



# **Epidemiology of Outbreaks in Ireland, 2007**

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### **Further information:**

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

## Summary

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- 260 infectious disease outbreaks, of which 238 were gastroenteric/infectious intestinal disease (IID) outbreaks were notified in 2007
- These outbreaks were responsible for 4833 cases of illness, and 890 hospitalisations
- 60/238 (25%) of all IID outbreaks were family outbreaks
- Viral gastroenteritis caused by norovirus (NV) continues to be the most common cause of IID outbreaks (61% of IID outbreaks confirmed/suspected NV)

## Introduction

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The principal objective of the national outbreak surveillance system is to gather 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, to monitor the effectiveness of prevention programmes and to inform policy.

## Case Definitions

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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 (family outbreak) or may be more widespread (general outbreak) and involve cases either locally, nationally or internationally.

## Materials and Methods

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Since 1st January 2004, outbreaks or “unusual clusters of changing patterns of illness” became notifiable under the Amendment to the Infectious Diseases Regulations.<sup>1</sup> (see outbreak definition in box above). Since that date, medical practitioners and clinical directors of diagnostic laboratories are required to notify 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 1<sup>st</sup> 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. Figures may differ from those published previously, due to ongoing updating of notification data on CIDR.

## Results

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During 2007 there were 260 outbreaks with 4833 associated cases of illness reported via CIDR. In total 890 cases were hospitalised. It is unknown if the pathogen was acquired while an inpatient or if a case was hospitalised as a result of their infection. Of these were 238 outbreaks were of infectious intestinal disease (IID) notified on CIDR. These IID outbreaks resulted in 4713 associated cases of illness. There were 22 non-IID outbreaks reported with a 120 cases of illness.

General outbreaks accounted for 73.9% (n=192) of all outbreaks notified. The remaining outbreaks were considered family/household outbreaks (26.1%, n=68).

The regional distribution of all outbreaks of infectious disease in 2007, and those specifically IID, are detailed in Table 1. HSE-SE had the highest crude incidence outbreak rate of 10.4 per 100,000. HSE-S reported the greatest number of outbreaks (n=56). Of note, in 2006 HSE-M had an outbreak rate of 13.9 per 100,000. In 2007 this rate significantly decreased to 5.2 per 100,000.

**Table 1:** All outbreaks of ID, number of IID and non-IID outbreaks, and total numbers ill in all outbreaks reported by health region (2007).

Region	No. of Outbreaks	Outbreak Rate	No. ill in all outbreaks	No. of IID outbreak	No. of Non IID outbreaks
E	71	4.7	1627	67	4
M	13	5.2	136	13	0
MW	14	3.9	192	12	2
NE	21	5.3	442	21	0
NW	22	9.3	315	20	2
SE	48	10.4	861	44	4
S	56	9.0	840	50	6
W	14	3.4	412	10	4
HPSC	1	~	8	1	0
Total	260	6.1	4833	238	22



### Outbreak Type

A summary of all outbreaks by pathogen type and the resulting number of persons ill are shown in Table 4.

**Table 4:** Number of outbreaks and persons ill by pathogen type and outbreak type

Outbreak Pathogen Type	General		Family		Total ill
	No. of Outbreak	No ill	No. of Outbreak)	No ill	
IID	178	4526	60	187	4713
Non IID	14	99	8	21	120
Total	192	4625	68	208	4833

### Causative Pathogen

The breakdown of IID and non-IID outbreaks by pathogen are outlined in Tables 2 and 3 respectively.

**Table 2:** Pathogens associated with IID outbreaks notified on CIDR in 2007

Disease	No General Outbreaks	No Family Outbreaks	Total No Outbreaks	No ill
Noroviral Infection	107	4	111	3307
Acute Infectious Gastroenteritis	49	4	53	719
Campylobacter infection	1	8	9	21
Clostridium difficile	3	0	3	60
Cryptosporidiosis	6	10	16	358
EHEC	4	17	21	104
Giardiasis	0	3	3	4
Hepatitis A (acute)	0	3	3	6
Norovirus & Rotavirus	1	0	1	17
Rotavirus	4	3	7	30
Salmonellosis	3	7	10	85
Trichinosis	0	1	1	2
Total	178	60	238	4713

**Table 3:** Non-IID outbreaks notified on CIDR in 2007

Disease	Total No Outbreaks	No ill
Hepatitis B (acute & chronic)	4	10
Influenza	1	13
Measles	3	13
Meningococcal disease	1	2
MSSA (methicillin sensitive staph aureus)	1	4
Mumps	3	10
Outbreak	1	20
Suspected Scarlet Fever	1	3
Suspected Varicella	1	4
Tuberculosis	2	25
Varicella	4	16
Total	22	120

**IID-Outbreaks:**

There were seven outbreaks notified where associated cases of illness exceeded 100. All of these outbreaks were of general type and associated pathogens were considered to be IID (Table 5). Six of these were caused by norovirus.

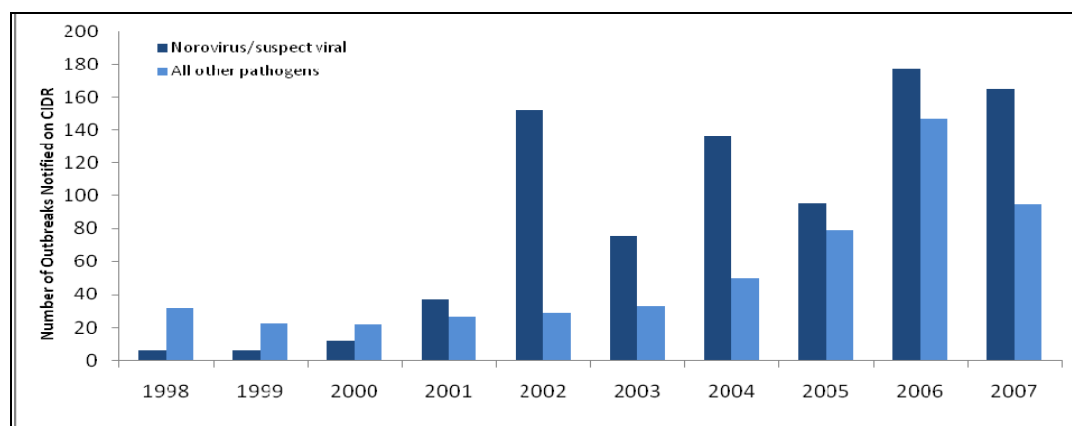
Norovirus was responsible for the largest outbreak of 2007. This occurred within a hospital with approximately 407 cases of illness. The second largest outbreak was a waterborne outbreak caused by *Cryptosporidium* in Galway with 304 people reported ill. This outbreak was the largest *Cryptosporidium* outbreak reported in Ireland since outbreaks for surveillance began (Table 5). After norovirus (n=111), the next most commonly reported IID outbreaks were acute infectious gastroenteritis (n=53), EHEC (n=21), cryptosporidiosis (n=16), salmonellosis (n=10) and campylobacter (n=9).

**Table 5:** Outbreaks where reported cases of illness exceeded 100.

Region	Organism/Pathogen	Type	Month	Outbreak type	Transmission mode	Outbreak location	No. ill
S	Norovirus	IID	Jan	General	P-P	Hospital	101
E	Norovirus	IID	Feb	General	P-P	Hospital	115
W	<i>Cryptosporidium</i>	IID	Mar	General	WB	Community	186
E	Norovirus	IID	Jun	General	P-P	Hospital	153
SE	Norovirus	IID	Jul	General	P-P	Hospital	134
NE	Norovirus	IID	Sep	General	P-P	Hotel	133
E	Norovirus	IID	Nov	General	P-P	Hospital	407

Figure 1 compares the number of Norovirus outbreaks to all other outbreaks by year since 1998. Norovirus/suspected viral outbreaks continue to be the most prevalent cause of IID outbreaks, accounting for over 60% of all IID outbreaks reported in the year. This continues the trend observed in previous years.

**Figure 1:** Number of outbreaks by year and by pathogen, 1998-2007  
(Data prior to 2001 provided by FSAI outbreak surveillance system)



There were 21 EHEC outbreaks reported in 2007, ten less than 2006. These outbreaks can be subdivided into seventeen family outbreaks and four general (two in crèche, one in a hotel and one in a private house). Sixteen outbreaks were due to VTEC O157, three due to VTEC O26, one was caused by an ungroupable strain and one was a mixed strain outbreak. One general VTEC outbreak in 2007 was linked to a hotel, with fifty-six associated cases of illness. Foodborne transmission was suspected as a mode of transmission in this outbreak although no specific food was implicated during investigations. *E. coli* O157 was isolated from the private water supplies associated with one outbreak and one sporadic case in 2007.

In 2007, there were ten outbreaks of salmonellosis reported via CIDR to the HPSC; three general and seven family outbreaks. Of the seven family outbreaks, one was travel associated and the remaining six were located in private houses. The three general outbreaks resulted in a total of sixty-five

persons ill. There were two smaller outbreaks, one located in a crèche and the other in a community with 13 associated cases.

The third outbreak was notified in mid-July of 2007 in HSE-S. There were 52 cases with a 31% hospitalisation rate. The cases were notified from the 2nd week of July until the 1st of August. The peak onset of illness was 6th-9th July. The outbreak phage type was identified as S Enteritidis PT4. The outbreak was epidemiologically linked to a local bakery, bakery X. Results from the analytical study indicated a strong statistical association between illness and eating food from bakery X and/or eating food from outlets supplied by bakery X. Investigators concluded that it was not possible to definitively state how Salmonella Enteritidis was introduced to Bakery X. However, the evidence appeared to support the introduction of S. Enteritidis by either pigeons or by foodhandlers. Once introduced, conditions and practices in the premises could then have contributed to the spread of infection within the premises. Department of Agriculture and Food trace back to the supplying flocks revealed no evidence of supply of contaminated raw eggs to the premises. The bakery closed voluntarily.

In 2007 there were nine family outbreaks and one general outbreak in a residential home of campylobacteriosis notified. A total of 21 cases of illness were associated with these outbreaks. These were all small clusters of illness with no more than three people reported ill in any outbreak.

Sixteen outbreaks of cryptosporidiosis were reported in 2007: six general outbreaks and ten family outbreaks. Three hundred and ninety six people were reported ill as a result of these outbreaks. The suspected mode of transmission for nine outbreaks was person-to-person, and for three outbreaks, water was suspected to have played a role in transmission. The Galway outbreak of cryptosporidiosis had 304 laboratory confirmed cases associated. A preliminary report on the outbreak showed that it was primarily due to *C. hominis*. Cases were clustered in areas supplied by water treatment plants which used water from Lough Corrib. Boil water notices were issued

for four water supplies in March 2007 and were lifted in July and August 2007 following closure of two older plants and upgrading of two newer plants. No specific point source of contamination was identified.

#### Non-IID Outbreaks:

Twenty-two outbreaks of non-IID/gastroenteric diseases were notified in 2007. Table 3 outlines the responsible pathogens and numbers ill. Tuberculosis was the most common cause of non-IID outbreaks notified. An outbreak notified by HSE-S in March 2007 resulted in 21 cases of tuberculosis (18 children and 3 adults) and involved two crèches. The vast majority of child cases were toddlers (children aged 2 to 3 years). A symptomatic crèche worker (index case) was diagnosed with sputum positive pulmonary TB in March 2007. This case had worked in two large crèches and worked primarily with toddler children at both locations. None of the 18 paediatric cases had BCG vaccination. The *M. tuberculosis* strain isolated from the index case was reported as being pan-sensitive.

#### Mode of Transmission:

Person-to-person (p-p) spread was the mode of transmission reported for the majority (49%) of outbreaks of IID in 2007 (n=117). Most of these outbreaks were due to norovirus/ suspect viral. Person-to-person was also cited in 14% of IID outbreaks (n=34) as an associated mode of transmission.

**Table 6:** Principal mode of transmission reported in outbreaks of IID, 2006 and 2007.

Primary Mode of Transmission	Number of IID Outbreaks 2007	Number of IID Outbreaks 2006
Airborne	2	2
Animal Contact	1	1
Foodborne	9	19
FB and Animal	0	1
Foodborne & Waterborne	1	2
Not Specified	26	26
Other	1	2
Person-to-person	117	162
Person-to-person & Airborne	30	37
Person-to-person & Foodborne	4	8
P-P and WB	0	3
P-P, FB and Airborne	0	4
Unknown	42	30
Waterborne	5	3
<b>Total</b>	<b>238</b>	<b>300</b>

### Location

Healthcare settings were the commonest location for outbreaks - 54.6% of all reported IID outbreaks occurred in hospitals and residential institutions. A further 22.2% occurred in private homes, 5.5 % occurred in hotels and 5.5% in crèches.

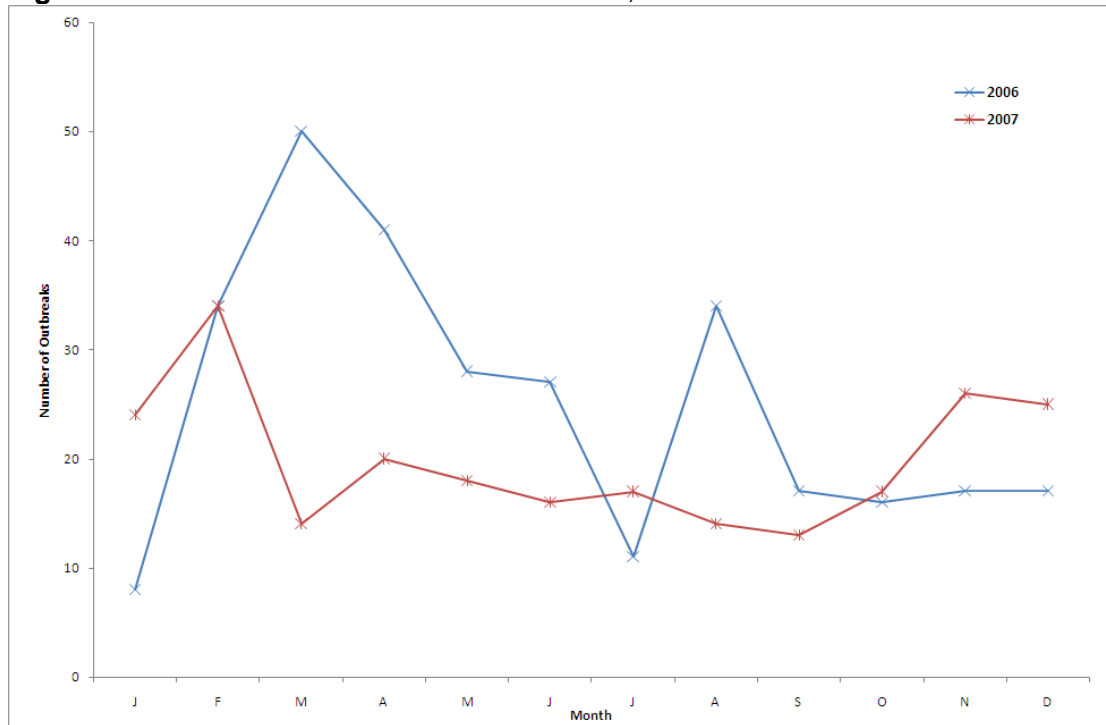
**Table 5:** IID Outbreaks by location, 2007 and 2006.

Location	Number of IID Outbreaks 2007	Number of IID Outbreaks 2006
Coach Tour	2	2
Community Hospital/Long-stay unit	39	22
Community outbreak	6	2
Crèche	13	10
Hospital	60	97
Hotel	13	17
Not Specified	2	7
Other	11	12
Private House	53	51
Residential institution	31	61
Restaurant/Café	1	2
School	2	3
Staff canteen	0	1
Travel Related	5	13
<b>Total</b>	<b>238</b>	<b>300</b>

### Seasonal distribution

When the IID outbreaks are analysed by month of onset the majority occurred in the first three months of the year. This peak is attributable to the number of norovirus outbreaks that occurred at this time. This seasonality was also evident in 2006.

**Figure 2:** Seasonal distribution of IID outbreaks, 2006 and 2007.



## **Discussion**

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Review of 2007 data show that there were 260 outbreaks notified on CIDR with 4714 associated cases of illness associated with all outbreaks, of these 890 cases were hospitalised. General outbreaks account for 74% and family outbreaks for 25%. Numbers are lower than those seen in 2006, but remain higher than seen in previous years (2005 n=175, 2004 n=187). There were 65 more outbreaks notified in 2006, with an added 486 cases of illness and a 14% hospitalisation rate.

During 2007, despite lower numbers of reported outbreaks, the hospitalisation rate reached 19% of all cases. However further review of larger outbreaks (Table 5) confirm that 5 of the 7 largest outbreaks occurred within hospital's all caused by norovirus.

The crude incidence outbreak rate per 100,000 was 7.7 for the year. Regional variation ranged from 10.4 outbreaks per 100,000 in the South East to 3.4 outbreaks per 100,000 in the West. All areas, with the exception of the Midlands and the South East, experienced outbreaks rates similar to 2006. The Midlands regional experienced a drop in rate from 19.5 per 100,000 in 2006 to 5.2 per 100,000 in 2007. This is primarily due to the drop in norovirus outbreaks experienced in the region from 21 reported outbreaks in 2006 to just five in 2007. The South East experienced a slight increase in CIR from 7.6 per 100,000 to 10.4 per 100,000. Review of the data reveals outbreak numbers and causative pathogens were similar in both years, except for Cryptosporidiosis. This increased from two outbreaks in 2006, with 10 associated cases of illness, to nine reported outbreaks in 2007 with 40 associated cases of illness.

IID outbreaks were dominated by norovirus and AIG infections. There were lower numbers of outbreaks where Salmonellosis and EHEC were causative pathogens but caused higher illness burden than seen in 2006. Again, rises in



Cryptosporidiosis outbreaks were seen nationally with double the number reported in 2006 and almost a six fold increase in cases ill.

Number of non-IID outbreaks did not vary to previous years, with the exception of outbreaks associated with Tuberculosis. The most significant outbreak of tuberculosis reported in Ireland in recent years causing 21 cases of illness.

Identification of outbreaks in a timely manner is essential to safeguarding public health. This review highlights the varied and unpredictable nature of outbreaks and their pathogens. Recognition of outbreaks and people affected by such outbreaks has repercussions for public health action locally but also may affect actions taken by other foreign agencies. Details of Irish cases of illness originating overseas can aide colleagues abroad to identify possible sources of origin and prevent spread.

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