Strengthening immunization services and introduction of hepatitis B vaccine in countries of Central and Eastern Europe and Newly Independent States, 3rd meeting, Kiev, 25-28 May 2004

Hib in countries of the WHO European Region

A. Lobanov, WHO/EURO
**Hemophilus influenzae** type B (Hib) disease: public health impact and control

- Estimated at least 3 million cases of serious diseases, especially meningitis and pneumonia in young children, and more than 400 thousand deaths in the world each year
- Meningitis in >30% of cases in children below 5 years of age
- May cause deafness, learning problems, fits
- Immunization with modern Hib conjugate vaccines prevents >90% Hib disease
- Hib conjugate vaccines are usually given to infants together with DTP, OPV and HepB
Measurement of Hib disease burden

• Surveillance
  – detection: standard case definition
  – recording and reporting
  – laboratory diagnosis

• Studies
  – prospective
  – retrospective

• Rapid assessment tool
“Haemophilus influenzae type b (Hib) meningitis in the pre-vaccine era: a global review of incidence, distribution and case fatality rates”
Mean annual incidence of Hib meningitis in the WHO European Region before introduction of immunization: population based studies and surveillance data

Rates per 100,000 children <5yrs

<table>
<thead>
<tr>
<th>Country</th>
<th>Population based study</th>
<th>Surveillance</th>
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<tbody>
<tr>
<td>Sweden</td>
<td>29</td>
<td>26</td>
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<tr>
<td>Denmark</td>
<td>26</td>
<td>22</td>
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<tr>
<td>Switzerland</td>
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<td>Netherlands</td>
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<td>Israel</td>
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<td>France</td>
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<td>Luxembourg</td>
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<tr>
<td>Ireland</td>
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<tr>
<td>Austria</td>
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<td>Slovenia</td>
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<td>Germany</td>
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<td>Spain</td>
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<td>Austria</td>
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<tr>
<td>Hungary</td>
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<td>1</td>
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<tr>
<td>Czech Republic</td>
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<td>1</td>
</tr>
</tbody>
</table>
Incidence of Hib-meningitis in children < 5 yrs of age, by WHO Region

WHO Regional Office for Europe

Source: WHO/HQ
Incidence of Hib-meningitis in children 0-11 months of age, by WHO Region

Source: WHO/HQ
Case-fatality rates of Hib-meningitis in children < 5 years of age, by WHO Region

Source: WHO/HQ
European Union Invasive Bacterial Infections Surveillance Network

Established in 2000, 21 countries involved

Disaggregated data for 1999-2002 supplied by:

- Denmark
- Netherlands
- Finland
- Portugal
- Germany
- UK
- Greece
- Ireland
- Czech Republic
- Israel
- Italy
- Norway

Some countries have not been able to fully contribute
Incidence of invasive Hib disease in children under 5 yrs prior to introduction of Hib immunisation

Incidence (per 100,000)

- Sweden
- Finland
- Belgium
- Denmark
- Israel
- UK
- Italy
- Ireland
- France
- Czech Republic
- Greece
- Spain
Percentage decline in incidence Hib following vaccine introduction

- Finland
- Netherlands
- UK
- Ireland
- Israel

Year relative to introduction
Incidence of Hib disease in children 1996-2002
(combined country data)

Incidence per 100,000

< 1 year
< 5 years
< 15 years

1996
1997
1998
1999
2000
2001
2002
Age-specific distribution of diagnoses in all EU-IBIS countries and years combined.

- Under 1
- 1 year
- 2 years
- 3 years
- 4 years
- 5-14 yrs

- Other
- Pneumonia
- Epiglottitis
- Septicaemia
- Meningitis
Hib diagnosis

• Meningitis still the predominant diagnosis
• Meningitis decreases in importance with age
• Epiglottitis increases in importance with age
• Meningitis decreasing with the age shift in Hib infection
HepB3, Hib3 and DTP3 vaccine coverage in the European Region 1990-2002
Haemophilus influenzae type b immunization policy in the European Region in 2003

Source: WHO/UNICEF joint reporting form as of 18/05/2004
Hib3 coverage in the European Region in 2002

Eur map country level.shp
- >95
- 90 - 95
- 80 - 90
- <80
- no data/no universal immunisation
Incidence of Hib meningitis in the European Region in 2003
Per 100,000

Source: WHO/UNICEF joint reporting form as of 18/05/2004
WHO-supported population based Hib meningitis studies

<table>
<thead>
<tr>
<th>Country</th>
<th>Period</th>
<th>Hib meningitis /100 000 &lt;5 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>1992-97</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>1997-99</td>
<td>6.1</td>
</tr>
<tr>
<td>Poland</td>
<td>1998-99</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.7</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1999-02</td>
<td>5.7</td>
</tr>
</tbody>
</table>

Compare to Finland 37-57 / 100 000 <5 yrs: pre-vaccination
## Confirmed bacterial meningitis in children < 5 years of age

<table>
<thead>
<tr>
<th>Country</th>
<th>Years</th>
<th>Total confirmed cases</th>
<th>N. mening.</th>
<th>Hib</th>
<th>S. pneum.</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUL</td>
<td>1997-1999</td>
<td>88</td>
<td>23 (26%)</td>
<td>21 (24%)</td>
<td>23 (26%)</td>
<td>21 (24%)</td>
</tr>
<tr>
<td>6 regions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POL</td>
<td>1998-1999</td>
<td>56</td>
<td>33 (59%)</td>
<td>17 (30%)</td>
<td>0</td>
<td>6 (11%)</td>
</tr>
<tr>
<td>2 districts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RUS</td>
<td>1999-2001</td>
<td>212</td>
<td>117 (55%)</td>
<td>39 (18%)</td>
<td>23 (11%)</td>
<td>33 (16%)</td>
</tr>
<tr>
<td>Moscow</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: M. Kojouharova et al., A. Zielinski et al., A. Platonov
Annual incidence of acute lower respiratory tract infection caused by *H.influenzae* type b in Russia 1997-1999 (estimation)

Source: A. Platonov
Programme on study of epidemiology and prevention of Hib-infection in Russia supported by the Vishnevskaya-Rostropovich Foundation

Started in 2003

St. Petersburg
Novosibirsk
Nizhny Novgorod
Murmansk
# Etiology of invasive infections in St. Petersburg 2001-2003

<table>
<thead>
<tr>
<th>Years</th>
<th>Total confirmed cases</th>
<th>N. meningitidis</th>
<th>Hib</th>
<th>S. pneumoniae</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2003</td>
<td>138</td>
<td>81 (59%)</td>
<td>38 (27%)</td>
<td>19 (14%)</td>
</tr>
</tbody>
</table>

including 31 confirmed cases of Hib meningitis

Source: Research Institute of Child Infections, St. Petersburg, Russia
Hib rapid assessment tool

RAT is a methodology for rapid assessment of the burden of Hib disease using local available data.

Two methods to develop national estimates:

1. Retrospective estimation of incidence of Hib meningitis in children <5 years of age (data from selected hospitals and labs) and use of meningitis rate to estimate morbidity and mortality of Hib.

2. Estimation of morbidity and mortality of Hib based on local estimates of the overall mortality in children < 5 years of age.

### Hib rapid assessments in the WHO European Region

<table>
<thead>
<tr>
<th>Country</th>
<th>Hib meningitis per 100,000 &lt; 5 years old</th>
<th>Total annual estimated Hib cases</th>
<th>Total annual estimated Hib deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALB (2001)</td>
<td>15</td>
<td><strong>366-800</strong></td>
<td><strong>54-74</strong></td>
</tr>
<tr>
<td>KGZ (2002)</td>
<td>5-25</td>
<td>139-750</td>
<td>15-78</td>
</tr>
<tr>
<td>ARM (2003)</td>
<td>3-15</td>
<td>36-180</td>
<td>2-9</td>
</tr>
<tr>
<td>MDA (2003)</td>
<td>13 (10-16)</td>
<td>120-198</td>
<td>6-10</td>
</tr>
<tr>
<td>UKR (2003)</td>
<td>4-12</td>
<td>480-1440</td>
<td>24-72</td>
</tr>
<tr>
<td>UZB (2002)</td>
<td>4-22</td>
<td>588-3391</td>
<td>37-351</td>
</tr>
</tbody>
</table>
Hib rapid assessments in the WHO European Region, 2003

Cost-effectiveness:

Savings equal to the Hib vaccination cost, if the cost is

in Moldova: USD 1.5 per child or USD 0.5 per dose

in Ukraine: USD 2.7 per child or USD 0.9 per dose
Conclusions:

• High Hib incidence in the WHO Region was recorded in West Europe in pre-vaccination era

• Effective surveillance and additional studies are needed, especially in NIS

• Decision for Hib vaccine introduction should be based on thorough analysis of various factors

• Long-term political commitment and financial sustainability are crucial for decision-making