The WHO coordinated rotavirus sentinel hospital surveillance network was formed in 2008; this bulletin presents surveillance data as reported by WHO Member States from July 2012 to June 2013.

During this time period, 65 WHO Member States reported data to the WHO (Figure 1, Table 1). Sixty-five percent of these Member States were based in two WHO Regions: AFR and AMR. Globally, over half of the reporting Member States and the 189 reporting sites were eligible for surveillance funding from the GAVI Alliance.

A total of 69,663 children <5 years of age were hospitalized for treatment of acute gastroenteritis and enrolled in surveillance (Table 1). Almost half of these children were reported from the Region of the Americas.

Three Regions (African, European, and South East Asian) met the 90% target for percent of suspect cases with a stool specimen collected within 2 days of hospital admission. In the Eastern Mediterranean Region, some sites with a large case volume only collect stool specimens from a sample of cases as a cost saving measure.

Table 1: Number of countries and sites reporting data and number of children <5 years of age hospitalized for the treatment of acute gastroenteritis and enrolled in the WHO Global Rotavirus Surveillance Network, July 2012—June 2013

<table>
<thead>
<tr>
<th>WHO Region</th>
<th>Number of Member States Reporting (% GAVI)</th>
<th>Number of Sentinel Sites Reporting (% GAVI)</th>
<th>Number of Children &lt;5 Years of Age Hospitalized and Enrolled* (% Global Cases Enrolled)</th>
<th>Number of Stool Specimens Collected within 2 Days of Admission (% of Regional Cases Enrolled) (Target=90%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR</td>
<td>26 (92)</td>
<td>46 (91)</td>
<td>10,433 (15)</td>
<td>9,395 (90)</td>
</tr>
<tr>
<td>AMR</td>
<td>16 (25)</td>
<td>79 (24)</td>
<td>33,867 (49)</td>
<td>11,180 (33)</td>
</tr>
<tr>
<td>EUR</td>
<td>6 (100)</td>
<td>11 (100)</td>
<td>9,640 (14)</td>
<td>9,583 (99)</td>
</tr>
<tr>
<td>SEAR</td>
<td>4 (100)</td>
<td>10 (100)</td>
<td>3,721 (6)</td>
<td>3,718 (100)</td>
</tr>
<tr>
<td>WPR</td>
<td>5 (80)</td>
<td>14 (50)</td>
<td>2,891 (4)</td>
<td>2,510 (87)</td>
</tr>
<tr>
<td>Global</td>
<td>65 (71)</td>
<td>189 (56)</td>
<td>69,663 (100)</td>
<td>43,038 (62)</td>
</tr>
</tbody>
</table>

*Any child aged 0-59 months admitted for treatment of acute (i.e. 14 days) watery gastroenteritis/diarrhoea to a sentinel hospital conducting surveillance. Excluded are children with bloody diarrhoea and children transferred from another hospital.

The laboratory is a critical component of rotavirus surveillance.

**Rotavirus Detection**

Rotavirus detection is only calculated for sentinel sites that meet both of the following criteria:

1. Tested stool specimens from ≥100 children <5 years of age enrolled in surveillance during the 12 month period; and
2. Reported data for each month of the 12 month period.

Due to the seasonality of rotavirus disease, annual rotavirus detection can only be calculated for sentinel sites that have provided data to WHO for all 12 months. During this reporting period, rotavirus detection is calculated for July 2012 to June 2013.

**Table-2: Numbers of reporting Member States, sentinel hospitals, and children <5 years of age hospitalized for treatment of acute gastroenteritis in sentinel hospitals that tested stool specimens from ≥100 cases and reported data each month, July 2012—June 2013**

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of Member States Reporting</th>
<th>Number of Sentinel Sites Reporting</th>
<th>Number of Children &lt;5 Years of Age Hospitalized and Enrolleda (% of Global Cases Enrolled)</th>
<th>Number of Stool Specimens Tested (% of Regional Cases Enrolled) (Target=90%)</th>
<th>Number of Total Rotavirus Positive (% of Regional Stool Specimens Tested)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR</td>
<td>9</td>
<td>12</td>
<td>6,098 (13)</td>
<td>5,376 (88)</td>
<td>1,849 (34)</td>
</tr>
<tr>
<td>AMR</td>
<td>8</td>
<td>31</td>
<td>23,226 (49)</td>
<td>8,604 (37)</td>
<td>1,935 (22)</td>
</tr>
<tr>
<td>EMR</td>
<td>2</td>
<td>7</td>
<td>5,478 (11)</td>
<td>4,371 (80)</td>
<td>1,116 (26)</td>
</tr>
<tr>
<td>EUR</td>
<td>6</td>
<td>10</td>
<td>9,552 (20)</td>
<td>9,509 (100)</td>
<td>2,739 (29)</td>
</tr>
<tr>
<td>SEAR</td>
<td>4</td>
<td>7</td>
<td>3,437 (7)</td>
<td>2,253 (66)</td>
<td>708 (31)</td>
</tr>
<tr>
<td>Global</td>
<td>29</td>
<td>67</td>
<td>47,780 (100)</td>
<td>30,113 (63)</td>
<td>8,347</td>
</tr>
</tbody>
</table>

*Any child aged 0-59 months admitted for treatment of acute (i.e. 14 days) watery gastroenteritis/diarrhoea to a sentinel hospital conducting surveillance. Excluded are children with bloody diarrhoea and children transferred from another hospital.

Data from the WHO-coordinated Global Rotavirus Surveillance Network as at April 2014.

Among the 65 Member States that reported data to WHO during the 12 month period of July 2012 to June 2013, 29 (45%) Member States had at least one sentinel site that met both criteria to calculate rotavirus detection (Table 2). Globally, 67 (35%) of the 189 sentinel sites met both inclusion criteria. Forty-six percent of sites meeting both criteria were in AMR.

The lowest Regional median rotavirus detection (20%) was in the 8 AMR Member States, of which 7 had introduced rotavirus vaccine (Figure 2). The largest Regional median rotavirus detection was in the Southeast Asian Region (35%), and the largest percentage reported by a Member State was from Myanmar (47%). Global rotavirus detection was not calculated since WPR sites did not meet the inclusion criteria and were thus excluded.

Globally, 13 (45%) of the 29 Member States with sentinel sites meeting both criteria had introduced rotavirus vaccine. Median rotavirus positivity was 22% in vaccine introducing countries and 30% in non-vaccine using Member States excluding Chile which did not detect any rotavirus positive stool specimens. Further assessment of surveillance practices in Chile is recommended to better understand this finding.

More detailed analysis of surveillance data is required to assess trends in rotavirus detection, particularly pre- and post-rotavirus vaccine introduction. Analysis should first evaluate the consistency of case enrolment, specimen collection, and testing over time. Since children aged <1 year are targeted for vaccination, age stratified analysis of time trends should consider using age groups of <1 year, 1 to <2 years, and 3 to <5 years.

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*Structure of rotavirus*

Figure 2: Annual rotavirus detection positivity for sentinel hospitals that tested stool specimens from ≥100 children and reported data each month, by WHO Member State, July 2012—June 2013

Sudan

The Ministry of Health, Sudan began rotavirus sentinel hospital surveillance in April 2007, in response to a strong need to have national data to estimate the burden of rotavirus disease in the country.

Following data collection and careful analysis, Sudan introduced rotavirus vaccine into the national immunization programme in July 2011. Rotavirus vaccine coverage was 75% in 2012 and 80% in 2013.

During the two pre-vaccine introduction years of 2009 and 2010, seasonality of rotavirus detection included two disease peaks in March to April and October to November.

Following rotavirus vaccine introduction, March to April seasonal peaks in 2012 and 2013 have diminished. Longer term consistent surveillance will be required to determine if this decreasing trend will continue and if the October to November peak will also diminish. This more detailed analysis will be conducted by the Ministry of Health and will include careful assessment of the consistency of surveillance practices over time.

Dr Amani (right of photo, former EPI Manager, Sudan) and Dr Teleb (left of photo, WHO EMRO)

“Rotavirus surveillance data has helped us decide to introduce rotavirus vaccine... sharing the data with pediatric associations has been helpful to rationalize the use of antibiotics.” Dr Amani, Sudan’s EPI Manager in 2011
June 2012 to July 2013 Data

Sixty-five Member States reported data to WHO during this time period. Of these, 29 (45%) Member States had at least one sentinel site that met criteria to calculate rotavirus positivity, and 13 (45%) of these Member States had introduced rotavirus vaccine. The median global rotavirus detection could not be calculated for this reporting period as the sentinel sites in the Western Pacific Region countries did not meet the inclusion criteria. Member States with sites meeting inclusion criteria and that continue consistent surveillance practices are well poised to assess changes in disease over time including pre– and post-vaccine introduction.

Limitations and Explanations

Surveillance data has limitations and should be cautiously interpreted. One limitation is that these data are from sentinel hospitals associated with the network, which are usually located in large urban areas. Hence, these patients and data may not be representative of the entire country. Surveillance practices must be consistent over time in order to compare pre– and post-vaccine introduction data. Member States and sentinel sites are best placed to judge the consistency of surveillance. Thus, the ability to interpret data at the global level is limited.

Next Steps: Following the 2013 Strategic Review

In 2013, WHO conducted a strategic review to assess surveillance network performance, provide recommendations for strengthening the network, and assess the network’s utility as a platform for other vaccine-preventable disease surveillance. The review’s findings were summarized in the previous bulletin (http://www.who.int/immunization/monitoring_surveillance/resources/who_rv_bulletin_nov2013.pdf) and were published in WHO’s WER (http://www.who.int/wer/2013/wer8930.pdf) and CDC’s MMWR (http://www.who.int/immunization/monitoring_surveillance/data/rota_mmwr_july2014.pdf) in July 2014.

Consistent surveillance practices are required to assess trends in disease epidemiology before and after vaccine introduction. To support Member States in assessing surveillance quality, WHO has in 2014 begun quarterly determination of agreed process and performance indicators (http://www.who.int/entity/immunization/monitoring_surveillance/resources/global_framework_indicators_sites_labs.xls) for each sentinel site.

Regular monitoring and supervision of activities at the country level remains the most important activity to ensure high-quality and consistent surveillance practices over time. Regular analysis of surveillance data can help detect any anomalies in surveillance practices that might lead to false data. Such anomalies may include deviation from case enrolment and specimen collection protocols, and stock-outs of laboratory rotavirus testing kits that result in time periods without rotavirus detection.

Moving forward, the Global Rotavirus Surveillance Network has developed a solid infrastructure in many countries to enable generation of reliable data to assess trends in rotavirus disease epidemiology before and after vaccine introduction. As recommendations from the strategic review are implemented during 2014, the network should produce even higher quality data in the coming years.

WHO gratefully acknowledges the dedicated efforts of the numerous individuals and organizations involved with compiling surveillance information, including Ministries of Health, sentinel hospitals, as well as the network of national, regional, and global, reference laboratories. WHO also gratefully acknowledges the financial support from GAVI that is provided eligible countries.