Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

hpsc

Epidemiology of Rotavirus in Ireland, 2007

Health Protection Surveillance Centre,
25-27 Middle Gardiner Street, Dublin 1

Table of Contents

Acknowledgements

The authors wish to thank all who have provided data for this report, including specialists in public health medicine, senior/area medical officers, surveillance scientists, clinical microbiologists, medical scientists, infection control nurses, principal/ environmental health officers.

Authorship:
Report written by Ms Mairead Skally and edited by Dr Paul McKeown, HPSC.

Citation:
Epidemiology of Rotavirus in Ireland, 2007.
Health Protection Surveillance Centre, December 2008.

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

Summary

- Rotaviral infections accounted for 2326 of the 2520 Acute infectious Gasteroenteritis (AIG) notifications on the Computerised Infectious Disease Reporting (CIDR) system in 2007.

- The highest burden of illness was evident in the under two age category.

- The HSE-W region had the highest rise in incidence with an increase in CIR of 36.9% since 2006.

Introduction

Rotavirus causes a sporadic, seasonal, often severe gastroenteritis of infants and young children, characterized by vomiting, fever and watery diarrhoea. It is the most common cause of acute gastroenteritis in children worldwide and a frequent cause of diarrhoea associated deaths in developing countries[1]. The World Health Organisation estimates that every child will be infected by rotavirus by the age of five. In developed countries, mortality due to rotavirus is low; however, the morbidity and economic costs associated with infection are significant[2].

Illness is characterised by sudden onset of diarrhoea and vomiting, often with mild fever. Occasionally there is blood in the stools. Symptoms usually last for only a few days but in severe cases hospitalisation may be required due to dehydration. Transmission is usually person-to-person, mainly via the faecal-oral route. Children less than two years of age are most susceptible to infection, although cases are often seen in elderly and immunocompromised adults – particularly in institutional settings. Transmission can be rapid, through person-to-person contact, airborne droplet spread, or contact with contaminated objects such as toys.

Case Definitions

Acute infectious gastroenteritis:

Case classification

Possible: N/A

Probable: Acute onset of diarrhoea and/or vomiting with no known non-infectious cause

Confirmed: If a laboratory diagnosis has been made see definition for specific organism

Note:
Rotavirus, although not specifically listed, should be reported under the category of acute infectious gastroenteritis

Taken from Case Definitions for Notifiable Diseases. Infectious Diseases (Amendment No. 3) Regulations 2003 (SI No. 707 of 2003). Available at http://www.hpsc.ie

Materials and Methods

Acute Infectious Gastroenteritis (AIG) became a statutorily notifiable disease for the first time in January 2004 under the Amendment to the Infectious Diseases Regulations. In this category, cases of rotavirus, *Clostridium difficile* and 'gastroenteritis unspecified' are now notifiable. Prior to 2004, laboratory-based data on rotavirus was captured within the disease category of 'Gastroenteritis in children less than two years of age'.

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 acute infectious gastroenteritis and rotavirus data from CIDR presented in this report are based on data extracted from the CIDR system on 10th September 2008. These figures may differ from those published previously, due to ongoing updating of notification data on CIDR.

Results

Incidence

Given the universal distribution of Rotavirus, the numbers of notifications will always represent an underestimate of the true incidence and are more reflective of habits of presentation to medical practitioners, investigation, notification practices and testing.

That said, there were 2520 notifications of acute infectious gastroenteritis (AIG) in 2007. Rotavirus was the causative organism identified in 2326 (92%) of these, giving a crude incidence rate (CIR) of 54.9 cases per 100,000 population (Table 1). This is the highest rate recorded since Rotavirus became notifiable with an increase from a CIR of 50.0 cases per 100,000 in 2006 to 54.9 in 2007.

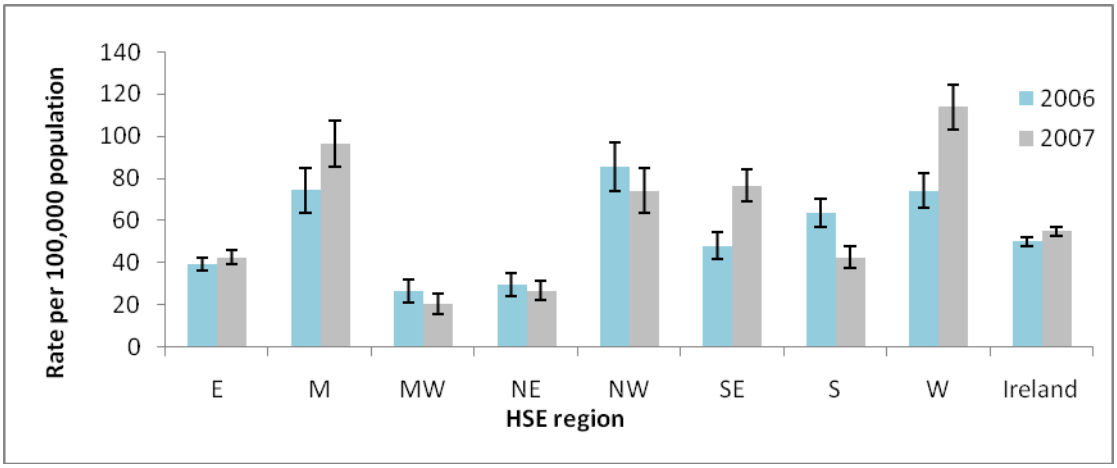
As in previous years, regional variation was observed in the number of cases reported. Figure 1 compares the CIR for each region for both 2006 and 2007. Most notably increases are seen in HSE-M, where the CIR increased by 22.3% HSE-SE, where the CIR increased by 28.6%, and, HSE-W, where the CIR increased by 36.9%

Table 1. Number of cases, CIR of rotavirus infections in Ireland by HSE area, 2007 and total number with crude incidence rate for 2004-2007.

HSE Area	No. of cases	*CIR incl. 95% C.I.	*ASIR incl. 95% C.I.
E	637	42.5 [39.2 - 45.8]	43.5 [40.1 - 46.9]
M	243	96.6 [84.4 - 108.7]	88.3 [77.2 - 99.3]
MW	74	20.5 [15.8 - 25.2]	20.6 [15.9 - 25.3]
NE	106	26.9 [21.8 - 32.0]	23.4 [18.9 - 27.9]
NW	176	74.2 [63.3 - 85.2]	73.2 [62.4 - 83.9]
SE	353	76.6 [68.6 - 84.6]	74.5 [66.7 - 82.2]
S	265	42.7 [37.5 - 47.8]	44.5 [39.1 - 49.8]
W	472	113.9 [103.7 - 124.2]	117.7 [107.1- 128.3]
Total 2007	**2326**	*54.9 [52.6 - 57.1]	
Total 2006	**2112**	***50.0 [48.0 - 52.0]**	
Total 2005	**2251**	***53.1 [50.9 – 55.3]**	
Total 2004	**1600**	***37.8 [35.9 – 39.6]**	

*Rates calculated using 2006 census data and may differ from previously published rates.

Figure 1: Crude incidence rate by region for human rotavirus infections in Ireland, 2006 and 2007.

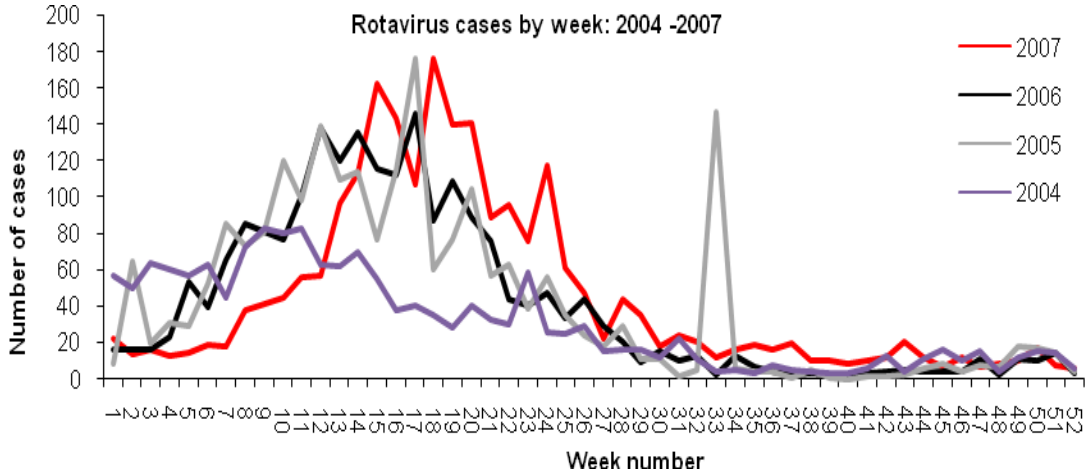


Seasonal distribution

Rotaviral infection has a well documented seasonal pattern in Ireland with peaks in cases occurring each year in early spring[4]. However in 2007, there was a change to this pattern. The usual upsurge did not appear until week 12, a full four weeks later than is usual, and the plateau continued for a month longer than usual. This delay was seen in other countries including the US and Germany.

Analysis of the data by week of notification from 2004 to 2007 is shown in Figure 2. (There is a 'false' second peak seen in 2005 during week 33, 2005 which is attributable to bulk uploading of notifications for the HSE-W region).

Figure 2: Seasonal distribution of rotavirus events by week, 2004-2007 (CIDR).



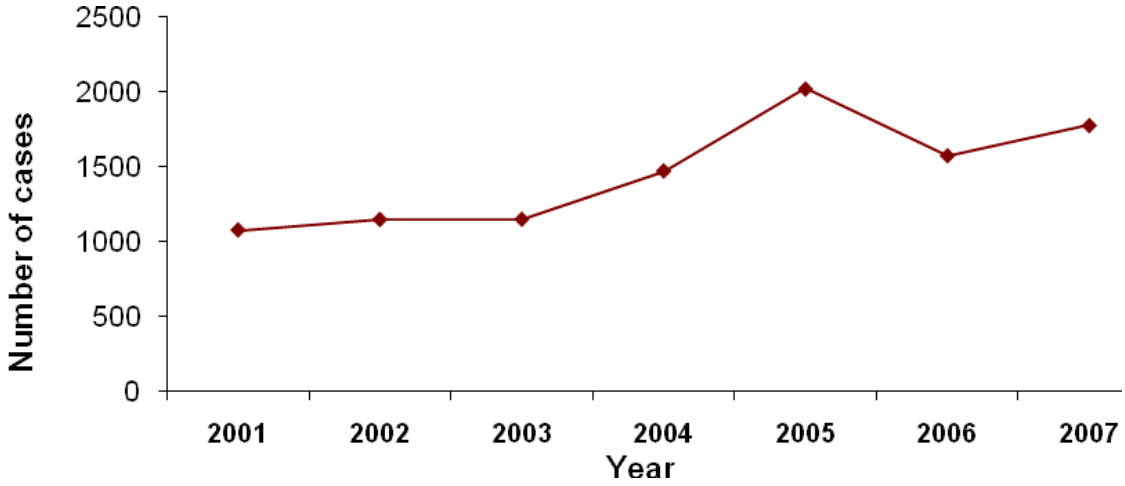
Age

Rotavirus is primarily a paediatric illness, with children generally affected in the first 2-3 years of life. Data from 2004 to 2007 show that the peak incidence of clinical disease occurred in the 6-24 month age group. The majority of infections (n=1780) occurred in children less the two years of age. There has been a continuous increase in the number of cases affecting this age group over recent years (see Figure 3). The CIR increased from 676.6 per 100,000 cases in 2006 to 746.1 per 100,000 cases in 2007(see Table 2). However, as rotavirus only became notifiable since 2004, relative increases are probably reflective of increased awareness amongst reporting clinicians.

Table 2: Age specific incidence rates for rotavirus in Ireland, 2007

Age Group (Years)	Number of cases	Age specific incidence rate
0-4	2255	746.1
5-9	45	15.6
10-14	7	2.6
15-19	0	0.0
20-24	0	0.0
25-34	1	0.1
35-44	1	0.2
45-54	0	0.0
55-64	1	0.2
65+	7	1.5
Unknown	9	
Total	2326	54.6

Figure 3: Number of cases of rotavirus in children less than two years of age by year, 2001 to 2007



Sex distribution

In 2007 males accounted for 1,186 cases (51%); females 1,116 (48%), with 1% of cases unknown. This represented a ratio of males: females of 1.06:1. This was similar to previous years.

Outbreak data

In 2007, there were seven rotavirus outbreaks and one mixed norovirus/rotavirus outbreak notified on CIDR (see Table 3). These eight outbreaks combined led to forty seven cases of illness. The mixed outbreak was the largest outbreak reported with 17 people ill. This outbreak occurred within a crèche with a person-to-person transmission route documented. The second largest outbreak was a rotavirus outbreak occurring within a hospital. Ten patients were affected via a person-to-person transmission route. No additional information such as age or gender was reported on CIDR. Five outbreaks reported in the period 2004 to 2006 resulting in thirty- three cases of illness.

Table 3: Rotavirus Outbreaks notified on CIDR, 2007.

Rotavirus Outbreaks 2007		
Date	**Location**	**Number People Ill**
April	Hospital	10
April	Private House	2
April	Creche	4
December	Private House	2
July	Community	2
June	Private House	2
June	Creche	8

Mixed Rotavirus Outbreaks 2007		
Date	**Location**	**Number People Ill**
May	Creche	17

Discussion

In 2004, rotavirus infections became statutorily notifiable for the first time under the disease category AIG. Prior to 2004, only gastroenteritis cases in children under two years of age were notifiable.

Although 2006 resulted in a slight decrease in the incidence of rotavirus, 2007 figures contradict this and have resulted in a continuation of an increasing trend noted since 2001.

The crude incidence rate (CIR) of rotavirus increased to 54.9 cases per 100,000 (50.0 cases per 100,000 in 2006) and is comparable with the CIR reported in 2005 of 53.1 cases per 1000,000. Regional increases were seen in the HSE-E and more notably in HSE-M, HSE-SE and the HSE-W. These differences are likely to reflect variations in testing and reporting habits in different HSE areas

The overall national rate of infection in Ireland is still considerably higher than that in Northern Ireland (20.6/100,000)[5]. The CIR in England and Scotland for 2007 was not available at time of writing. Meaningful comparisons cannot be made as rotavirus is not statutorily notifiable in Northern Ireland. The CIR in Northern Ireland given in this report is derived from laboratory reports only.

The rotavirus season came a month later than usual in 2007. This occurrence was similar to that seen in other countries.

Rotavirus Vaccines

In 1998, a tetravalent rotavirus vaccine, Rotashield® was recommended for routine vaccination of US infants with 3 doses at ages 2, 4, and 6 months. The vaccine had a greater than 80% efficacy, but significant evidence of association with intussusception appeared within 12 months of introduction and it was withdrawn. Since then, two vaccines, RotaRix® (live oral vaccine from a strain isolated from a case of infantile gastroenteritis) and RotaTeq®

(five reassortant rotaviruses developed from human and bovine parent strains) have undergone trials[6]. A number of countries are examining their need for rotavirus vaccination.

Both appear to be safe and efficacious. They are, however expensive. The European Centre for Disease Prevention and Control is currently reviewing these vaccines from the standpoints of efficacy and safety, cost benefit and public health. They will issue recommendations to Member States later in the year.

References

1. Health Protection Agency – Centre for Infections. http://www.hpa.org.uk/infections/topics_az/rotavirus/data.htm

2. Communicable Disease Surveillance Centre Northern Ireland http://www.cdscni.org.uk/surveillance/Gastro/Rotavirus.htm

3. SCIEH. Gastro-intestinal and foodborne infections: Incidence of viral and protozoal infections reported to HPS in 2006 (Norovirus, Rotavirus, Adenovirus, Astrovirus, Calicivirus, Hepatitis A, Cryptosporidium, Giardia). http://www.documents.hps.scot.nhs.uk/ewr/pdf2007/0705.pdf

4. The Pediatric ROTavirus European CommitTee ('PROTECT'). The paediatric burden of rotavirus disease in Europe. *Epidemiol Infect* 2006; **134**(5): 908-16.

5. Dennehy PH. Rotavirus vaccines--an update. *Vaccine* (2007) **25**:3137-41.

6. Glass RI, Parashar UD, Bresee JS, Turcios R, Fischer TK, Widdowson MA, Jiang B, Gentsch JR. Rotavirus vaccines: current prospects and future challenges. *Lancet.* (2006) **368**:323-32.

7. Parashar UD, Alexander JP, Glass RI. Prevention of Rotavirus Gastroenteritis among infants and children. *MMWR Recomm Rep*. (2006) **55**:1-13. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5512a1.htm