

SURVEILLANCE OF INFECTIOUS INTESTINAL DISEASE (IID), ZOOSES AND OUTBREAKS



A quarterly report by the Health Protection Surveillance Centre in collaboration with the Departments of Public Health

Quarter 4–2004

March 2005

A number of important outbreaks of infectious intestinal disease occurred during the final quarter of 2004. A German cruise ship, the “MV Mona Lisa” out of Bremer Haven, was the location of an outbreak of *Salmonella* Enteritidis phage type 4 that affected almost 100 people. The ship docked in the Orkneys, in Northern Scotland, Dublin and Dover as part of the cruise. No cases of illness were reported in Ireland as a result of the outbreak.

Since November 2004, there has been increased norovirus activity in the Republic of Ireland with numbers of outbreaks and numbers of cases of illness being comparable to the levels seen during the significant upsurge during Winter 2002-2003. This pattern is being seen across Europe.

For the first time, outbreak incidence rates are being reported in the Quarterly Report. This will enable direct comparisons between regions and over time.

The production of this quarterly report would not be possible without the valuable input and commitment from the Directors of Public Health, Specialists in Public Health Medicine, Surveillance Scientists, Clinical Microbiologists, General Practitioners, Hospital Clinicians, Infection Control, Environmental Health and laboratory personnel, and other professionals who provide the data for HPSC's surveillance systems.

Note: Data are collected and analysed using the Computerised Infectious Disease Reporting (CIDR) system. The data in this report are provisional and will not be regarded as final until all returns are received and data have been validated.

OUTBREAK SURVEILLANCE

Table 1. Outbreaks of Infectious Intestinal Disease (IID) in Quarter 4, 2004

Month	HB	Type of outbreak	Location	No. ill	No. Hosp.	Date Onset	Suspect mode of transmission	Organism
Oct	ERHA	General	Hospital	19	0	15/10/2004	P-P	Norovirus
Oct	ERHA	General	Hospital	109	51	16/10/2004	P-P	Norovirus
Oct	ERHA	General	Residential Institution	11	0	12/10/2004	P-P	Suspect viral
Oct	ERHA	General	Hotel	3	0	11/10/2004	Foodborne	<i>S. aureus</i>
Oct	ERHA	General	Hospital	34	0	26/10/2004	P-P	Suspect viral
Oct	ERHA	General	Hospital	5	0	26/10/2004	P-P	Rotavirus
Oct	ERHA	General	Hospital	62	5	25/10/2004	P-P	Norovirus
Oct	MHB	General	NK	45	0	16/10/2004	P-P and airborne	Suspect viral
Oct	MWHB	General	Restaurant	3	0	03/10/2004	Foodborne	Suspect viral
Oct	MWHB	General	Hospital	139	0	23/10/2004	P-P	Norovirus
Oct	NEHB	General	Residential Institution	10	0	13/10/2004	P-P	Suspect viral
Oct	NEHB	General	Hospital	10	4	17/10/2004	P-P	Norovirus
Oct	NEHB	General	Hospital	6	0	17/10/2004	P-P	Suspect viral
Oct	NEHB	Family	Private Household	1	1	10/10/2004	Waterborne	<i>E. coli</i> O157
Oct	NEHB	General	Residential Institution	15	1	08/10/2004	P-P	Suspect viral
Oct	NEHB	General	Residential Institution	10	0	22/10/2004	P-P	Suspect viral
Oct	NEHB	General	Residential Institution	13	0	23/10/2004	P-P	Suspect viral
Oct	SEHB	General	Hospital	47		19/10/2004	P-P	Norovirus
Oct	SEHB	General	School	11	2	09/10/2004	P-P	<i>Shigella sonnei</i>
Oct	SEHB	General	Hospital	30		15/11/2004	P-P	Norovirus
Oct	SHB	General	Day care centre	21	0	12/10/2004	P-P	Norovirus
Oct	SHB	General	Hotel	10	0	26/10/2004	P-P	Norovirus
Oct	SHB	General	Hospital	18	0	27/10/2004	P-P	Suspect viral
Oct	SHB	General	Residential Institution	7	0	23/10/2004	P-P	Suspect viral
Oct	SHB	General	Hospital	5	0	23/10/2004	P-P	Suspect viral
Oct	WHB	General	Hotel	7	0	19/10/2004	P-P	Suspect viral
Nov	ERHA	General	Residential Institution	10	0	30/11/2004	P-P	Suspect viral
Nov	ERHA	General	Residential Institution	21	0	26/11/2004	P-P and airborne	Suspect viral
Nov	ERHA	General	Hospital	14	0	16/11/2004	P-P	Suspect viral
Nov	ERHA	General	Residential Institution	14	0	15/11/2004	P-P	Suspect viral
Nov	ERHA	General	School	89	0	11/11/2004	P-P and airborne	Suspect viral
Nov	ERHA	General	Hospital	10	0	19/11/2004	P-P	Suspect viral
Nov	ERHA	General	Hospital	462	0	18/11/2004	P-P	Norovirus
Nov	ERHA	General	Restaurant/Café	13	0	NK	P-P and foodborne	Norovirus
Nov	MHB	General	Nursing home	10	0	26/11/2004	P-P	Suspect viral
Nov	MHB	General	Nursing home	21	0	26/11/2004	P-P and airborne	Norovirus
Nov	MWHB	General	Hotel	15	0	13/11/2004	P-P	Norovirus
Nov	NEHB	General	School	200	0	10/11/2004	P-P	Suspect viral
Nov	NEHB	General	Hospital	6	0	21/11/2004	P-P	Suspect viral

Nov	NEHB	General	Hospital	7	0	17/11/2004	P-P	Norovirus
Nov	SEHB	General	Hospital	91		04/11/2004	P-P	Norovirus
Nov	SEHB	General	Hospital	36		19/11/2004	P-P	Norovirus
Nov	SEHB	Family	Private Household	2		18/11/2004	P-P	<i>E. coli</i>
Nov	SEHB	Family	Private Household	2		06/11/2004	P-P	<i>Cryptosporidium</i>
Nov	SHB	General	Other	11	0	07/11/2004	Foodborne	Not known
Nov	SHB	General	Residential Institution	8	0	23/11/2004	P-P and airborne	Suspect viral
Nov	WHB	General	Hotel	30	0	NK	Unknown	Suspect viral
Nov	NWHB	General	Nursing Home			05/11/2004	P-P	Norovirus
Dec	ERHA	General	Hospital	5	0	01/12/2004	P-P	Suspect viral
Dec	ERHA	General	Residential Institution	8	0	16/12/2004	P-P	Suspect viral
Dec	ERHA	General	Residential Institution	19	0	02/12/2004	P-P	Suspect viral
Dec	ERHA	General	Hospital	9	0	04/12/2004	P-P	Suspect viral
Dec	ERHA	General	Residential Institution	6	0	NK	P-P	Suspect viral
Dec	ERHA	General	Residential Institution	14	0	09/12/2004	P-P	Norovirus
Dec	ERHA	General	Residential Institution	24	0	12/12/2004	P-P	Suspect viral
Dec	ERHA	General	Residential Institution	5	0	24/12/2004	P-P	Suspect viral
Dec	ERHA	General	Hospital	18	0	24/12/2004	P-P	Suspect viral
Dec	ERHA	General	Hospital	11	0	29/12/2004	P-P	Suspect viral
Dec	MHB	General	Nursing home	37	0	29/12/2004	P-P and airborne	Norovirus
Dec	MHB	General	Hospital	18	0	31/12/2004	P-P and airborne	Norovirus
Dec	MHB	General	Hospital	17	0	10/12/2004	P-P and airborne	Norovirus
Dec	MHB	General	Nursing home	36	0	06/12/2004	P-P and airborne	Norovirus
Dec	NEHB	General	Hospital	8	0	12/12/2004	P-P	Suspect viral
Dec	NEHB	General	Hospital	18	0	26/12/2004	P-P	Suspect viral
Dec	NEHB	General	Residential Institution	11	0	12/12/2004	P-P	Suspect viral
Dec	SEHB	General	Residential Institution	29		22/12/2004	P-P	Norovirus
Dec	SHB	General	Residential Institution	12	0	08/12/2004	P-P	Norovirus
Dec	SHB	General	Residential Institution	34	0	01/12/2004	P-P	Norovirus
Dec	NWHB	General	Nursing Home	27	0	01/12/2004	P-P	Norovirus
Dec	NWHB	General	Nursing Home	9	0	24/12/2004	P-P	Norovirus

P-P denotes Person-to-Person transmission

NK denotes Not Known

Table 2. Non-ILD Outbreaks in Quarter 4, 2004

Month	HB	Type of outbreak	Location	No. ill	No. Hosp.	Date Onset	Suspect mode of transmission	Organism
Oct	NWHB	General	College	3	3	15/10/2004	P-P	Meningitis
Nov	ERHA	General	Other	4	3	11/11/2004	Waterborne	Leptospirosis
Nov	NWHB	General	College	9	0	02/11/2004	P-P	Mumps
Nov	SHB	General	School	65	2	29/11/2004	P-P	Suspect Respiratory Virus
Dec	NWHB	General	College	7	1	15/12/2004	P-P	Mumps

P-P denotes Person-to-Person transmission

Since July 2001, outbreaks have been reported to HPSC. Initial information is provided by a public health professional using a preliminary notification form (by fax or email). A full report is then forwarded by the lead investigator once more complete data are available. The data requested includes 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, suspect vehicle and factors contributing to the outbreak. The data provided on final reports is crucial in providing information on the reasons why the outbreak occurred, the factors that lead to the spread of disease and the lessons that can be learnt to prevent further such outbreaks.

Since the 1st January 2004, with the amendment to the Infectious Diseases Regulations (2003), there is a statutory requirement for medical practitioners and clinical directors of a diagnostic laboratory to notify to the medical officer of health ‘any unusual clusters or changing patterns of any illness, and individual cases thereof, that may be of public health concern’.

Table 1 shows a line listing of all general and family IID outbreaks reported to the HPSC in the fourth quarter of 2004. There were 70 IID outbreaks reported during this period, resulting in at least 2098 people being ill. The most common cause of IID outbreaks during this period was norovirus with 63 outbreaks being either confirmed or suspect norovirus (90% of all outbreaks). There were four suspect foodborne outbreaks, one of which was caused by *S. aureus*. There was one suspect waterborne outbreak

reported, a family outbreak of *E. coli* O157. One outbreak of shigellosis occurred during this quarter in a school, responsible for eleven people being ill, and two hospitalisations. Fifty-five outbreaks (79%) were reported to have occurred in healthcare settings, i.e. hospitals or residential institutions, during this period.

For the first time in this report, we are presenting outbreak incidence rates per health board (Table 3). The highest rate was reported from the NEHB region and the lowest from the WHB region.

Table 3. No of IID outbreaks per health board region and rate per health board population

Health Board	No of IID outbreaks	Rate per 100,000 population
ERHA	25	1.78
MHB	7	3.11
MWHB	3	0.88
NEHB	13	3.76
NWHB	3	1.35
SEHB	8	1.88
SHB	9	1.55
WHB	2	0.52

Table 2 presents the non-IID outbreaks reported to HPSC in Quarter 4, 2004. There were two outbreaks of mumps, a suspect respiratory virus outbreak and an outbreak of leptospirosis amongst canoeists on the River Liffey in Dublin.¹

NOTIFICATIONS OF INFECTIOUS INTESTINAL AND ZOO NOTIC DISEASE

The number of notifications of infectious intestinal and zoonotic disease by health board and month for the fourth quarter of 2004 is shown in Table 4.

Table 4. Intestinal Infectious and Zoonotic Disease Notifications Quarter 4 2004 by Health Board

Infectious Intestinal Disease	E	M	MW	NE	NW	SE	S	W	Total
Acute infectious gastroenteritis (incl. rotavirus)	71	29	2	10	9	15	17	5	158
<i>Bacillus cereus</i> foodborne infection/intoxication	0	0	0	0	0	0	0	0	0
Botulism	0	0	0	0	0	0	0	0	0
Campylobacter infection	143	32	1	32	13	40	72	44	377
Cholera	0	0	0	0	0	0	0	0	0
<i>Clostridium perfringens</i> (type A) food-borne disease	1	0	0	0	0	1	1	0	3
Cryptosporidiosis	3	2	1	6	3	9	15	9	48
Enterohaemorrhagic <i>Escherichia coli</i>	1	0	0	4	1	2	1	1	10
Giardiasis	11	1	0	1	0	1	5	1	20
Listeriosis	1	0	0	0	0	0	0	1	2
Noroviral infection	235	23	2	33	0	25	19	3	340
Paratyphoid	0	0	0	0	0	0	0	0	0
Salmonellosis	23	7	5	5	1	7	14	8	70
Shigellosis	6	0	1	0	1	12	1	0	21
Staphylococcal food poisoning	0	0	0	0	0	0	0	0	0
Typhoid	0	0	0	0	0	0	0	0	0
Yersiniosis	2	0	0	0	0	0	1	0	3
Zoonotic Disease									
Anthrax	0	0	0	0	0	0	0	0	0
Brucellosis	0	1	1	0	0	0	0	0	2
Echinococcosis	0	0	0	0	0	0	0	0	0
Leptospirosis	4	1	0	1	0	2	0	0	8
Plague	0	0	0	0	0	0	0	0	0
Q Fever	0	0	0	0	0	0	0	0	0
Toxoplasmosis	4	2	0	0	0	1	0	0	7
Trichinosis	0	0	0	0	0	0	0	0	0
Typhus	0	0	0	0	0	0	0	0	0
Rabies	0	0	0	0	0	0	0	0	0

SALMONELLA ENTERICA

Human salmonellosis (*S. enterica*) is a notifiable disease. The National Reference Laboratory for Salmonella (NSRL) in Ireland was established in 2000 in the Dept. of Medical Microbiology, University College Hospital, Galway. This laboratory accepts *S. enterica* isolates from all clinical and food laboratories in Ireland for serotyping, phage typing and antimicrobial sensitivity testing. Table 5 shows the number of salmonellosis notifications by health board and month for the fourth quarter of 2004. The seasonal trend is broadly similar to the same period for the past three years as depicted in Figure 1 below.

Table 5. Salmonellosis Notifications by Health Board and Month, Q4 2004

Salmonellosis	E	M	MW	NE	NW	SE	S	W	Total
Oct	12	5	2	4	1	2	4	1	31
Nov	7	1	1	0	0	2	6	5	22
Dec	4	1	2	1	0	3	4	2	17
Total	23	7	5	5	1	7	14	8	70

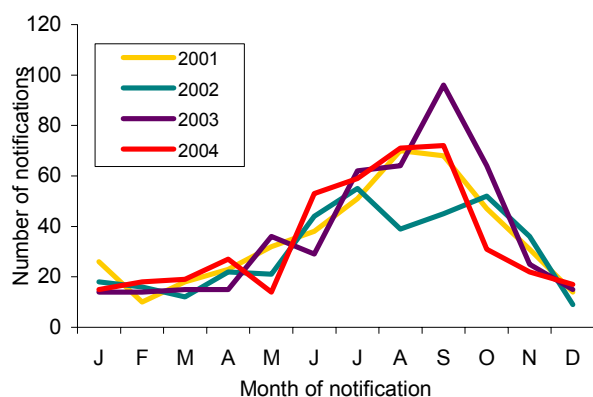


Figure 1. Seasonal Distribution of Human Salmonellosis Notifications, 2001-2003 and to end Q4 2004

Table 6 shows the *S. enterica* isolates typed by the NSRL in the fourth quarter of 2004 (n=68). The commonest human serotype isolated was *S. Enteritidis* (n=25 [37%]) followed by *S. Typhimurium* (n=20 [29%]).

7/68 (10%) of *S. enterica* isolates were reported to be associated with travel outside of Ireland during this quarter.

S. Typhi and S. Paratyphi

There was one case of typhoid and one of paratyphoid reported during Quarter 4. Both were travel-associated. The typhoid case was associated with travel to India, and the paratyphoid case with travel to Nepal.

Table 6. Serotypes of *S. enterica* referred to NSRL in Quarter 4, 2004 (Data are provided courtesy of Prof. Martin Cormican and Dr Geraldine Corbett-Feeney, NSRL).

Serotype	E	M	MW	NE	NW	SE	S	W	Total
Adelaide	0	0	0	0	0	1	0	0	1
Agona	0	0	0	0	0	0	0	1	1
Derby	0	0	0	0	0	1	0	0	1
Dublin	0	0	1	0	0	0	0	0	1
Enteritidis	11	2		2	1	2	5	2	25
Hadar	0	0	0	0	0	1	0	0	1
Haifa	0	0	0	0	0	1	0	0	1
Hvittingfoss	1	0	0	0	0	0	0	0	1
Kentucky	1	0	0	0	0	0	1	0	2
Montevideo	0	0	0	0	0	0	0	1	1
Newport	0	0	1	0	0	0	1	1	3
Paratyphi A	0	0	0	0	0	0	1	0	1
Stanley	0	0	1	0	0	0	0	0	1
Thompson	0	0	0	0	0	0	0	2	2
Typhi	0	0	0	0	0	0	0	1	1
Typhimurium	2	5	1	2	0	2	7	1	20
Unnamed	2	0	0	0	0	0	1	1	4
Virchow	1	0	0	0	0	0	0	0	1
Total	18	7	4	4	1	8	16	10	68

VEROTOXIGENIC *E. COLI* (VTEC)

Illness caused by enterohaemorrhagic *E. coli* (EHEC) became a notifiable disease on January 1st 2004. Under EHEC, all verotoxin positive *E. coli*, and *E. coli* of serogroups O157, O26, O111, O103, O145 regardless of whether verotoxin producers, are reported. Previously, VTEC were notified under the category of 'Food Poisoning (bacterial other than Salmonella)'.

The number of EHEC notified in Q4 2004 is shown in Table 4. Under the legislation, it is required that information on EHEC be gathered and reported. However, because of their clinical and public health significance, it is important to distinguish between those isolates that are verotoxin-producers and those that are not.

Of 10 EHEC notified in this quarter, all were verotoxin positive and all were serogroup O157. No non-O157 VTEC were notified in this quarter.

Enhanced surveillance of VTEC O157

Since 1999, enhanced information has been provided on all cases of verotoxigenic *E. coli* O157. The number of cases reported below is based on date of onset and these figures may differ from the number of cases notified during the quarter.

Table 7. Confirmed VTEC O157 reported to the Enhanced Surveillance System by Health Board and Month, Q4 2004

VTEC O157	E	M	MW	NE	NW	SE	S	W	Total
Oct	0	0	0	4	1	0	1	0	6
Nov	0	0	0	0	0	2	0	0	2
Dec	0	0	0	0	0	0	0	1	1

Total	0	0	0	4	1	2	1	1	9
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Nine confirmed cases of VTEC O157 were reported which had a date of onset between October 1st and December 31st 2004, 3 males, 5 females and 1 sex not reported. This compares with 11 cases in Q4 2003, and 10 cases in Q4 2002 (Figure 2).

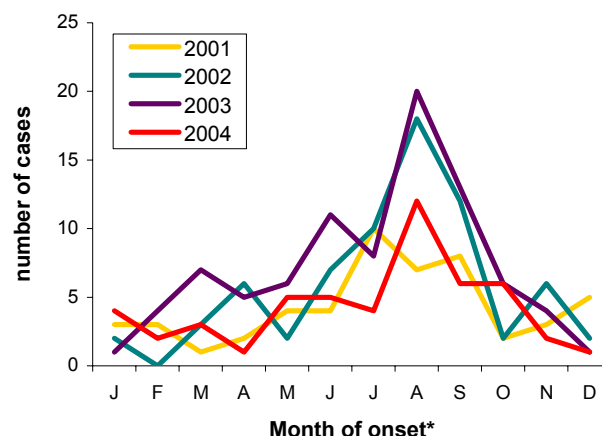


Figure 2. Seasonal Distribution of Confirmed VTEC O157 cases, 2001-2004

*where date of onset is unavailable, e.g. asymptomatic cases, the month of onset of the associated case is used

Outbreaks of VTEC O157

There were 2 family/household outbreaks of VTEC O157 infection reported in Q4, one each in the NEHB (4 cases), and the SEHB (2 cases). The suspected modes of transmission reported were waterborne and person-person spread (Table 1).

CAMPYLOBACTER

Human campylobacteriosis became a notifiable disease on January 1st 2004. Prior to this, human campylobacter infection was notified under the category of 'Food Poisoning (bacterial other than Salmonella)'. The notifications for the fourth quarter of 2004 are shown in Table 8, with the highest number recorded in October.

Table 8. Campylobacter Notifications by Health Board and Month, Q4 2004

Campylobacter Infection	E	M	MW	NE	NW	SE	S	W	Total
Oct	68	17	0	11	8	20	23	17	164
Nov	38	12	1	9	5	7	33	14	119
Dec	37	3	0	12	0	13	16	13	94
Total	143	32	1	32	13	40	72	44	377

CRYPTOSPORIDIUM

Table 9. Cryptosporidiosis Notifications by Health Board and Month, Q4 2004

Cryptosporidiosis	E	M	MW	NE	NW	SE	S	W	Total
Oct	2	0	0	1	2	4	6	2	17
Nov	1	1	1	2	1	5	3	2	16
Dec	0	1	0	3	0	0	6	5	15
Total	3	2	1	6	3	9	15	9	48

Human cryptosporidiosis became a notifiable disease on January 1st 2004. Prior to this, cryptosporidiosis

was notifiable in Ireland only in young children under the category 'Gastroenteritis in Children Under 2'. In Q4 2004, 48 cases of cryptosporidiosis were notified (Table 9). This was as expected given the seasonal distribution of this disease.

Outbreak of cryptosporidiosis

A family outbreak (2 cases) was reported during this quarter in the SEHB. The suspected mode of transmission was person-to-person (Table 1).

NOROVIRUS

Human noroviral infection became a notifiable disease on January 1st 2004. There were 340 cases reported in the fourth quarter of 2004, as shown in Table 10. These data are certainly an under-ascertainment of the true burden of disease due to this pathogen.

Norovirus outbreaks

Norovirus or suspect viral aetiology is the commonest cause of outbreaks of acute gastroenteritis in Ireland. In the fourth quarter of 2004 there were 63 outbreaks confirmed or suspected to be caused by this virus, representing 90% of IID outbreaks reported to HPSC

during this period, and involving at least 2063 people becoming ill, as outlined in Table 1.

Table 10. Norovirus Notifications by Health Board and Month, Q4 2004

Noroviral Infection	E	M	MW	NE	NW	SE	S	W	Total
Oct	10	0	0	0	0	1	2	1	14
Nov	73	0	2	0	0	11	6	0	92
Dec	152	23	0	33	0	13	11	2	234
Total	235	23	2	33	0	25	19	3	340

LISTERIA

Human listeriosis became a notifiable disease on January 1st 2004. Prior to this, listeriosis was notified under the category of 'Food Poisoning (bacterial other than Salmonella)' or 'Bacterial Meningitis' as appropriate.

Two cases of listeriosis were notified in Q4 2004 (Table 4). Both were non pregnancy-associated adult cases.

SHIGELLA

On January 1st 2004, infection with *Shigella* spp. became notifiable as 'Shigellosis'. Prior to this, it was notifiable as 'Bacillary Dysentery'.

During quarter 4 2004, 21 cases of shigellosis were notified (Table 4). This compares with 12 cases notified as bacillary dysentery in quarter 4 in 2003 and 7 in 2002.

15 cases were reported as *S. sonnei*, 4 as *S. flexneri*, and the species was not specified for the remaining 2 cases.

Outbreak of shigellosis

A general outbreak of *S. sonnei* was reported by the SEHB comprising 11 cases. The suspected mode of transmission was reported as person-to-person (Table 1).

GIARDIA

Human giardiasis became a notifiable disease on January 1st 2004. Prior to this, giardiasis was notifiable in Ireland only in young children under the category 'Gastroenteritis in Children Under 2'.

During quarter 4 2004, 20 cases of giardiasis were notified (Table 4). This compares with 4 notifications in Q1, 6 in Q2 and 15 in Q3 2004.

ACUTE INFECTIOUS GASTROENTERITIS incl. ROTAVIRUS

Since 1st January 2004, there is a notifiable disease category termed 'Acute Infectious Gastroenteritis'. This includes all unspecified causes of gastroenteritis and also specifically, gastroenteritis due to rotavirus. It should be noted that acute infectious gastroenteritis is now notifiable in all age groups, unlike the former notifiable disease category of 'Gastroenteritis in children under 2 years'.

During quarter 4 2004, there were 158 notifications of acute infectious gastroenteritis. 121 were reported as rotavirus (Table 11) and 82% of these were under 2 years of age.

Table 11. Rotaviral infections Notified under the Category of 'Acute Infectious Gastroenteritis' by Health Board and Month, Q4 2004

Rotaviral Infection	E	M	MW	NE	NW	SE	S	W	Total
Oct	9	5	0	1	1	2	7	1	26
Nov	21	11	1	3	4	1	4	1	46
Dec	24	12	0	2	2	6	0	3	49
Total	54	28	1	6	7	9	11	5	121

Outbreak of rotavirus

A general outbreak of rotavirus was reported by the ERHA comprising 5 cases (Table 1).

FOODBORNE INTOXICATIONS

Bacillus cereus foodborne infection/intoxication, botulism, *Clostridium perfringens* (type A) foodborne disease and staphylococcal food poisoning became notifiable diseases on January 1st 2004. Prior to this, these diseases were notified under the category of 'Food Poisoning (bacterial other than Salmonella)'.

Three cases of *Clostridium perfringens* (type A) foodborne disease were reported in Q4 2004 (Table 4).

Outbreak of *S. aureus*

A general outbreak of *S. aureus* was reported by the ERHA comprising 3 cases. The suspected mode of transmission was reported as foodborne (Table 1).

NON-IID ZOOONOTIC DISEASES

Non-IID zoonoses now notifiable include: anthrax, brucellosis, echinococcosis, leptospirosis, plague, Q Fever, toxoplasmosis, trichinosis, typhus and rabies. The Q4 2004 notifications of these zoonotic diseases are reported by health board in Table 4.

Two cases of brucellosis were notified, as compared to one in Q4 in both 2002 and 2003. There were also seven notifications of toxoplasmosis in this quarter.

Eight cases of leptospirosis were notified. This compares with four notified in the same period in 2003 and two in Q4 2002.

Leptospirosis outbreak

An outbreak of leptospirosis was reported among canoeists on the river Liffey¹. Four cases were reported, three of whom were hospitalised.

1. O'Meara, M and M. Fitzgerald. 2004. Eurosurv. Wkly. 2004;8(48).

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