Epidemiology of Human Rotavirus Disease in Ireland

Dr Paul McKeown
Head GZV, HPSC
Surveillance
- Collecting data
- Collating data
- Analysing data
- Communicating information/knowledge to those who need to know

Expert Advice
- Operational Support to the Health System
- Policy advice
- Identifying and developing best practice
- Research – initiation and collaboration
- For professionals in communicable disease control – especially joint training
- Teaching

Research

Training

Infectious Disease Regulations

Partnership – Collaboration – Intersectoral Working
Global Burden Rotavirus

- 24 million cases of RoV annually
- Almost half a million deaths
- 50% in SSA
- 22% in India

Countries with the greatest number of rotavirus deaths among children <5 years of age, 2013.

India 47,082 (22%)
Nigeria 30,800 (14%)
Pakistan 14,700 (7%)
Democratic Republic of the Congo 13,526 (6%)
Angola 9,682 (5%)
Ethiopia 6,817 (3%)
Afghanistan 4,792 (2%)
Chad 4,240 (2%)
Niger 3,978 (2%)
Kenya 3,908 (2%)
Other Countries 75,281 (35%)


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Number of rotavirus deaths (A) and rates of rotavirus mortality (B) among children <5 years of age, by country, 2013.
## Notification Rate, Rotavirus, Ireland 2004-2014

<table>
<thead>
<tr>
<th>Year of notification</th>
<th>Number of notifications</th>
<th>Rate per 100,000 population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>119</td>
<td>0</td>
</tr>
<tr>
<td>2005</td>
<td>224</td>
<td>10</td>
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<tr>
<td>2006</td>
<td>211</td>
<td>15</td>
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<td>2007</td>
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<td>2008</td>
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<td>2010</td>
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<tr>
<td>2013</td>
<td>106</td>
<td>15</td>
</tr>
<tr>
<td>2014</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Global Burden Rotavirus

- Commonest global cause of paediatric gastrointestinal infection
- Causes sporadic, seasonal and occasionally severe gastroenteritis of infants and young children
- Characterised by vomiting, fever and watery diarrhoea.
- Transmission usually person-to-person, mainly via faecal-oral route.
- Children <2 most susceptible to infection - cases are often seen in elderly and immunocompromised adults, particularly in institutional settings
- By 6 years great majority of children will have had at least one episode of rotavirus infection
- Symptoms usually last for only a few days but in severe cases hospitalisation may be required due to dehydration.
Rotavirus in Ireland

• Significant burden on secondary system
• Private GP attendances cover about from 2/3 population
• Potential for greater propensity to attend A/E and thus be admitted
• Current best estimates for RoV notification/hospitalisation are:
  – Notification Rate: 44.9 per 100,000 (total) population
  – Notification Rate: 489 per 100,000 (<5) population
  – Admission Rate: 575 per (<5) 100,000
Rotavirus in Ireland

- Prior to 2004, RoV cases notified under the disease category “Gastroenteritis in children under two years”
- From 2004 to 2010, RoV was notifiable in all age groups under the disease category “Acute Infectious Gastroenteritis” (AIG),
- Became notifiable in its own right under the Infectious Diseases (Amendment) Regulations 2011 (S.I. No. 452 of 2011).
- Since March 2013, RoV notifications from HSE-East are based on laboratory testing results rather than patient episodes.
- Added complication is that notifications from HSE-E may also refer to area of laboratory testing rather than area of patient residence.
Rotavirus in Ireland

- During 2014, 2,061 cases of rotavirus notified
- Corresponds to CIR of 44.9 per 100,000 population
- Represents decrease of 11.9% compared to the mean CIR during 2004-2013
- Between 70-80% of notifications are in children <2 years
- About 40% of notifications are 6-18 months of age
- See about 4-6 outbreaks a year (frequently nosocomial)
Rotavirus 2014 CIR compared to 2004-2013 mean CIR by HSE area (CIDR)
Rotavirus Seasonality: Distribution of Monthly Notifications 2004-2015 (CIDR)
Rotavirus Seasonality: Number of rotavirus notifications by month, 2014 compared to mean monthly number of notifications 2004-2013 (CIDR)
Between 2004 and 2014 there were 159/28028 (7.8%) notifications in those >65
Rotavirus Notifications, Ireland, Notifications in Children, Various Age Categories, 2004-2014 (CIDR)
Rotavirus Vaccines

• Two major safe and effective vaccines available on the global market:
  – RotaTeq® - Merck & Co., Inc.
  – Rotarix® - GlaxoSmithKline (GSK)
• Both orally administered
• Both subject of large-scale trials in a range of countries/conditions
• Both have excellent safety profiles
Eighty-One countries* have introduced RV nationally

*As of May 1, 2016
RV = rotavirus vaccine
Rotavirus Vaccination in Ireland

• Extensive research into cost benefits of RoV vaccination in Ireland
• Few deaths would be prevented but potentially significant cost savings in terms of reduction in GP visits, A/E attendances, hospitalisation
• First estimates suggested that whereas the EU RoV hospitalisation rate was 1 in 17 for those <5
• This has been reassessed as being 575 per 100,000 under five or 1:170
Rotavirus Vaccination in Ireland

• Annual potential healthcare activity savings following implementation of universal RoV vaccination in Ireland (Tilson et al, 2011)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Numbers Prevented</th>
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<tbody>
<tr>
<td>GP Visits</td>
<td>1970</td>
</tr>
<tr>
<td>A/E attendance</td>
<td>3280</td>
</tr>
<tr>
<td>Hospitalisation</td>
<td>2490</td>
</tr>
</tbody>
</table>

• According to Tilson et al in 2011, a vaccination programme was estimated to cost approximately €6.54 million per year but €4.65 million of this would be offset by reducing healthcare resource use
• Ultimately, in 2014, NIAC recommended inclusion of RoV vaccine in primary childhood schedule
• Funding has been secured for the introduction of RoV vaccine in the Primary Childhood Immunisation Programme
Acknowledgements

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• Ms Fiona Cloak, SA HPSC