Hospital-based Surveillance of Rotavirus Gastroenteritis in Latin America

The Latin America Rotavirus Vaccine Study Group
Presented by Miguel O’Ryan
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Institute of Biomedical Sciences
University of Chile
• **Background**
  - RV-associated disease burden data are limited

• **Opportunity**
  - Set up of phase III RV vaccine trial

• **Objective**
  - Describe disease burden of RV GE in Latin America

• **Methods**
  - Prospective, multi-center, hospital-based study in 11 countries
    - **Inclusion Criteria**
      - Children <3 years
      - Treated at hospital site for Gastroenteritis
Study Sites in Latin America

- Ciudad de México (MX)
- Durango (MX)
- Morelos (MX)
- Santo Domingo (DR)
- Panamá (PA)
- Chiriqui (PA)
- Valencia (VE)
- Belem (BZ)
- Mendoza (AG)

Additional locations:
- Estado de México (MX)
- Tegucigalpa (HO)
- Léon (NI)
- Cali (CO)
- Viña del Mar (CH)
- Concepción-Talcahuano
- Condo (VE)
Study Duration by Country

- limitation of study -

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<thead>
<tr>
<th>Country</th>
<th>Nov-02</th>
<th>Dec-02</th>
<th>Jan-03</th>
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Range: 50-220 days; Median: 158 days
# Results

## Baseline Data

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Diarrhea episodes</td>
<td>8,031</td>
</tr>
<tr>
<td>Completed questionnaires and stool samples</td>
<td>81%</td>
</tr>
<tr>
<td>Rotavirus positive/tested (%)</td>
<td>3,122/6,361 (49%)</td>
</tr>
<tr>
<td>Hospitalized patients (inpatients)</td>
<td>2,421 (78%)</td>
</tr>
<tr>
<td>Male : Female ratio</td>
<td>1.4 : 1</td>
</tr>
</tbody>
</table>
Proportion of RV Positive by Month

Mexico (n=1154) / Range 10% - 79%

Dom Rep (n=395) / Range 35% - 80%

Costa Rica (n=635) / Range 11% - 63%

Venezuela (n=301) / Range 8% - 78%
Overall Cumulative Age Distribution of RV+ Children (%)

- 6 months: 18%
- 12 months: 54%
- 24 months: 90%
Cumulative age distribution of rotavirus positive children at **12 months** of age, by country

- Chile
- Costa Rica
- Panama
- Brazil
- Nicaragua
- Argentina
- Mexico
- Honduras
- Dominican
- Venezuela
- **Overall**
### Results

**Treatment RV+ GE**

**Before coming to hospital site**

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Median delay between RV GE onset and hospital admission</td>
<td>2 days</td>
</tr>
<tr>
<td>Received oral hydration (single or combination therapy)</td>
<td>52%</td>
</tr>
<tr>
<td>Received antibiotic therapy</td>
<td>27%</td>
</tr>
</tbody>
</table>

**At hospital site**

<table>
<thead>
<tr>
<th>Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received oral-intravenous hydration (single or combination therapy)</td>
<td>69-77%</td>
</tr>
<tr>
<td>Received antibiotic therapy</td>
<td>24%</td>
</tr>
</tbody>
</table>
Median Duration of Hospitalization Due to RV Gastroenteritis (2 days)
### Outcome of Hospitalized RV+ Cases

<table>
<thead>
<tr>
<th>Status</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Fully recovered at time of discharge</td>
<td>96%</td>
</tr>
<tr>
<td>Sequelae at time of discharge</td>
<td>4%</td>
</tr>
<tr>
<td>Died (2 patients among 3,122 RV+ children)</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Country</td>
<td>G1</td>
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<tr>
<td>-------------</td>
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<tr>
<td>Overall</td>
<td>51%</td>
</tr>
<tr>
<td>Argentina</td>
<td>96%</td>
</tr>
<tr>
<td>Brazil</td>
<td>57%</td>
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<tr>
<td>Chile</td>
<td>21%</td>
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<tr>
<td>Colombia</td>
<td>88%</td>
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<tr>
<td>Costa Rica</td>
<td>30%</td>
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<tr>
<td>Dominican</td>
<td>46%</td>
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<tr>
<td>Honduras</td>
<td>100%</td>
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<td>Mexico</td>
<td>48%</td>
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<td>Nicaragua</td>
<td>28%</td>
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<tr>
<td>Panama</td>
<td>89%</td>
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<tr>
<td>Venezuela</td>
<td>42%</td>
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</table>
Household Costs of RV Gastroenteritis

Collaboration Emory University

- Obtained information family expenditures
- Caregiver cost questionnaire (subset of cases)
  - payments for medical treatment
  - out of pocket expenses (travel, additional supplies)
  - time lost from work
  - qualitative impact on households
Proportion of Parents Who Took Paid Time Off (overall 40%)
Hours Lost From Paid Work
(Median 12 hours)

Nicaragua: 25 hours
Chile: 16 hours
Argentina: 15 hours
Brazil: 15 hours
Venezuela: 14 hours
Mexico: 13 hours
Dominican: 12 hours
Panama: 11 hours
Honduras: 10 hours
Costa Rica: 9 hours
Colombia: 8 hours
Overall: 12 hours
Source of Money to Pay for Illness Associated Expenses

- Borrowed: 51%
- Cut Expenses: 33%
- Used Savings: 24%
- Asked for donation: 13%
- Sold assets: 3%
Impacto de Infección por Rotavirus en Latinoamérica

O’Ryan M, Pérez-Schael et al. Ped Infect Dis J 2001; 20:685-93

Valencia:
Jorge Lizarraga

Santiago:
Sótero del Río

Bs. Aires:
Ricardo Gutiérrez
Impacto de la diarrea aguda total y por rotavirus en **visitas médicas**

<table>
<thead>
<tr>
<th>Lugar</th>
<th>Visitas Médicas:</th>
<th>Número de deposiciones:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Totales</td>
<td>Diarrea aguda</td>
</tr>
<tr>
<td>Argentina</td>
<td>116,596</td>
<td>4,375 (3.8%)</td>
</tr>
<tr>
<td>Chile</td>
<td>123,320</td>
<td>6,599 (5.4%)</td>
</tr>
<tr>
<td>Venezuela</td>
<td>36,787</td>
<td>3,370 (9.2%)</td>
</tr>
</tbody>
</table>

Niños < 36 meses de edad, período estudio 48 meses
Impacto de la diarrea aguda total y por rotavirus en **hospitalizaciones**

<table>
<thead>
<tr>
<th>Lugar</th>
<th>Hospitalizaciones:</th>
<th>Número de deposiciones:</th>
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<tbody>
<tr>
<td></td>
<td>Totales</td>
<td>Diarrea aguda</td>
</tr>
<tr>
<td>Argentina</td>
<td>2.550</td>
<td>56 (2.2%)</td>
</tr>
<tr>
<td>Chile</td>
<td>4.773</td>
<td>283 (5.9%)</td>
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<tr>
<td>Venezuela</td>
<td>8076</td>
<td>1071 (13%)</td>
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</tbody>
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Impacto de Enfermedad Por Rotavirus Extrapolada

O’Ryan M, Pérez-Schael et al. Ped Infect Dis J 2001; 20:685-93

<table>
<thead>
<tr>
<th>País</th>
<th>Visitas Médicas</th>
<th>Hospitalizaciones</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Totales</td>
<td>Pob &lt; 3 años</td>
</tr>
<tr>
<td>Argentina</td>
<td>106.000</td>
<td>1/20</td>
</tr>
<tr>
<td>Chile</td>
<td>57.761</td>
<td>1/22</td>
</tr>
<tr>
<td>Venezuela</td>
<td>96.000</td>
<td>1/18</td>
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</tbody>
</table>
Rotavirus causes a highly significant proportion of diarrhea cases among children < 3 years of age in Latin America:
- 40-50% of cases requiring hospitalization
- 30-40% of cases requiring ER visit

Seasonal variations and age prevalence variations among countries.
- Small proportion (<20%) occurring in < 6 months of age.

Marked overuse of antimicrobials for rotavirus diarrhea, significant need for IV rehydration.

Low mortality as expected for a prospective surveillance study

Different serotype patterns across countries within the same season
- Low circulation of G2 types during the period
- Emerging G9 in certain countries

Households in Latin America are economically affected by RV GE
- additional point to consider outside “health care perspective”