This first twice-yearly Invasive Bacterial Diseases (IBD) Global Surveillance and Information Bulletin describes sentinel surveillance for invasive bacterial diseases among hospitalized children under five years of age. IBD surveillance is used to provide data guiding use and impact of vaccines that target *Haemophilus influenzae* type b (Hib), *Streptococcus pneumoniae*, and *Neisseria meningitidis*. These organisms cause diseases with a variety of clinical presentations including those of the brain (meningitis), lung (pneumonia), and bloodstream (sepsis) among others. These bacteria cause a significant burden of disease. For example, acute respiratory disease, mainly pneumonia, accounts for 17% of the 10.4 million deaths among children <5 years of age globally and *Streptococcus pneumoniae* and Hib account for close to 50% of pneumonia deaths.¹

**The WHO Invasive Bacterial Diseases (IBD) Surveillance Network**
During the past years, a number of IBD surveillance sites and networks were established to gather data to assess disease burden, estimate vaccine effectiveness, and determine which specific serotypes of *Streptococcus pneumoniae* and *Neisseria meningitides* that cause the majority of disease in each WHO region and to monitor changes in strain prevalence over time and in response to vaccine introduction. During 2008, some existing surveillance networks were transitioned to a network coordinated by WHO, with financial support targeted to Global Alliance for Vaccines and Immunisation (GAVI) eligible countries. Each participating country has at least one “core sentinel” surveillance site where hospitalized children <5 years of age with signs or symptoms of bacterial meningitis have their cerebrospinal fluid assessed by diagnostic laboratory analysis for the presence of bacteria. All sites use standardized definitions, collect a core dataset, and use standardized quality-controlled laboratory methods. The current WHO Meningitis/Encephalitis system includes 46 WHO Member States (page 3). Some “added” surveillance sites perform additional diagnostic testing including culturing blood for bacterial infection (sepsis). Further specialized “enhanced population-based” sites will collect data to determine the number of children with these diseases in a defined population (disease incidence) and possibly collect information related to pneumonia.

**Detection of Invasive Bacterial Diseases**  (see page 3 for detailed data)
During 2008, more than 22,000 children <5 years of age with suspected invasive bacterial disease were enrolled in the WHO IBD surveillance system worldwide and assessed for possible meningitis. Approximately 14% of the children with probable bacterial meningitis had disease likely caused by an organism against which there is a

protective vaccine (5.7% to *Neisseria meningitidis* 5.2% were due to *Streptococcus pneumoniae*, and 2.8% to *Haemophilus influenzae*\(^2\).) Twenty-three percent of all hospitalized children with probable bacterial meningitis subsequently died.

Overall, 32 (70%) of the 46 countries participating in the IBD surveillance system included Hib vaccine in their vaccination schedule during 2008. Among the 22 WHO Region of Africa (AFR) participating countries, 12 countries introduced Hib vaccine prior to 2008, 4 introduced the vaccine in 2008, and 6 did not use Hib vaccine\(^3\). Excluding countries that introduced vaccine during 2008\(^4\), *Haemophilus influenzae* was detected in 13.8% of children with probable bacterial meningitis in AFR countries not using Hib vaccine, and in only 6.4% of children with probable bacterial meningitis in AFR countries using Hib vaccine (Table 1). Since Ministries of Health collect data on the vaccination status of these children, additional and more detailed analysis will likely be forthcoming from these countries.

Table 1. *Haemophilus influenzae* type b (Hib) vaccine use, and probable bacterial meningitis due to *Haemophilus influenzae*, WHO Region of Africa\(^3\), 2008.

<table>
<thead>
<tr>
<th>Hib Vaccine Use</th>
<th>Number of Countries</th>
<th>Number of Reporting Sites</th>
<th>Total Number of Meningitis Cases with Probable Bacterial Meningitis</th>
<th>Total Number of Probable Bacterial Meningitis cases with HI Identified</th>
<th>% of Probable Bacterial Meningitis Cases with HI Identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>12</td>
<td>15</td>
<td>636</td>
<td>41</td>
<td>6.4</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>8</td>
<td>261</td>
<td>36</td>
<td>13.8</td>
</tr>
</tbody>
</table>

**Spotlight on GAVI, Hib Initiative, and Transition of IBD Surveillance to WHO**

The GAVI Alliance (www.gavialliance.org) has supported the establishment and implementation of many of the current IBD surveillance sites through the Pneumo Accelerated Development and Introduction Plan (PneumoADIP), (www.preventpneumo.org). Since 2000, the GAVI global health partnership has brought together public and private sectors in support of global immunization. The Bill & Melinda Gates Foundation has been the leading private sector member of this Alliance.

The Hib Initiative (www.hibaction.org), financed by GAVI, has supported surveillance networks for meningitis and pneumonia caused by *Haemophilus influenza* type b. The Hib Initiative has united experts from Johns Hopkins Bloomberg School of Public Health, the London School of Hygiene and Tropical Medicine, the Centers for Disease Control and Prevention and WHO in this effort.

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\(^2\) Serotype data is currently unavailable. Based on previous evidence, over 90% of HI cases are expected to be Hib (http://whqlibdoc.who.int/hq/2009/who_ivb_09.02_eng.pdf).

\(^3\) All 6 countries will introduce Hib vaccine by the end of 2009.

\(^4\) The 4 countries that introduced vaccine during 2008 are excluded in an attempt to ensure a true comparison of vaccine using countries with countries not using vaccine.

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### Meningitis/Encephalitis Surveillance

#### Countries Participating in the WHO Network, 2008

<table>
<thead>
<tr>
<th>Region</th>
<th>Total No. of Reporting Sites</th>
<th>Number of suspected meningitis cases</th>
<th>Number of hospitalized cases that met the eligibility criteria for typing</th>
<th>No. (%) of all isolates forwarded to regional reference laboratory</th>
<th>Number of cases that had blood cultures performed</th>
<th>No. (%) of cases with a blood culture identified by culture or latex</th>
<th>No. (%) of all blood cultures with a bacterial pathogen identified by culture or latex</th>
<th>No. (%) of cases with probable bacterial meningitis cases with HI identified by culture or latex</th>
<th>No. (%) of probable bacterial meningitis cases with meningococcus identified by culture or latex</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR</td>
<td>22</td>
<td>6,989</td>
<td>8,640</td>
<td>8,583</td>
<td>99</td>
<td>90</td>
<td>100</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>AMR</td>
<td>107</td>
<td>7,089</td>
<td>8,323</td>
<td>8,061</td>
<td>97</td>
<td>90</td>
<td>100</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>SEAR</td>
<td>1,104</td>
<td>485</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>90</td>
<td>100</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>12,109</td>
<td>17,451</td>
<td>20,151</td>
<td>18,940</td>
<td>99</td>
<td>90</td>
<td>100</td>
<td>80</td>
<td>90</td>
</tr>
</tbody>
</table>

#### Performance indicator

**Probable bacterial meningitis – a suspected case with examination of CSF showing at least one of the following 1) turbid appearance, 2) WCC (>100 cells / mm3), 3) WCC (10-100 cells / mm3) AND either an elevated protein (>100 mg/dl) or decreased glucose (<40 mg/dl).**

#### Data collected from WHO Regions and partners

*Slide date: 13 November 2009*

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1. *Indicates the year of introduction in the entire Country and in the national immunization schedule.
2. The data used from this bulletin or from the website are in the public domain. While there should be no restrictions on the use of this information, the WHO cannot be held responsible for the inaccuracy or use made of the data.
3. Performance indicator: *Indicates the year of introduction in the entire Country and in the national immunization schedule. The data used from this bulletin or from the website are in the public domain. While there should be no restrictions on the use of this information, the WHO cannot be held responsible for the inaccuracy or use made of the data.*