**SPECIAL POINTS OF INTEREST:**

- 61 WHO Member States reported data during January 2012-June 2013
- 104 (70%) sites are from GAVI-eligible countries.
- A total of 149 sentinel sites reported data.
- 61 (77%) Member States reported data to WHO.
- 36 Member States that reported data have at least one site receiving targeted support from WHO.

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**Global IB-VPD Sentinel Hospital Surveillance Network**

Figure 1: WHO Member States that reported data to the Global Invasive Bacterial—Vaccine Preventable Disease (IB-VPD) Surveillance Network, July 2012 to June 2013.

The WHO coordinated IB-VPD sentinel hospital surveillance network was formed in 2008; this bulletin presents a summary of case-based surveillance data as reported by WHO Member States in AFR, EMR, EUR and WPR, for the period from July 2012 to June 2013 and aggregated data from Member States in AMR and SEAR for January to December 2012. Sixty-one WHO Member States reported data to the WHO (Figure 1, Table I).

Table I: Number of countries and sites reporting data and number of children <5 years of age hospitalized for the treatment of suspected meningitis, pneumonia and sepsis in the WHO Global IB-VPD Surveillance Network, July 2012—June 2013 and January-December 2012

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of Member States reporting data to WHO (% GAVI)</th>
<th>Number of sites reporting data to WHO (% GAVI)</th>
<th>Number of children &lt;5 years of age enrolled with suspected meningitis cases (total global cases)</th>
<th>Number of enrolled suspected meningitis cases with cerebrospinal fluid collected (% of total global cases)</th>
<th>Number of children &lt;5 years of age enrolled with suspected pneumonia &amp; sepsis cases (total global cases)</th>
<th>Number of enrolled suspected pneumonia cases with blood collected (% of total global cases)</th>
<th>Total number of meningitis, pneumonia and sepsis cases enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR</td>
<td>31 (90)</td>
<td>48 (92)</td>
<td>9,567 (34)</td>
<td>9,565 (100)</td>
<td>1,031 (3)</td>
<td>ND</td>
<td>10,598</td>
</tr>
<tr>
<td>AMR</td>
<td>11 (27)</td>
<td>38 (21)</td>
<td>11,149 (39)</td>
<td>10,156 (91)</td>
<td>19,036 (59)</td>
<td>6961 (37)</td>
<td>30,185</td>
</tr>
<tr>
<td>EMR</td>
<td>6 (67)</td>
<td>26 (73)</td>
<td>3,433 (12)</td>
<td>3,212 (94)</td>
<td>1,132 (3)</td>
<td>816 (72)</td>
<td>4,565</td>
</tr>
<tr>
<td>EUR</td>
<td>6 (83)</td>
<td>14 (79)</td>
<td>608 (2)</td>
<td>608 (100)</td>
<td>3 (0)</td>
<td>3 (100)</td>
<td>611</td>
</tr>
<tr>
<td>SEAR</td>
<td>4 (75)</td>
<td>9 (89)</td>
<td>3229 (12)</td>
<td>1,554 (47)</td>
<td>9,907 (30)</td>
<td>3,643 (37)</td>
<td>13,236</td>
</tr>
<tr>
<td>WPR</td>
<td>3 (100)</td>
<td>14 (100)</td>
<td>265 (1)</td>
<td>265 (100)</td>
<td>1,402 (4)</td>
<td>1,402 (100)</td>
<td>1,667</td>
</tr>
<tr>
<td>Total</td>
<td>61 (77)</td>
<td>149 (75)</td>
<td>28,351 (100)</td>
<td>25,360 (89)</td>
<td>32,511 (100)</td>
<td>12,825 (39)</td>
<td>60,862</td>
</tr>
</tbody>
</table>

Notes: Summary of data reported to WHO HQ is for January 2012-June 2013 (AFR, EMR, EUR, WPR) and 2012 (AMR, SEAR). Brazil conducted laboratory based surveillance and accounts for 10,103 of the suspected meningitis cases enrolled in AMR.

*Any child aged 0-59 months admitted to a sentinel hospital conducting surveillance with sudden onset of fever (> 38.5 °C rectal or 38.0 °C axillary) and one of the following signs: neck stiffness, altered consciousness with no other alternative diagnosis, or other meningeal sign; Or every patient a case was classified as suspect meningitis based on 1) admission diagnosis; 2) clinical characteristics; or 3) had a lumbar puncture performed.

**Any child aged 0-59 months admitted to a sentinel hospital conducting surveillance, demonstrating a cough or difficulty breathing and displaying fast breathing when calm (defined by age): 1.Age 0 to <2 months: 60 breaths/minute or more; 2.Age 2 to <12 months: 50 breaths/minute or more; 3.Age 12 to <59 months: 40 breaths/minute or more

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Among Member States reporting data to WHO, 31 (51%) were located in the African Region. Seventy percent of the sentinel sites that reported data were located in a GAVI-eligible country.

A total of 60,862 children <5 years of age were hospitalized for treatment of suspect meningitis, pneumonia or sepsis and enrolled in surveillance (Table 1). Seventy-three percent of the enrolled suspect meningitis cases were from the WHO Regions of the Americas and Africa. Among the enrolled children with suspect pneumonia and sepsis, 61% and 32% were from the Regions of the Americas and South-East Asia, respectively.

The categorization of children in this network as either suspect meningitis or pneumonia/sepsis is limited by incomplete admission diagnosis and clinical characteristics data. This analysis relied on composite variables; therefore cases may be misclassified.

In early 2014, sites that reported data were assessed based on performance for 2008-2012. The assessment was based on consistency of reporting (annual number of months) and the number of cases enrolled at each site. Some GAVI-eligible sites were selected to receive targeted support in 2014 and 2015, which includes financial resources and technical assistance. During this reporting period, 36 Member States that receive targeted support reported data to WHO (Figure 1).

**Analysis of Case-Based Data**

The case-based data provided by four regions was used to calculate the percent of suspect cases classified as meeting the WHO case definition for probable bacterial meningitis (PBM)*. The monthly proportion of PBM cases remained relatively consistent, ranging from 46-64% (Figure 3). Case-based data is critical to monitoring trends in the tests used at each site and the added value of providing additional diagnostic laboratory tests. WHO is moving towards collecting standardized case-based data from all regions through the development of standard variables and a web-based platform for data entry and management.

*WHO Case Definition for Probable Bacterial Meningitis: A suspected meningitis case with CSF examination showing at least one of 1) Turbid appearance; 2) Leukocytosis (> 100 cells/mm3); 3) Leukocytosis (10-100 cells/mm3) AND either an elevated protein (>100 mg/dl) OR decreased glucose (< 40 mg/dl)

Data from the WHO-coordinated Global IB-VPD Surveillance Network as at April 2014.
WHO recommends that cerebrospinal fluid (CSF) specimens from children with suspected meningitis are tested at the hospital laboratory by culture, Gram stain, and a rapid test. Blood from suspect pneumonia and sepsis cases should be tested by culture and Gram stain. Availability of diagnostic tests varies among sites. Within the IB-VPD network, specimens are also tested by PCR at a reference laboratory to confirm diagnosis. The percent of children tested by any laboratory method increased in early 2013, which has resulted in a corresponding rise in the number of laboratory confirmed cases in the network (Figure 4).

During this time period, 467 laboratory confirmed meningitis cases for *Streptococcus pneumoniae* (Spn), *Neisseria meningitides* (Nm) or *Haemophilus influenzae* (Hi) were reported in the four regions with case-based data. Sixty-one percent of confirmed cases were in the African Region. Globally, Spn was the main pathogen detected comprising 73% of positive cultures and 61% of positive PCR results. Regional variation in pathogens was detected. In the European Region, the main pathogen identified by all tests was Nm.

Among children enrolled with suspect pneumonia and sepsis, 14 laboratory confirmed cases for Hi or Spn were reported in regions with case-base data. An additional 80 and 94 laboratory confirmed cases were detected in AMR and SEAR, respectively.

WHO is in the process of transitioning to case-based data reporting in all regions. Thus additional detailed analyses will be performed in the near future to further characterize the network’s performance. This analysis may likely be limited by the quality and completeness of the data.

**Online Data Entry and Management Tool**

In late 2013, WHO and external consultants began the process of developing an online, case-based data entry and management system for WHO IB-VPD and rotavirus surveillance. A system has been developed and is being piloted in AMR (El Salvador and Nicaragua) and SEAR (Bangladesh) during 2014.

The online surveillance data management system would contribute to a more cohesive system and one, integrated network. Benefits of this system include standardized variables, reporting and analyses; more timely analysis of data; better linkages between reference and sentinel site laboratory data; as well as better ability to monitor and improve data quality in real-time.

**Figure 4:** Number of children <5 years of age enrolled with suspect meningitis with a laboratory confirmed bacterial pathogen detected by any diagnostic testing method and percent tested by any confirmatory laboratory test* in regions reporting case-based data (AFR, EMR, EUR, WPR), July 2012—June 2013

*Confirmatory laboratory tests include: 1) Culture (CSF or blood); 2) Rapid Diagnostic Test (Immunochromatographic or Latex Agglutination tests); 3) Polymerase Chain Reaction (PCR)

**Figure 5:** Example of the dashboard display of case-based summary data of the online IB-VPD and rotavirus surveillance data entry and management tool currently being piloted in AMR and SEAR.
Conclusions, Limitations and Next Steps

Conclusions from 2012-2013 Data

Sixty-one Member States reported data to WHO during the time period reported in this bulletin. Of these, 36 (59%) Member States had at least one sentinel site that is receiving targeted financial and technical support. Forty-six (75%) of countries reporting data have introduced PCV10 or PCV13. Analysis of PCV impact requires two years of stable and high-quality pre- and post-introduction data. With continued improvement of the surveillance network and data quality, it is hopeful that the network can contribute to the knowledge of PCV impact.

Limitations and Explanations

Surveillance data has limitations and should be cautiously interpreted. Data quality is affected by how long the site has been active since it takes 1-2 years for surveillance sites to become fully operational. “Zero reporting” has not yet been initiated by the surveillance network. This requires surveillance sites to report months where they enrolled zero cases instead of not reporting. The consistency of surveillance in this network therefore may be underestimated. The availability of laboratory diagnostic tests varies between sites which influences detection rates and limits ability to make comparisons across sites in the network. Missing data is also a limitation in the surveillance network. Composite variables that utilize existing data to fill in gaps are required to globally analyze surveillance data. This can lead to over or under estimations of certain indicators (i.e. CSF collected based on any laboratory results being available may underestimate the number of children that had an LP). In 2014, a list of core variables for IB-VPD surveillance was introduced to facilitate standardization of data collection across regions.

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_ibvpd_bulletin_nov2013.pdf) and will be shared in WHO’s WER and CDC’s MMWR in December 2014.

Consistent surveillance practices are required to assess disease epidemiology before and after vaccine introduction. To support Member States in assessing surveillance quality, WHO has begun to evaluate agreed process and performance indicators for each sentinel site on a quarterly basis (http://www.who.int/immunization/monitoring_surveillance/resources/NUVI/en/). In addition to the performance analysis, an annual in-depth analysis of higher performing sites will look more closely at trends at the sentinel site level.

The global IB-VPD surveillance network implemented recommendations from the strategic review in 2014. Moving forward, 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.

Acknowledgements

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

More Information

For surveillance: http://www.who.int/immunization/monitoring_surveillance/resources/NUVI/en/
For IBD disease and vaccine: http://www.who.int/immunization/monitoring_surveillance/burden/VPDs/en/
The World Health Organization (WHO) produces this bulletin twice a year to share data and activities from the WHO-coordinated global sentinel hospital surveillance network with partners at the national, regional, and global levels.
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