 25 cases of illness in 2006.

Discussion

Analysis of the 2006 data reveals that campylobacteriosis still remains the most common cause of bacterial gastroenteric infection in Ireland with over four times the number of salmonellosis cases reported in 2006. The crude incidence rate (CIR) of campylobacteriosis increased in Ireland in 2006 (42.8 cases/100,000 persons) compared to 2005 (42.5/100,000). This was in fact the highest rate reported in Ireland since the year 1999 and represents an increasing trend since 2001. For the same period, higher rates were noted for Northern Ireland (53.9/100,000), England and Wales^{1,2} (87.3/100,000) and Scotland³ (95.3/100,000).

Campylobacter is a zoonotic pathogen with some very interesting epidemiologic features. The data in 2006 again reflects the higher incidence in young children and the bias towards male cases in almost all age groups. However, many of the risk factors associated with Campylobacter infection in humans are still poorly understood. Some of these issues were discussed at a major international conference on “Campylobacter, Helicobacter and Related Organisms” (CHRO) held in September 2007 in the Netherlands⁴, presenting up to date research in areas such as epidemiology, typing, genomics and pathogenesis, and risk assessment and control.

Many approaches have been taken in different countries around the world in an attempt to control spread of this pathogen. New Zealand, which has a particularly high rate of campylobacteriosis, has applied a quantitative risk model in the poultry food chain from entry to primary processing until consumption, in order to assess risk management interventions⁵. Their studies have concluded that poultry is the most important vehicle for Campylobacter transmission in New Zealand. In addition, they were able to show that exposure to the pathogen through food preparation activity and cross contamination to other foods, was greater than either undercooking or poultry purchase.

Denmark is another country that has developed a number of novel intervention strategies aimed at reducing levels of *Campylobacter* in broiler meat ⁶. These have included reducing infection at farm level (biosecurity measures), reducing the concentration of *Campylobacter* on chicken meat at slaughter house level (e.g. by allocating meat from positive flocks to the production of frozen products) and thirdly a consumer education programme. The results of this intervention which took place in 2001 were that the percentage of *Campylobacter* positive broiler flocks decreased significantly and a decrease in human cases was also observed from 2001 to 2006.

It is widely accepted that the genomic diversity of this pathogen has hindered development of a 'gold standard' typing method. In recent years however, development of new innovative molecular methods such as MLST have enabled us to begin our understanding of the epidemiology and diversity of *Campylobacter spp*⁷. It is hoped that further research in this area will help to identify key subtypes that are distributed throughout distinct populations in order to track this pathogen through the food chain.

Although our rates of campylobacteriosis in Ireland are not as high as in the UK, the upward trend in incidence since 2001 is of concern. Efforts must continue to control this zoonotic pathogen which continues to be a significant public health concern, both in terms of burden of human illness and economic costs. The recent formation of a National Zoonoses Committee should enable collaborative strategies to be developed for targeted and enhanced control of campylobacteriosis in Ireland.

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