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Risk Groups and Uptake of Influenza and Pneumococcal Vaccine in Ireland

Background

The National Immunisation Advisory Committee (NIAC) recommends influenza and pneumococcal vaccine to the following at-risk groups: those 65 years and over; persons with chronic illness and immunosuppression. Influenza vaccine is recommended for all residents of long-stay care facilities and healthcare workers (HCWs).[1] Both vaccines are free of charge for persons in at-risk groups.

Currently in Ireland, there is no system for estimating the uptake of influenza and pneumococcal vaccine in risk groups except for influenza among persons aged 65 years and over.

The proportion of the Irish population aged 18-64 years who belong to health risk groups is unknown. A United Kingdom study found that 6% of the study population aged 15-64 years belonged to risk groups.[2]

The World Health Assembly recommended the following targets for influenza vaccine uptake among people at health risk and those aged 65 years and over: 50% uptake by 2006 and 75% uptake by 2010.[3] The Irish national target for influenza vaccination in those aged 65 and over for 2006/2007 was 65%.

Factors associated with influenza vaccine uptake are identified in international studies. Family doctors have been found to strongly influence vaccination uptake and public perception of vaccine safety has also been shown to be correlated with uptake.[4,5]

We conducted a survey to estimate the uptake of influenza and pneumococcal vaccine in Irish adults who belong to risk groups for the 2005/2006 influenza season in order to provide baseline information and to improve targeted immunisation programmes. The secondary objective was to estimate the proportion of persons in the study population aged 18-64 years who belonged to health risk groups and to determine possible factors influencing vaccine uptake.

Methods

We undertook a cross-sectional retrospective telephone survey. We selected a sample of non-institutionalised Irish adults, based on age and sex. A respondent was defined as a person aged 18 years and over, residing in Ireland and living in a household with a landline telephone.

We estimated the sample size assuming that 6% of the population between 15 and 64 years of age belong to risk groups for influenza and pneumococcal disease.[2] A sample size of 1,500 persons was required. Persons living in institutional settings and non-private dwellings, or those unable to complete the telephone interview due to language or speech difficulties were excluded.

The questionnaire was designed to be used as a computer-assisted telephone interview (CATI) and piloted. We sought information on influenza and pneumococcal vaccination; factors influencing vaccination; demographic information and the health status of the respondent. To identify HCWs, questions about working in healthcare facilities were asked.

Results

Size of health risk groups

Of 1,218 respondents aged between 18 and 64 years, 136 (11.2%; CI: 9.5-13.1) reported one of the health conditions attributable to health-risk groups.

Influenza vaccine uptake

In total, 1,439 of 1,500 respondents (95.9%) knew that influenza vaccine was available: 280 (19.5%; CI: 17.5-21.6) said they had been vaccinated against influenza before or during the 2005/2006 season; among these 208 (74.3%) were vaccinated in September or October 2005.

Vaccine uptake among those aged 65 years and older was 68.6% (CI: 62.2-74.4); among at-risk individuals aged 18 to 64 years, 27.6% (CI: 20.9-35.4) and among HCWs, 20.0% (CI: 13.1-28.7).

Role of family doctors and reasons for getting influenza vaccine

Of the 280 vaccinated respondents, 257 (91.8%) received the vaccine from their family doctor and 18 (6.4%) at their workplace, 3 (1.1%) in hospital and 2 (0.7%) reported another source.

Of the vaccinated respondents who responded to the question on reasons for getting the influenza vaccine (n = 208), family doctor recommendation was the most commonly cited reason (47.6%) (table 1).

Reasons for not getting influenza vaccine among risk groups

Non- vaccinated respondents in risk groups indicated that the main reason for not getting the influenza vaccine was low self-perceived risk (table 2).

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Campylobacteriosis in Ireland, 2006

Background

Campylobacteriosis is the commonest reported bacterial cause of infectious intestinal disease in Ireland. Two species account for the majority of infections: *Campylobacter jejuni* and *Campylobacter 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 one in every 1,000 cases leads to a severe neurological disorder called Guillain-Barré Syndrome (GBS). Rehydration and electrolyte replacement is the cornerstone of treatment. Antibiotics are indicated in cases of severe or prolonged illness.

Undercooked meat especially poultry is often associated with illness as is unpasteurised milk and untreated water. Flies have also been postulated as a possible transmission route. The majority of infections, however, remain largely unexplained by recognised risk factors for disease.

Methods

Human campylobacter infection became a statutorily notifiable disease for the first time in January 2004 under the Infectious Diseases (Amendment) Regulations 2003.

Since then, the data on campylobacteriosis have 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).

Results

Incidence

In total, 1,815 notifications of human campylobacteriosis were notified in 2006 in Ireland, 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 HSE area, 2006.

HSE area	No. of cases	CIR (95% CI)
E	670	44.7 [41.3 - 48.1]
M	127	50.5 [41.7 - 59.2]
MW	132	36.6 [30.3 - 42.8]
NE	123	31.2 [25.7 - 36.7]
NW	105	44.3 [35.8 - 52.7]
SE	197	42.7 [36.8 - 48.7]
S	256	41.2 [36.2 - 42.3]
W	205	49.5 [42.7 - 56.3]
Ireland	**1,815**	**42.8 [40.8 - 44.8]**

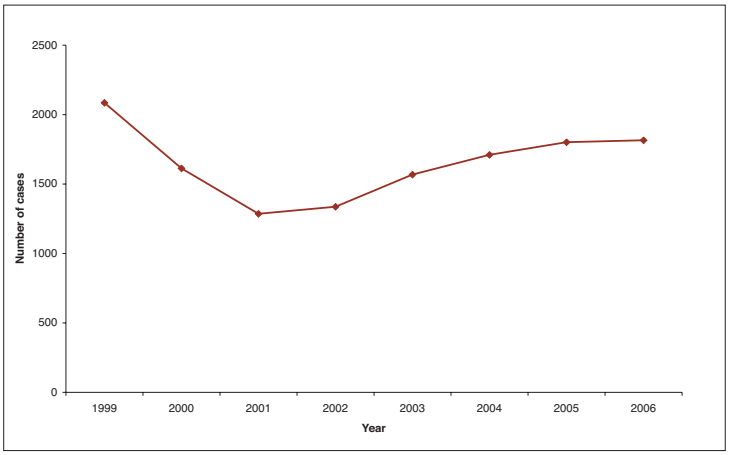

Figure 1. Annual number of cases of campylobacteriosis in Ireland, 1999-2006

Age standardised incidence rates (ASIR) were calculated to allow comparisons to be made between HSE areas without the confounding effects of age (figure 2). In 2006, the highest incidence was reported from HSE W followed by HSE M. The lowest rate was reported from HSE NE (figure 2).

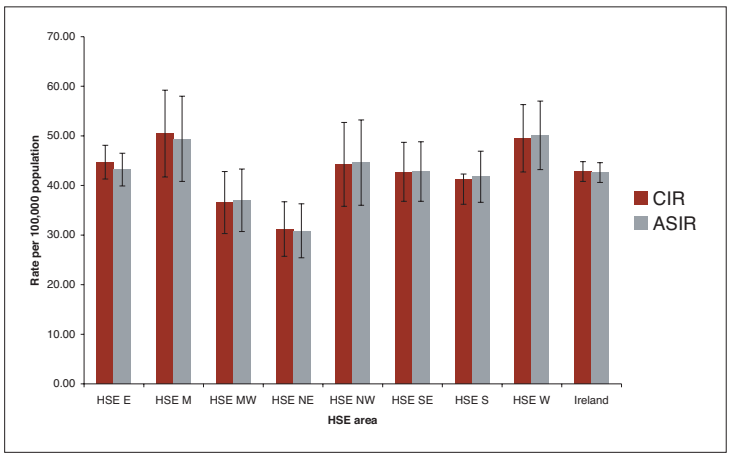

Figure 2. ASIR of human campylobacteriosis in Ireland, compared to CIR in each HSE area, 2006.

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.

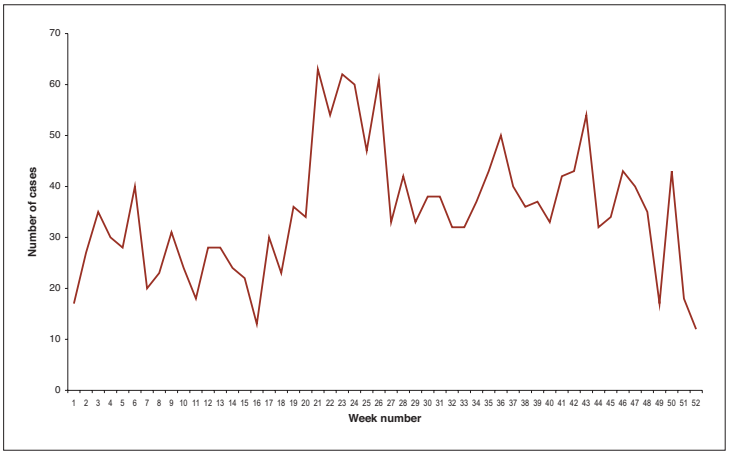

Figure 3. Total cases of campylobacteriosis events by week, 2006 (data from CIDR)

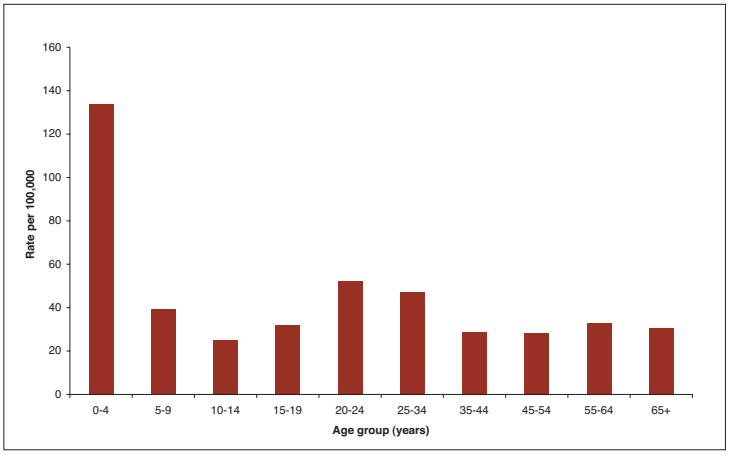

Figure 4. Age-specific incidence rates for campylobacteriosis in Ireland, 2006 (data from CIDR)

Age
The highest burden of illness is seen in children less than five years of age (figure 4). This was also noted in previous years and is a well-reported feature of campylobacteriosis.

Gender distribution
Females accounted for 44.4% of all cases notified; males 55.2% (unknown 0.4%). In almost all age-groups there is a predominance of male cases (figure 5).

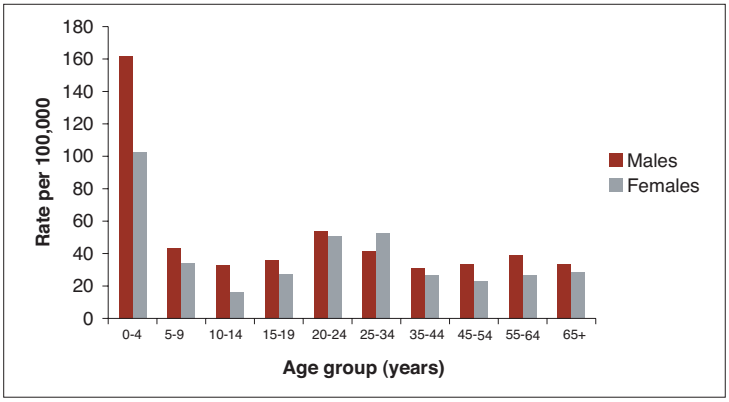

Figure 5. Age-gender adjusted incidence of campylobacteriosis according to age group in 2006.

Typing data
Campylobacter typing data were available for 38% (692/1,815) of isolates. Of these, 629 (91%) were reported as *C. jejuni*; 58 (8%) as *C. coli*; three cases as *Campylobacter lari,* and one case each of *Campylobacter laridis* and *Campylobacter fetus*.

Country of infection
Information on country of infection was available for 12% (218/1,815) 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 (four cases each).

Outbreak data
There were eleven small 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 - over four times the number of salmonellosis cases reported in 2006. The CIR of campylobacteriosis increased in Ireland in 2006 (42.8/100,000 population) compared to 2005 (42.5/100,000). This was 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 (87.3/100,000) and Scotland (95.3/100,000).[1]

Campylobacter is a zoonotic pathogen with some very interesting epidemiologic features. The data in 2006 again reflect 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 Netherlands, which presented up-to-date research in areas such as epidemiology, typing, genomics and pathogenesis, and risk assessment and control.[2]

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 interventions.[3] 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.[4] 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*.[5] 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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*Table 1. Reasons for getting influenza vaccine (n=208)**

	Number of respondents	Proportion (%)	95% CI
Ongoing chronic disease	55	26.4	20.7-33.1
Aged 65 years and over	44	21.1	16.0-27.5
GP/doctor recommended	99	47.6	40.7-54.6
Healthcare worker	20	9.6	6.1-14.7
Because of my job	18	8.6	5.4-13.5
For prevention/protection	50	24.0	18.5-30.5
Have got it before, found it good	10	4.8	2.5-8.9
Advertised, advised, recommended to get it	9	4.3	2.1-8.3

*Adds to >100% as respondents could indicate more than one answer

Table 2. Reasons among risk groups for not being vaccinated

	HCWs (n=92)		Aged 18-64 with health risk (n=97)		Aged 65 and over (n=74)	
	No.	(%)	No.	(%)	No.	(%)
Low risk/low perceived relevance	64	69.6	64	66.0	44	59.5
Only good for elderly people	13	14.1	19	19.6	0	0
I don't get the flu/rarely get the flu/ I seldom fall sick	19	20.7	16	16.5	22	29.7
I don't need it	32	34.8	29	29.9	22	29.7
Problems with vaccine / injection / side-effects	12	13.0	13	13.4	21	28.4
Problems with awareness / access / affordability	9	9.8	14	14.4	3	4.1
Medical condition / advice	0	0	1	1.0	0	0
Other reason	7	7.6	5	5.2	6	8.1

Pneumococcal vaccine uptake

In total, 144 of 1,448 respondents (9.9% CI: 8.5-11.6) had received pneumococcal vaccine at some time. Vaccine uptake among persons aged over 65 years, was 41.3% (CI: 35.0-47.9) and among health risk individuals aged 18-64 years, 11.0% (CI: 6.7-17.2). Among those vaccinated with pneumococcal vaccine, 53 (36.8%) received it during the previous 12 months, 74 (51.4%) in the previous12 month to five year period; and 17 (11.8%) had received it over five years previously.

Discussion

Influenza vaccine uptake in those aged over 65 years in our survey reached the World Health Assembly target and surpassed the recommended national target for Ireland. It was similar to influenza vaccine uptake reported for this age group in the US (63.3%) in 2005 but less than that reported in Australia (79.1%) in 2004.[6 7]

Our study identified a low pneumococcal vaccine uptake for those aged 65 and over. This compares unfavorably with US and Australian studies which reported pneumococcal vaccine uptakes of 63.7% and 51.1% respectively.[6 7] This finding is disappointing and highlights the need for raising awareness among healthcare professionals and the public.

Vaccine uptake among respondents aged between 18 and 64 years with a health risk was low for both vaccines. This group is at increased risk of complications from influenza and pneumococcal disease and should be vaccinated. A recent UK population-based telephone survey estimated that 56.8% of UK residents aged less than 65 years with a health risk had received influenza vaccine, approximately double our findings.[8]

Influenza vaccine is recommended for HCWs because they can transmit infection to vulnerable patients.[1] Influenza uptake among HCWs in our study was low and was similar to that reported in an Irish study in 2001 which estimated an uptake of 17.5%.[9] Our results suggest that influenza vaccination uptake among Irish HCWs has not changed substantially since 2001. Achieving high influenza vaccine uptake rates among HCWs is difficult. Influenza vaccine uptake in other countries is similar or even lower than the rate reported in Ireland. A UK study which looked at influenza uptake during the 2002/2003 and 2004/2005 seasons reported uptakes of 20.4% and 34% respectively.[8] A German study (undertaken in 2003/2004) found an uptake of 18% among health professionals.[10]

The results of our study confirm that general practitioners play a pivotal role in promoting vaccination. Respondents were more likely to get influenza vaccine if the family doctor recommended it.

Low self-perceived risk of getting influenza was the main reason for non-vaccination stated by two-thirds of all health risk groups. This misconception needs to be addressed. A European study in 2004 reported some other reasons for non-vaccination, such as sufficient resistance to flu; cost of vaccination; forgetfulness; having had a bad experience in the past or objecting to vaccination.[11]

To increase vaccine uptake additional work is needed to raise awareness among family doctors, practice nurses, relevant healthcare professionals and staff working in immunisation programmes.

Additional efforts are also needed to increase influenza vaccine uptake among HCWs themselves. Information targeted at this group should emphasise the benefit to the individual HCW as well as to their vulnerable patients. Focused health promotion campaigns for healthcare staff can improve knowledge and awareness. Increasing influenza vaccination rates among HCWs is particularly important, as they are one of the priority groups for the pandemic vaccine. Setting targets for uptake in this group should be considered.

Development of a national immunisation information system and chronic disease registers should also be a priority. Such information systems are critical for accurate measurement of performance in relation to vaccine uptake. Investment in such systems is cost-effective considering the public health importance of immunisation in preventing morbidity and mortality.

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