Annual Report on Outbreaks of Infectious Disease in Ireland, 2003

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Introduction

The aim of outbreak investigations is to identify the source of the outbreak, institute control measures and prevent additional cases. The data obtained during outbreak investigations can be used to determine possible ways of preventing future outbreaks.

The primary 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 of the system 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.

Outbreak definition

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. 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.

Methods

Since July 2001, public health professionals have been requested to report all investigated infectious disease outbreaks to HPSC using a preliminary notification form (by fax or email). A follow-up investigation form and/or final report is then forwarded by the lead investigator at the end of the investigation. The data collected include information on the source of reporting of the outbreak, the extent of the outbreak, mode of transmission, location, pathogen involved, laboratory investigation, morbidity and mortality data, suspected vehicle and factors contributing to the outbreak. These data are stored and analysed in a Microsoft Access database in HPSC.

Results

During 2003, 109 outbreaks of infectious disease were reported to HPSC, of which 102 were gastrointestinal/ infectious intestinal disease (IID) outbreaks. The IID outbreaks were responsible for at least 2113 people becoming ill. The regional distribution of all outbreaks of infectious disease, and those specifically IID are detailed in Table 1. The majority of outbreaks were reported from the ERHA region (n=42), although the highest outbreak rates were in the South-Eastern and Southern health board regions. The lowest rate was reported from the WHB.

Table 1. All outbreaks of ID, number of IID outbreaks and total numbers ill in IID outbreaks reported by health board (2003).

Health Board	No. of Outbreaks	Outbreak rate per 100,000 pop.	No. of IID outbreaks	No. ill in IID outbreaks
ERHA	42	3.0	39	1103
MHB	3	1.3	2	70
MWHB	6	1.8	6	85

NEHB	6	1.7	6	151
NWHB	6	2.7	6	60
SEHB	19	4.5	16	204
SHB	26	4.5	26	412
WHB	1	0.3	1	28
Total	**109**	**2.8**	**102**	**2113**

Causative Pathogen

Tables 2 and 3 outline the breakdown of IID and non-IID outbreaks by pathogen respectively. In 2003, as has been the trend since the year 2000, the IID outbreaks have been dominated by norovirus or suspect viral outbreaks, comprising 74% of all IID outbreaks in 2003 (Figure 1). The overall numbers of IID outbreaks decreased in comparison with 2002, but was still an increase on all other previous years (Figure 2). The only other confirmed viral cause of IID outbreaks in 2003 was rotavirus, causing an outbreak in a crèche in the Eastern region.
After norovirus, the next most commonly reported outbreaks were *Salmonella enterica* and *E. coli* O157.

There were eight outbreaks of *S. enterica* reported in 2003, three general and five household outbreaks. The general outbreaks were all reported to be foodborne, and all occurred in restaurant/cafes. There was one general outbreak of *S.* Hadar (11 people ill), one of *S.* Rissen (11 people ill) and one outbreak of *S.* Typhimurium (6 people ill). There were four household outbreaks of *S.* Enteritidis and one of *S.* Kentucky.

Two general outbreaks of VTEC *E. coli* O157 occurred during the summer months of 2003. Both occurred in hotel restaurants in the Eastern region. Five confirmed and twelve probable cases were reported in one outbreak, with seven cases hospitalised. An intensive investigation took place, but no food or water items were identified as the source of the outbreak.
In the second general outbreak of VTEC, three confirmed cases were identified. One of the cases developed haemolytic uraemic syndrome (HUS) and two cases were hospitalised. No source was identified.
Five family outbreaks of VTEC were reported to the outbreak surveillance system in 2003. In addition, the HPSC Enhanced Surveillance system for *E. coli* O157 identified a further eight family clusters[1], as a result of sporadic case investigation, but only those outbreaks notified through the national outbreak surveillance system are analysed in this report.

There were two outbreaks of *Campylobacter spp* reported in 2003, one occurred in a residential institution (19 ill) and the other in a hospital (6 ill). The sources were not identified in either of these outbreaks.

There were seven non-IID outbreaks reported in 2003 (Table 3) namely, Influenza A (3), Measles (1), Tuberculosis (2) and MRSA (1).

Table 2. Pathogens associated with IID outbreaks, 2003.

Pathogen	No of Outbreaks	No. ill

Suspect viral	39	576
Norovirus	37	1168
S. enterica	8	44
***E. coli* O157**	7	188
Campylobacter spp	2	25
Clostridium difficile	1	5
Rotavirus	1	12
Staph. aureus	1	4
Not Known	6	91
Total	**102**	**2113**

Table 3. Non –IID outbreaks reported in 2003

Pathogen	No. of outbreaks	
Influenza A	3	302
Measles	1	95
Tuberculosis	2	32
MRSA	1	12
Total	**7**	**441**

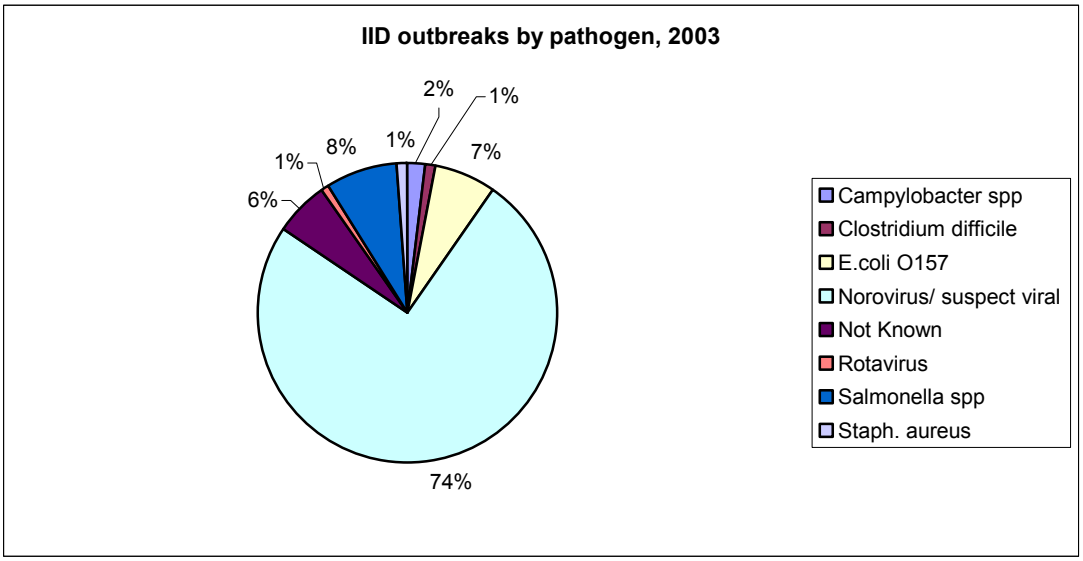

Figure 1. IID outbreaks by pathogen, 2003.

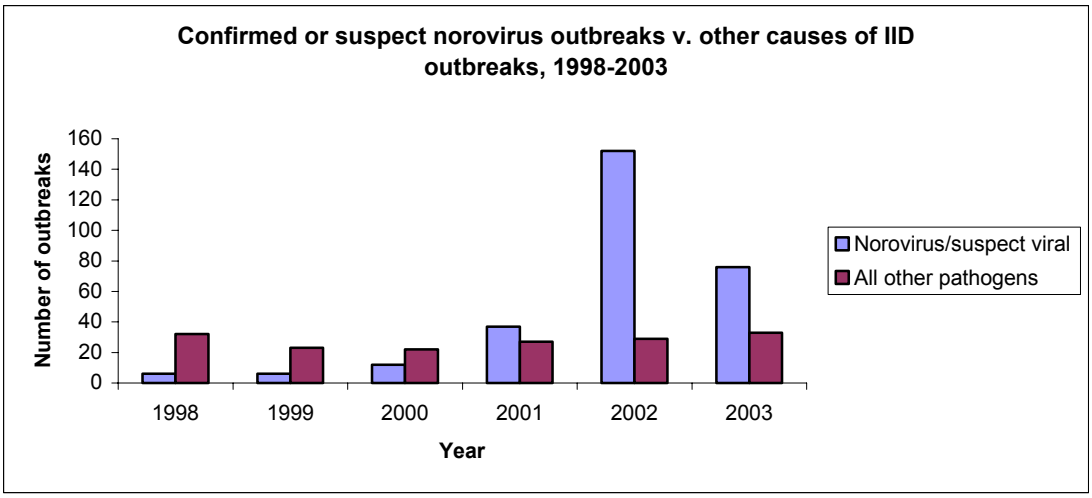

Figure 2. Number of outbreaks by year and by pathogen, 1998-2003
(Data prior to July 2001 provided by FSAI)

Mode of Transmission

In the majority of outbreaks of IID reported in 2003, the principal mode of transmission was reported as person-to-person (Table 4). The majority of these outbreaks were due to norovirus/ suspect viral, similar to the trend in 2002.
There were six outbreaks where the primary mode of transmission was described as foodborne. Four of these were due to *Salmonella enterica*, one was *S. aureus* and one was suspect norovirus. No waterborne outbreaks were reported in 2003.

Table 4. **Principal mode of transmission reported in outbreaks of IID (2003).**

Mode of Transmission	No of Outbreaks	No ill
Animal Contact	1	3
Foodborne	6	45
Person-to-person	62	1646
P-P/Airborne	11	197
P-P/Foodborne	1	16
Other	1	6
Unknown	20	200
Total	**102**	**2113**

Location

Similar to the trend reported in 2002, the commonest location in which outbreaks occurred in 2003 was health-care settings (Table 5). 64% of all reported outbreaks occurred in these settings. The greatest number of people ill was also associated with outbreaks in the health-care sector, with almost 1000 people known to be ill as a result of hospital outbreaks alone.
A significant number of suspect foodborne outbreaks also occurred in private homes and in eating establishments, emphasising the need for reinforcing good hygiene and food safety practices in these settings.

Table 5. IID Outbreaks by location and numbers ill, 2003.

Location	No of Outbreaks
Hospital	34
Residential Institution	31
Private House	12
Hotel	8
Restaurant/ Café	5
Crèche	4
Other	3
Tour Bus	2
Guest House/ B&B	1
School	1
Travel Related	1
Total	**102**

Seasonal distribution

When the IID outbreaks in 2003 are analysed by month of onset of illness of first case, it is seen that the majority of outbreaks occurred in the month of February (Figure 3). This is explained by the large number of outbreaks of norovirus that occurred at this time of the year.
A smaller peak was noted in September when the majority of *S. enterica* and *E. coli* outbreaks occurred.

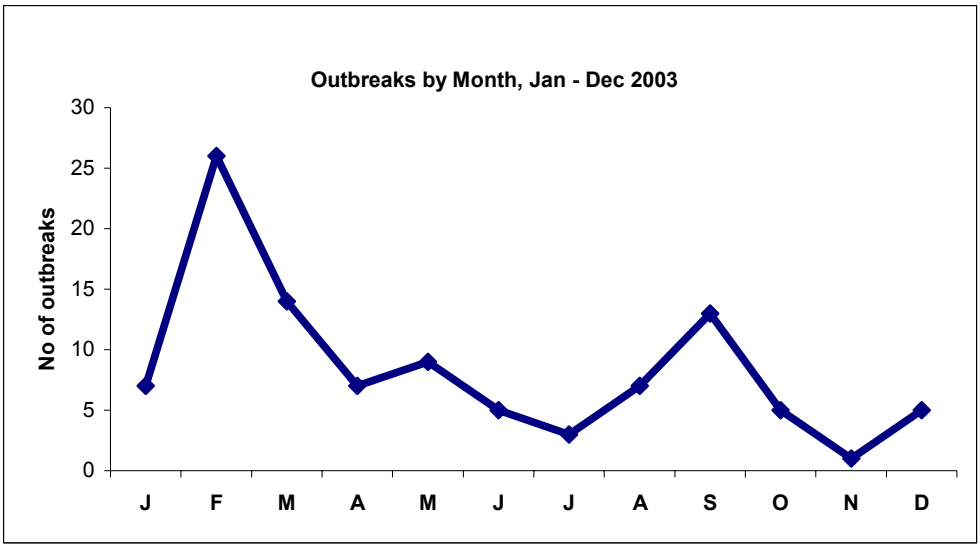

Figure 3. Seasonal distribution of IID outbreaks, 2003.

Discussion

Analysis of the outbreak data for 2003 shows a decrease in the overall number of outbreaks reported nationally compared to 2002. There were 102 outbreaks of IID reported nationally in 2003, compared to 188 in 2002. The overall number of outbreaks for 2003 however is still higher than that reported from 1998 to 2001.

The trend in recent years of a predominance of norovirus outbreaks seen since 2001, has continued in 2003 with the highest proportion of IID outbreaks being either

confirmed as norovirus or suspect viral. This trend has also been noted across much of Europe.[1] Interestingly, the numbers ill in these outbreaks seems to be much lower than in 2002. There were over 7650 people ill due to norovirus outbreaks in 2002. In 2003, however, that figure had decreased to 1744. It is likely that with the institution of early control measures, these outbreaks were being contained at a much earlier stage and hence there was a marked reduction in person-to-person spread of the virus. It is also likely that short-term immunity had developed to the new norovirus sub-type that was first seen in Ireland in 2002 (GII-4).[2] The national norovirus outbreak guidelines developed by the Viral Gastroenteritis sub-committee of HPSC appear to be in wide use and serve to assist in the management of these outbreaks particularly in healthcare settings.

Similar to 2002, all of the *Salmonella enterica* outbreaks reported in 2003 were small in size. Two very significant general outbreaks of *E. coli* O157 occurred in 2003. Both were associated with hotel restaurants in the Eastern part of the country. In one outbreak, over 130 possible cases were identified during the intensive investigation, and the final outcome was five confirmed and twelve probable cases, with seven cases hospitalised. Despite the thorough investigation, no food or water items were identified as a source of the outbreak. Similarly despite an intensive investigation of the second VTEC O157 outbreak, no source was identified.

For the first time, data on non-IID outbreaks were reported to the national outbreak surveillance system in 2003. With the introduction of the new ID legislation, all outbreaks and unusual clusters of illness became statutorily notifiable on 1st January 2004, so it is hoped that more complete reporting of all outbreaks will occur in the coming years.
In addition, with the advent of the CIDR system in 2004, real time data on outbreaks should become available to all users nationally as they go-live on the system. This will enable key epidemiological, microbiological and environmental data relating to the outbreak to be shared and assist in the management and control of the outbreak.

Outbreak investigations remain one of the most important components of public health in terms of learning more about the epidemiology of infectious diseases and their transmission routes. The lessons learnt from outbreak investigations should always be documented, so that information on the causes and factors contributing to outbreaks can be used to inform future prevention strategies.

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References

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2. Lopman B., Vennema H., Kohli E., Pothier P., Sanchez A., Negredo A. et al. Increase in viral gastroenteritis outbreaks in Europe and epidemic spread of new norovirus variant. *Lancet* 2004; **363**: 682-8.

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