MODULE 2: Epidemiology of Dengue

Dengue Clinical Management

Acknowledgements

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Dengue as an emerging disease

• DEN was a minor, geographically restricted disease until mid-20th century

• World War II/global cargo transport of \textit{Aedes} mosquitoes likely responsible for dissemination

• DEN/DHF present in the WHO regions of the Americas, South-East Asia, Eastern Mediterranean and Western Pacific; Africa reports DEN but only sporadic DHF \textsuperscript{1}

• DHF first documented in 1950s in the Philippines and Thailand

\textsuperscript{1}Amarasinghe et al., EID 2011

Dengue as an emerging disease (cont.)

- Several combining factors produce epidemiological conditions in tropical and subtropical developing countries that favouring viral transmission by *Aedes aegypti*:

  - rapid population growth
  - rural–urban migration
  - inadequate basic urban infrastructure
  - increase in volume of solid waste which provide larval habitats in urban areas.
Dengue in the Western Pacific Region

- Dengue is a major public health problem in the Western Pacific Region
- All four serotypes (DENV-1, -2, -3, -4) are present in the Region
- Occurs throughout the year but rates increase 1-2 months after the start of the rainy season in June
- Lack of reporting remains an important challenge in prevention and control

Figure: Annual Dengue Data in the Western Pacific Region, WHO Western Pacific Regional Office. http://www.wpro.who.int/emerging_diseases/annual.dengue.data.wpr/en/index.html
Dengue in the Western Pacific Region

Table 2. Reported number of dengue cases, deaths and case fatality ratios from Cambodia, the Lao People’s Democratic Republic, Malaysia, the Philippines, Singapore, Viet Nam and Australia, 2006–2010

<table>
<thead>
<tr>
<th>Country</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of cases</td>
<td>No. of deaths</td>
<td>CFR (%)</td>
<td>No. of cases</td>
<td>No. of deaths</td>
</tr>
<tr>
<td>Cambodia</td>
<td>16 669</td>
<td>158</td>
<td>0.95</td>
<td>39 851</td>
<td>407</td>
</tr>
<tr>
<td>The Lao People’s Democratic Republic</td>
<td>6 356</td>
<td>6</td>
<td>0.09</td>
<td>4 943</td>
<td>4</td>
</tr>
<tr>
<td>Malaysia</td>
<td>38 556</td>
<td>89</td>
<td>0.23</td>
<td>48 846</td>
<td>98</td>
</tr>
<tr>
<td>The Philippines</td>
<td>37 101</td>
<td>378</td>
<td>1.02</td>
<td>55 639</td>
<td>533</td>
</tr>
<tr>
<td>Singapore</td>
<td>3 127</td>
<td>10</td>
<td>0.32</td>
<td>8 828</td>
<td>24</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>68 532</td>
<td>53</td>
<td>0.08</td>
<td>104 393</td>
<td>88</td>
</tr>
<tr>
<td>Australia</td>
<td>189</td>
<td>0</td>
<td>0.00</td>
<td>316</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>170 530</td>
<td>694</td>
<td>0.41</td>
<td>262 814</td>
<td>1 154</td>
</tr>
</tbody>
</table>

* CFR - case fatality ratio

- Overall case management has improved, leading to a decrease in fatality rates

Dengue in the Western Pacific Region

• Cambodia, Malaysia, the Philippines and Viet Nam are the four countries in the Western Pacific Region with the highest numbers of cases (1,779,529) and deaths (7,235) reported in 2000 – 2010

• In this period and among those countries, Philippines had the highest number of cases (135,355) and deaths (793) in 2010

• The six most affected Pacific island countries and areas in 2000 – 2010 were New Caledonia (16,659 cases), French Polynesia (8,442 cases), Cook Islands (3,991 cases), Kiribati (2,982), American Samoa (2,512 cases) and Palau (2,493 cases). There were 44 deaths together in this period.

• New Caledonia and French Polynesia experienced severe dengue outbreaks in 2009, with a total of 11,089 cases

• Recent outbreaks, as seen in Cambodia in 2007, suggests that dengue is now occurring in rural areas as opposed to historically mainly among denser urban and peri-urban populations

Source: Annual Dengue Data in the Western Pacific Region, WHO Western Pacific Regional Office http://www.wpro.who.int/emerging_diseases/annual_dengue_data.wpr/en/index.html
Disease burden

- Dengue inflicts serious health and socioeconomic burden

- DALY’s lost to dengue = 528 in 2001

- The overall cost of a dengue case is US$ 828

- Estimates ignore:
  - underreporting of cases
  - substantial costs associated with dengue surveillance and vector control programmes.

Dengue Wards in the Western Pacific Region

Hospital in Phnom Penh, Cambodia
September 14, 2006

Quirino Memorial Hospital in Manila, Philippines
September 11, 2010