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Epidemiology of Outbreaks in Ireland

cidr

Table of Contents

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Further information:
For further information on Outbreaks in Ireland, please see:
http://www.ndsc.ie/hpsc/A-Z/Outbreaks/

Summary

- 325 infectious disease outbreaks, of which 300 were gastroenteric/ infectious intestinal disease (IID) outbreaks were notified in 2006, which was the highest number notified to date

- These outbreaks were responsible for at least 5200 cases of illness, and 734 hospitalisations

- 72/300 (24%) of all IID outbreaks were family outbreaks

- Viral gastroenteritis caused by norovirus (NV) continues to the most common cause of IID outbreaks (59% of IID outbreaks confirmed/suspected NV)

Introduction

The principal objective of the national outbreak surveillance system is to gain information on the epidemiology of all outbreaks of infectious disease in Ireland.

More specific objectives include measuring the burden of illness caused by outbreaks, identifying high-risk groups in the population and estimating the workload involved in the management of outbreaks. The information gathered can be used to inform public health professionals on the causes and factors contributing to outbreaks, to target prevention strategies and to monitor the effectiveness of prevention programmes.

Case Definitions

An outbreak of infection or foodborne illness may be defined as two or more linked cases of the same illness or the situation where the observed number of cases exceeds the expected number, or a single case of disease caused by a significant pathogen (e.g. diphtheria or viral haemorrhagic fever).
Outbreaks may be confined to some of the members of one family or may be more widespread and involve cases either locally, nationally or internationally.

Materials and Methods

Since 1st January 2004, outbreaks or "unusual clusters of changing patterns of illness" became notifiable under the Amendment to the Infectious Diseases Regulations.[1] (see outbreak definition in box above). Since that date, medical practitioners and clinical directors of diagnostic laboratories are required to notify to the medical officer of health any unusual clusters or changing patterns of illness, and individual cases thereof, that may be of public health concern.

In addition since 1st January 2004, all outbreak data are being entered into the CIDR system database (either directly by the HSE-region, if that region has gone live onto CIDR) or indirectly by staff in HPSC.

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

During 2006, 325 outbreaks of infectious disease were notified, responsible for at least 5200 cases of illness, and 734 hospitalisations. There were 300 gastrointestinal/ infectious intestinal disease (IID) outbreaks notified, of which at least 5057 people became ill. The regional distribution of all outbreaks of infectious disease, and those specifically IID are detailed in Table 1. The highest number of outbreaks was reported from the HSE-E, although the highest outbreak rate was in the Midland region. The lowest rates were reported from the HSE-E and HSE-MW.

Table 1. *All outbreaks of ID, number of IID and non-IID outbreaks, and total numbers ill in all outbreaks reported by health region (2006).*

Health Board	No. of Outbreaks	Outbreak rate	No. ill in all outbreaks	No. of IID outbreaks	Non-IID outbreaks
HSE-E	83	5.5	2202	80	3
HSE-M	49	19.5	435	44	4
HSE-MW	20	5.5	213	19	1
HSE-NE	23	5.8	261	20	3
HSE-NW	33	13.9	487	29	5
HSE-SE	35	7.6	492	34	1
HSE-S	59	9.5	876	52	7
HSE-W	23	5.6	228	22	1
Total	**325**	**7.7**	**5194**	**300**	**25**

Causative Pathogen

The breakdown of IID and non-IID outbreaks by pathogen are outlined in Tables 2 and 3 respectively. The overall numbers of IID outbreaks reported, increased compared with 2005.

Continuing the trend observed in previous years, the IID outbreaks in 2006 have been dominated by norovirus/ suspect viral outbreaks, accounting for 59% of all IID outbreaks reported in 2006 (Figure 1).

The two largest outbreaks reported in 2006 were both norovirus outbreaks occurring in acute hospital settings and responsible for 369 and 395 persons ill respectively.

After norovirus, the next most commonly reported outbreaks were acute infectious gastroenteritis, EHEC, salmonellosis, campylobacter and cryptosporidiosis.

There were 31 EHEC outbreaks reported in 2006, of which 28 were family outbreaks and 3 were general (2 in crèche, 1 in golf club). Thirty of these outbreaks were caused by VTEC and one family outbreak was caused by a non-VTEC strain. Twenty-five outbreaks were due to VTEC O157 and five were due to VTEC O26. In terms of mode of transmission, person-to-person spread was suspected in nine VTEC outbreaks in 2006, followed by suspect foodborne mode of transmission (four outbreaks) although no foods were found positive for VTEC during investigations.
For one family outbreak in 2006, examination of water from the household private wells confirmed the presence of the *E. coli* O157 indistinguishable from the associated human isolates.

There were 20 outbreaks of salmonellosis notified in 2006; 5 general and 15 family outbreaks. All of these were small outbreaks, with no more than five persons reported ill in any outbreak. Eleven of the outbreaks were reported to have been associated with travel outside of Ireland. Of the general outbreaks, one was associated with a crèche and four were travel-associated.

There were eleven family outbreaks of campylobacteriosis notified, responsible for 25 cases of illness. All of these were small clusters of illness, with no more than three people reported ill in any outbreak.

There were eight outbreaks of cryptosporidiosis notified in 2006; three general and five family outbreaks. Two of the general outbreaks were community outbreaks and one was associated with travel. Sixty people were reported ill

as a result of these outbreaks. The suspected mode of transmission for three outbreaks was person-to-person, and for four outbreaks, water was suspected to have played a role in transmission (recreational water for two family outbreaks and drinking water for two general outbreaks). One family outbreak was associated with foreign travel.

Twenty-five outbreaks of non-IID/gastroenteric diseases were notified in 2006. Table 3 outlines the pathogens implicated and numbers ill. Further details on the non-IID outbreaks are available in the individual disease chapters. It is hoped that surveillance data on these outbreaks will improve in the coming years.

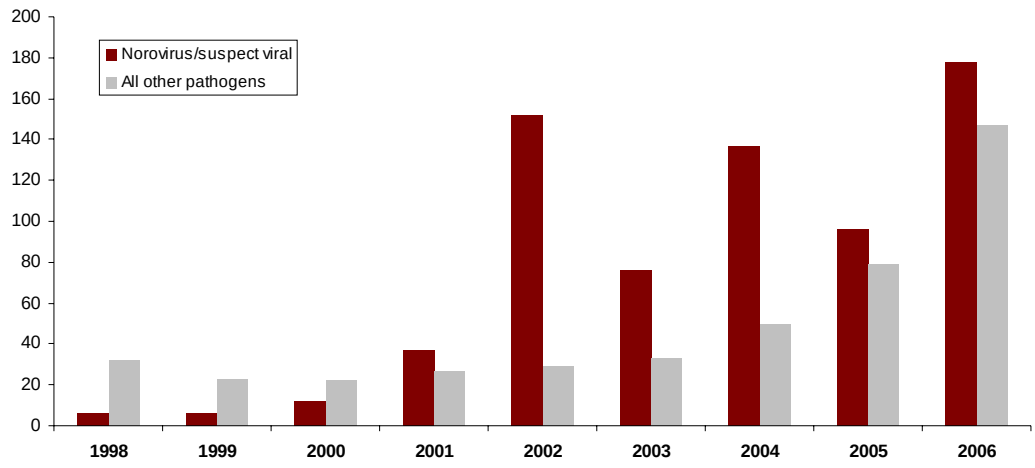

Figure 1. *Number of outbreaks by year and by pathogen, 1998-2006 (Data prior to July 2001 provided by FSAI)*

Table 2. *Pathogens associated with IID outbreaks notified in 2006*

Disease	Number of outbreaks	Number ill
Noroviral Infection	155	3905
Acute Infectious Gastroenteritis	38	518
EHEC	31	54
Suspected Norovirus	22	369
Salmonellosis	20	49
Campylobacter infection	11	25
Cryptosporidiosis	8	60
Rotavirus	3	14
Shigellosis	3	12
Hepatitis A (acute)	3	9
Clostridium difficile	2	18
Norovirus & C. difficile	1	20
Giardiasis	1	2
Typhoid	1	2
Aeromonas (AIG)	1	NK
Total	**300**	**5057**

Table 3. *Non–IID outbreaks notified in 2006*

Disease	No. outbreaks	No. ill
Coxsackie virus	1	5
ESBL *E. coli*	1	7
Hepatitis B	4	16
Influenza	2	14
Legionellosis	1	NK
Meningococcal disease	1	2
Mumps	5	33
M. tuberculosis	1	4
Pertussis	2	7
S. pneumoniae infection (invasive)	1	19
Suspected echo/coxsackie virus	1	7
Varicella	2	16
Viral meningitis	1	4
VRE	2	3
Total	**25**	**137**

Mode of Transmission

Similar to previous years, person-to-person spread is the mode of transmission reported for the majority of outbreaks of IID in 2006 (Table 4). Most of these outbreaks were due to norovirus/ suspect viral.

Table 4. *Principal mode of transmission reported in outbreaks of IID (2006).*

Primary Mode of Transmission	Number of IID Outbreaks
Person-to-person	162
P-P and Airborne	37
Unknown	30
Not Specified	26
Foodborne	19
P-P and FB	8
P-P, FB and Airborne	4
P-P and WB	3
Waterborne	3
Airborne	2
FB and WB	2
Other	2
Animal contact	1
FB and Animal	1
Total	**300**

Location

As in previous years, the commonest location in which outbreaks occurred in 2006 was healthcare settings (Table 5). 60% of all reported IID outbreaks occurred in these settings. 17% of all reported outbreaks occurred in private homes, 6 % occurred in hotels and 3% in crèches. 4% of outbreaks were associated with foreign travel in 2006.

Table 5. *IID Outbreaks by location, 2006.*

Location	Number of IID Outbreaks
Hospital	97
Residential Institution	61
Private House	51
Community hospital/long stay unit	22
Hotel	17
Travel related	13
Other	12
Crèche	10
Not Specified	7
Community outbreak	2
School	3
Coach Tour	2
Restaurant/Café	2
Staff canteen	1
Total	**300**

Seasonal distribution

When the IID outbreaks in 2006 are analysed by month of onset of illness of first case, it is seen that the majority of outbreaks occurred in the first 4 months of the year (Figure 2). This peak is attributable to the number of norovirus outbreaks that occurred at this time.

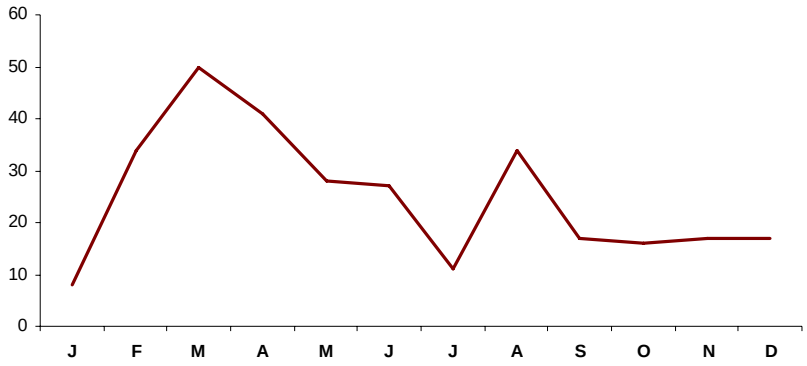

Figure 2. *Seasonal distribution of IID outbreaks, 2006.*

Discussion

Analysis of the 2006 outbreak data reveals that there were 325 outbreaks of infectious disease notified, responsible for at least 5200 cases of illness and 734 hospitalisations. This was the highest number of outbreaks notified since the surveillance system began.
The reason for this increase is partly due to improved surveillance since 2004 when all infectious disease outbreaks became notifiable, an increase in the number of non-IID outbreaks reported in 2006, and a significant number of family/household outbreaks notified in 2006, with 78/325 (24%) of all outbreaks being family outbreaks.

There was a variation in the rate of outbreaks notified per HSE region, with the highest rate being reported from the Midland region and the lowest from HSE-E, HSE-MW, and HSE-W regions (Table 1). The fact that the two latter regions are not yet live on CIDR may partly explain the lower rate.

Continuing the trend observed in previous years, the gastroenteric/ IID outbreaks have been dominated by norovirus/ suspect viral outbreaks, accounting for 59% of all IID outbreaks reported in 2006 (Figure 1). The two largest outbreaks reported were both norovirus outbreaks occurring in acute hospital settings, responsible for 369 and 395 persons ill respectively.
In recent years, the National Virus Reference Laboratory (NVRL) has been providing a detailed molecular typing and sequencing service for norovirus isolates from sporadic cases and outbreaks. This is proving invaluable, not only on a national level to allow us to track these strains in different outbreak settings, but also in comparing Irish strains to those circulating across Europe and worldwide, through the Foodborne Viruses in Europe project (FBVE)[1].
Genogroup 2, subtype 4 (GGII.4) strains remain the commonest circulating type in Ireland, with a particular variant 'GGII.4 -2006' predominating in the year 2006[2,3].

A notable feature of the 2006 data was the increased number of EHEC outbreaks notified (31 outbreaks) compared to just 20 in 2005. Thirty of these outbreaks were caused by VTEC organisms, with three being general outbreaks, and 27 family outbreaks.

In 2006, water was again noted to be an extremely important mode of transmission for many IID outbreaks in Ireland, particularly VTEC and *Cryptosporidium spp*. In one family outbreak of VTEC, the same strain of *E. coli* O157 was detected from both human isolates and from water from the private wells of affected households. For four outbreaks of cryptosporidiosis, water was suspected to have been the mode of transmission (recreational water for two family outbreaks and drinking water for two general outbreaks). For one of the general outbreaks, the water supply was a public supply and a boil water notice had to be issued. These outbreaks serve to re-emphasise the importance of protection of our drinking water supplies.

Travel-associated outbreaks were again a feature of the data from 2006. In total, thirteen outbreaks were reported to be travel-associated, with ten of these due to salmonellosis outbreaks and one typhoid family outbreak. There was also one outbreak of Hepatitis A, and one family outbreak of cryptosporidiosis associated with foreign travel. Fortunately these outbreaks were mainly small family clusters. It is hoped that surveillance data on travel-associated infections will continue to improve over the coming years, especially with country of infection data being reported through CIDR. In addition, for diseases such a typhoid and malaria, there is a need to reinforce public health messages and awareness amongst travellers to endemic countries.

Outbreak investigations are an extremely important and challenging component of public health and epidemiology, and help to identify the source of the outbreak, institute control measures and prevent additional cases. Extremely valuable information has been derived from analyses of the 2006

data from CIDR. It is evident that with the continuation of the national roll-out of CIDR, the quality of this data continues to improve each year.

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