A few years ago, my colleagues and I conducted a systematic review of data relating to the global burden of group A streptococcal diseases.\(^1,2\) Population-based data on rheumatic heart disease prevalence from 1985 through 2002 were included. We estimated that there were a minimum of 15.6 million people in the world with rheumatic heart disease, with 282 000 new cases each year and 233 000 resultant deaths each year; however, we also noted that the estimates of the number of cases in school-aged children in China (176 500) and Asia Other (102 000; Asia excluding South-Central Asia and China) were based on very few studies, none of which used echocardiography to confirm the presence of rheumatic heart disease lesions. Moreover, 5 of the 6 studies included in the Asia Other estimate came from 1 country, the Philippines. We therefore urged caution in interpreting these data from Asia, other than South-Central Asia, and concluded that there was an urgent need for more population-based data from this part of the world. In the 5 years since that review was compiled, more data have emerged to clarify the burden of rheumatic heart disease in Asia, which will be summarized here.

### Methods

The present study, a Medline search was conducted with the terms *rheumatic fever or rheumatic heart disease and Asia*. The abstracts of all articles retrieved from 2003 through November 2007 were reviewed, and the manuscripts of relevant articles were reviewed in full. Population-based studies of the prevalence of rheumatic heart disease in school-aged children were used to update the regional prevalence estimates from the previous review. Additional studies in other age groups and non-population-based studies were also reviewed if they were thought to possibly offer insights into the burden of rheumatic heart disease in Asia.

Updated denominator data were obtained from the United Nations Population Division (available at [http://esa.un.org/unpp/](http://esa.un.org/unpp/), accessed on February 15, 2008). Regions of Asia were divided in the same way as the previous review: South-Central Asia (Afghanistan, Bangladesh, Bhutan, India, Iran, Kazakhstan, Kyrgyzstan, Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Turkmenistan, and Uzbekistan), China, and “Asia Other” (all other Asian countries).

The author takes full responsibility for the integrity of the data and agrees to the manuscript as written.

---

### Results

Five population-based prevalence studies of rheumatic heart disease in school-aged children were found from South-Central Asia since 2003,\(^3–7\) along with 1 from China\(^8\) and 1 from Asia Other.\(^9\) Interestingly, 4 of 5 recent studies from South-Central Asia produced prevalence estimates substantially lower (range 0.68 to 1.3 per 1000) than the pooled estimate from this region in the previous review (2.2 per 1000), although 1 study from Pakistan gave a much higher estimate (between 7 and 12 per 1000).\(^6\) By contrast, the newer studies from China and Asia Other found prevalence rates higher than the previous estimate from those regions. The Chinese study reported a prevalence of 11 per 1000, which is dramatically higher than other estimates from Asia, but it is not clear whether echocardiographic confirmation was used in the study.\(^8\)

The additional study from Asia Other is noteworthy. A school-based survey conducted in Phnom-Penh found a prevalence rate of echocardiographically confirmed clinical rheumatic heart disease (ie, in children with significant cardiac murmurs) of 2.2 per 1000.\(^9\) However, an additional feature of that study was that all children had echocardiography performed, with the result that many children without clinically significant heart murmurs were also diagnosed with rheumatic heart disease (the prevalence estimate increased almost 10-fold, to 21.5 per 1000, with the inclusion of these subclinical cases).

A household survey in rural Pakistan used rigorous methodology and found an all-age prevalence of echocardiographically confirmed rheumatic heart disease of 5.7 per 1000.\(^4\) Unfortunately, detailed data on age subgroups were not presented, but a graph of rheumatic heart disease prevalence indicated a prevalence of \(\approx\)7 per 1000 in boys aged 5 to 14 years and 12 per 1000 in girls of the same age. The study also found that the highest prevalence of rheumatic heart disease in females occurred in those 45 to 54 years of age and in males in those 55 to 64 years of age.

The data from these population-based prevalence studies in school-aged children were used to estimate the total number of rheumatic heart disease cases in Asia (Table 2). The estimate from South-Central Asia (\(\approx\)450 000 cases) should be considered the most reliable, because it relied on 16 studies that used echocardiography. The estimate from China is based on 2 studies, neither of which could be confirmed as
having used echocardiography. The estimate from Asia highlights the variability of the overall estimate depending on whether all studies are included (≈150,000 cases) or the 1 echocardiography-based study is used (≈390,000 cases). The overall estimate is between 1.96 and 2.21 million cases of rheumatic heart disease in Asian children 5 to 14 years of age.

In the previous review, we detailed 4 studies that allowed an estimate of the proportion of rheumatic heart disease cases in the total population that could be expected to be found in the 5- to 14-year-old age group. We concluded that number of cases in school-aged children should be multiplied by 5.5 to 7.2 to estimate the total cases in all ages. The recent

Table 1. Studies Since 1985 of Rheumatic Heart Disease Prevalence in School-Aged Children in Asia

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year of Study</th>
<th>Place</th>
<th>Age, y</th>
<th>RHD Prevalence (per 1000)</th>
<th>No. Screened</th>
<th>No. of Cases</th>
<th>Echo</th>
<th>Type of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>South-Central Asia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grover et al(^{10})</td>
<td>1988–1991</td>
<td>India: north</td>
<td>5–15</td>
<td>2.1</td>
<td>31,200</td>
<td>66</td>
<td>Yes</td>
<td>Community project</td>
</tr>
<tr>
<td>Kumar et al(^{11})</td>
<td>1988–1990</td>
<td>India: Rajasthan</td>
<td>3.5–18</td>
<td>3.3</td>
<td>10,168</td>
<td>34</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>Patel et al(^{13})</td>
<td>1986</td>
<td>India: Anand</td>
<td>5–15</td>
<td>1.8</td>
<td>11,069</td>
<td>20</td>
<td>?</td>
<td>Yes</td>
</tr>
<tr>
<td>WHO(^{14})</td>
<td>1986</td>
<td>Pakistan: Islamabad</td>
<td>5–15</td>
<td>0.26</td>
<td>11,700</td>
<td>3</td>
<td>?</td>
<td>No</td>
</tr>
<tr>
<td>Avasthi et al(^{15})</td>
<td>1987</td>
<td>India: Ludhiana</td>
<td>6–16</td>
<td>1.3</td>
<td>6,005</td>
<td>8</td>
<td>?</td>
<td>Yes</td>
</tr>
<tr>
<td>Thakur et al(^{17,18})</td>
<td>1990s</td>
<td>India: north</td>
<td>5–16</td>
<td>2.9</td>
<td>15,080</td>
<td>44</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>Gupta et al(^{19})</td>
<td>1991</td>
<td>India: Jammu City</td>
<td>6–16</td>
<td>1.4</td>
<td>10,263</td>
<td>14</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>Shrestha et al(^{20})</td>
<td>1991</td>
<td>Nepal (rural)</td>
<td>5–16</td>
<td>1.4</td>
<td>4,452</td>
<td>6</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>Ahmed et al(^{21})</td>
<td>1991</td>
<td>Bangladesh (rural)</td>
<td>5–15</td>
<td>1.3</td>
<td>5,923</td>
<td>8</td>
<td>Yes</td>
<td>Community survey</td>
</tr>
<tr>
<td>Haque et al(^{22})</td>
<td>1992</td>
<td>Bangladesh: Dhaka and Dinajpur</td>
<td>5–15</td>
<td>2.2</td>
<td>15,798</td>
<td>36</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>Joardar et al(^{23})</td>
<td>1992</td>
<td>Bangladesh: Rajbari</td>
<td>5–20</td>
<td>1.45</td>
<td>686</td>
<td>1</td>
<td>No</td>
<td>Community survey</td>
</tr>
<tr>
<td>Begum et al(^{24})</td>
<td>1993</td>
<td>Bangladesh: Dhaka</td>
<td>5–15</td>
<td>2.4</td>
<td>10,538</td>
<td>25</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>Rizvi et al(^{25})</td>
<td>1993–1994</td>
<td>Pakistan: Rahim Yar Khan</td>
<td>5–14</td>
<td>7 to 12(^{*})</td>
<td>NK(^{*})</td>
<td>NK(^{*})</td>
<td>Yes</td>
<td>Household survey</td>
</tr>
<tr>
<td>Regmi and Pandey(^{26})</td>
<td>1997</td>
<td>Nepal: Kathmandu</td>
<td>5–16</td>
<td>1.2</td>
<td>4,736</td>
<td>6</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>Bahadur et al(^{27})</td>
<td>2002</td>
<td>Nepal: Kathmandu Valley</td>
<td>5–16</td>
<td>1.2</td>
<td>9,420</td>
<td>11</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>Jose and Gomathi(^{28})</td>
<td>2001–2002</td>
<td>India: Vellore</td>
<td>6–18</td>
<td>0.68</td>
<td>229,829</td>
<td>157</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>Periwal et al(^{29})</td>
<td>2005</td>
<td>India: Bikaner</td>
<td>5–14</td>
<td>0.67</td>
<td>3,002</td>
<td>2</td>
<td>Yes</td>
<td>School survey</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WHO(^{14})</td>
<td>1986</td>
<td>Guangdong Province</td>
<td>5–15</td>
<td>0.8</td>
<td>31,180</td>
<td>25</td>
<td>?</td>
<td>No</td>
</tr>
<tr>
<td>Chen et al(^{30})</td>
<td>1993–1994</td>
<td>Sichuan Province</td>
<td>5–18</td>
<td>11</td>
<td>46,595</td>
<td>512</td>
<td>Unknown(^{†})</td>
<td>Community survey</td>
</tr>
<tr>
<td>WHO(^{14})</td>
<td>1986</td>
<td>Thailand: Bangkok and Nakornrajasima</td>
<td>5–15</td>
<td>0.2</td>
<td>5,465</td>
<td>9</td>
<td>No</td>
<td>School survey</td>
</tr>
<tr>
<td>Guzman(^{25})</td>
<td>1987–1990</td>
<td>Philippines: Laguna</td>
<td>5–15</td>
<td>0.8</td>
<td>9,694</td>
<td>72</td>
<td>?</td>
<td>No</td>
</tr>
<tr>
<td>WHO(^{14})</td>
<td>1986</td>
<td>Philippines: Laguna</td>
<td>5–15</td>
<td>1.6</td>
<td>17,320</td>
<td>27</td>
<td>?</td>
<td>No</td>
</tr>
<tr>
<td>Marijon et al(^{31})</td>
<td>2001–2002</td>
<td>Cambodia: Phnom-Penh</td>
<td>6–17</td>
<td>2.2(^{‡})</td>
<td>3,677</td>
<td>8</td>
<td>Yes</td>
<td>School survey</td>
</tr>
</tbody>
</table>

RHD indicates rheumatic heart disease; WHO, World Health Organization; ?, not clear from publication if echocardiography was used (response likely inferred from manuscript); and NK, not known.

\(^{*}\)Household survey of all ages. Data not presented separately for school-aged children, except for graphical depiction of rheumatic heart disease prevalence, by gender.

\(^{†}\)Article in Chinese; only the English abstract was reviewed.

\(^{‡}\)Prevalence estimate for those diagnosed clinically with echocardiographic confirmation. Separate estimate presented for screening of all children with echocardiography: 79 cases, prevalence 21.5 per 1000 (ie, 90% of rheumatic heart disease cases were subclinical).
study from Pakistan supports this: Although sufficient data were not presented to make the same calculation, the graphical illustration of rheumatic heart disease prevalence by age group confirms that there was no decrease in prevalence (in fact, rates peaked in older age groups) between the 5- to 14-year-olds and the 55- to 64-year-olds. Applying these multiplication factors to the estimates in Table 2, one can estimate that the total number of rheumatic heart disease cases is between 10.8 million (lower estimate based on 5.5 multiplication factor and all studies) and 15.9 million (upper estimate based on 7.2 multiplication factor and echocardiographic studies only).

In the previous review, we pointed out that accurate estimates of mortality due to rheumatic heart disease are not possible because of the lack of data from developing countries. Our best estimates were based on an expected mortality of 1.5% per year in rheumatic heart disease patients, which was based on prospective studies from North America and the United Kingdom during the 1960s. However, a 12-year cohort study from India published in 2002 found a mortality rate among rheumatic heart disease patients of 3.3% per year. Applying this to the estimates in Table 2, we estimate that rheumatic heart disease is directly responsible for 356,000 to 524,000 deaths each year in Asia.

**Other Data**

A number of recent publications added information regarding rheumatic heart disease in Asia. A cross-sectional study of 8080 middle-aged to elderly people in China during 2001 to 2002 found a prevalence of 2 cases of echocardiographically proven rheumatic heart disease per 1000 people. A 50-year retrospective study from 2 hospitals in Shanghai, China, found that cardiovascular admissions increased 3-fold over this period but that the proportion due to rheumatic heart disease declined 5-fold (from 50% to 10% of cardiac admissions). A prospective study conducted in Lebanon from 1999 to 2005 found that rheumatic heart disease was the most common acquired heart disease in children (36% of cases).

**Endocarditis**

In the last review, all of the data published globally since 1980 documenting the association of infective endocarditis and rheumatic heart disease had come from Asia. This interest in endocarditis persisted: An additional 8 studies from Asia were found during the preparation of the present

### Table 2. Estimated Number of Rheumatic Heart Disease Cases in Children 5 to 14 Years of Age in Asia

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>South-Central Asia</td>
<td>18 (16)</td>
<td>1.4</td>
<td>392 078</td>
<td>1.2</td>
<td>379 692</td>
<td>1.2</td>
<td>365 731 000</td>
<td>444 946</td>
<td>455 608</td>
</tr>
<tr>
<td>China</td>
<td>2 (0)</td>
<td>5.9</td>
<td>77 775</td>
<td>6.9</td>
<td>NA</td>
<td>NA</td>
<td>198 485 000</td>
<td>1 370 446</td>
<td>NA</td>
</tr>
<tr>
<td>Asia Other</td>
<td>7 (1)</td>
<td>1.2</td>
<td>247 345</td>
<td>0.8</td>
<td>3677</td>
<td>2.2</td>
<td>178 694 000</td>
<td>149 547</td>
<td>388 782</td>
</tr>
<tr>
<td>Total</td>
<td>74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>742 910 000</td>
<td>1 964 939</td>
<td>2 214 836*</td>
</tr>
</tbody>
</table>

Echo indicates echocardiography; RHD, rheumatic heart disease; and NA, not applicable because there were no echocardiographic studies.

Prevalences are per 1000.

*Includes all-studies estimate for China, because no echocardiographic studies were available.

### Table 3. Studies Since 1980 Documenting the Association of Rheumatic Heart Disease and Infective Endocarditis in Asia

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year of Study</th>
<th>Country</th>
<th>Proportion of IE With RHD as Predisposing Factor</th>
<th>Rank of RHD as Predisposing Factor</th>
<th>Notes/Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cetinkaya et al37</td>
<td>1974–1999</td>
<td>Turkey</td>
<td>65%</td>
<td>Most common</td>
<td>Incidence IE 1.2 per 100 000 in 1990s; deduced incidence of RHD-related IE = 0.44 per 100 000</td>
</tr>
<tr>
<td>Borer et al38</td>
<td>1980–1994</td>
<td>Israel</td>
<td>37%</td>
<td>Most common</td>
<td>Mortality 25%</td>
</tr>
<tr>
<td>Choudhury et al39</td>
<td>1981–1991</td>
<td>India</td>
<td>42%</td>
<td>Most common</td>
<td>Mortality 21%</td>
</tr>
<tr>
<td>Dhawan et al40</td>
<td>1984–1990</td>
<td>India</td>
<td>49%</td>
<td>Most common</td>
<td>Mortality 21%</td>
</tr>
<tr>
<td>Kanafani et al41</td>
<td>1986–2001</td>
<td>Lebanon</td>
<td>33%</td>
<td>Most common</td>
<td>Mortality 25%</td>
</tr>
<tr>
<td>Lertsapcharoen et al42</td>
<td>1987–2004</td>
<td>Thailand</td>
<td>12%</td>
<td>2nd most common</td>
<td>Congenital heart disease in 74%</td>
</tr>
<tr>
<td>Agarwal et al43</td>
<td>1987–1988</td>
<td>India</td>
<td>68%</td>
<td>Most common</td>
<td>Mortality 21%</td>
</tr>
<tr>
<td>Garg et al44</td>
<td>1992–2001</td>
<td>India</td>
<td>47%</td>
<td>Most common</td>
<td>Mortality 25%</td>
</tr>
<tr>
<td>Heper and Yorukoglu45</td>
<td>1995–2000</td>
<td>Turkey</td>
<td>66%</td>
<td>Most common</td>
<td>Incidence IE 2.8 per 100 000</td>
</tr>
<tr>
<td>Yiu et al46</td>
<td>1995–2005</td>
<td>Hong Kong</td>
<td>18%</td>
<td>2nd most common</td>
<td>Congenital heart disease in 89%</td>
</tr>
<tr>
<td>Khanal et al47</td>
<td>1995–1997</td>
<td>India</td>
<td>56%</td>
<td>Most common</td>
<td>Mortality 30%</td>
</tr>
<tr>
<td>Liew et al48</td>
<td>1997–2004</td>
<td>Singapore</td>
<td>4%</td>
<td>Rare</td>
<td>Mortality 25%</td>
</tr>
</tbody>
</table>

IE indicates infective endocarditis.
report (Table 3). The recent studies from India, Turkey, and Lebanon all found that rheumatic heart disease was the most common underlying factor in endocarditis (range 33% to 66%), whereas studies from Hong Kong and Thailand found rheumatic heart disease in 18% and 12% of cases, respectively, and a study from Singapore found rheumatic heart disease in only 4% of endocarditis cases.

**Stroke**

A population-based stroke registry in Iran found an incidence of ischemic stroke of 43 per 100,000 population, with 11.8% due to cardioembolism, in 45% of whom rheumatic heart disease was detected. The authors concluded that rheumatic heart disease caused 4.3 preventable strokes per 100,000 people per year in Iran.

**Pregnancy and Rheumatic Heart Disease**

An 18-year study in Taiwan found that stroke occurred in 46.2 of 100,000 pregnancies, and 44% of cases had underlying rheumatic heart disease. Rheumatic heart disease was the most common underlying condition (27% of cases) found in pregnant patients admitted to the intensive care unit in a Saudi Arabian hospital between 1997 and 2002. In an Indian hospital between 1994 and 2000, rheumatic heart disease accounted for 88% of cardiac diseases in pregnant women.

**Discussion**

It is often claimed that the burden of some infectious diseases in Asia may be different from that in other parts of the world. For example, there has been considerable discussion as to whether there is evidence that *Haemophilus influenzae* type b infections are less common in Asian children than in children in other less-developed regions. Similarly, with the exception of a few countries in South-Central Asia (India, Bangladesh, and Pakistan most prominently), there has been little concern about rheumatic heart disease in most Asian countries.

The data presented here suggest that rheumatic heart disease is indeed an ongoing problem in Asia. Although the regional estimates for prevalence in school-aged children may not be as high as, for example, in sub-Saharan Africa, the total burden of cases (between 10.8 and 15.9 million cases in all ages) and deaths (356,000 to 524,000 each year) warrants urgent attention. Moreover, they are invaluable for providing the robust estimates of disease burden on which public health strategies must be based. It is clear from the studies outlined in Table 1 that there is a need for more and better studies from China and the Asia Other countries, and accordingly, the summary estimates from these places should be interpreted with caution.

The studies on infective endocarditis confirm that in most Asian countries, at least half of all cases of this severe and often fatal disease are due to underlying rheumatic heart disease, although in some countries with emerging middle classes, this proportion is probably lower. Similarly, the prospective stroke registry data from Iran support those in the previous report that indicate that a substantial proportion of strokes in developing countries are due to rheumatic heart disease. If the incidence of strokes due to rheumatic heart disease in Iran (4.3 per 100,000 people per year) were to be applied to the population of Asia (3.9 billion), it could be estimated that rheumatic heart disease causes 167,000 preventable strokes each year in Asia.

The compelling point about the data presented here is that almost all of these cases, severe complications and deaths, are preventable. Rheumatic heart disease can be prevented and controlled with the establishment of register-based coordinated control programs, the major focus of which is delivery of secondary prophylaxis to prevent recurrences of rheumatic fever. There is ample evidence that this strategy is cheap, cost-effective, and practical in developing countries. With the exception of some parts of a few countries in South-Central Asia, I am not aware of coordinated control programs in any Asian countries. Surely, it is time for health authorities in Asian countries and international organizations such as the World Health Organization to act on rheumatic heart disease in this region.

**Acknowledgments**

The author thanks Andrew Steer, Kim Mulholland, and Martin Weber, who contributed to the original review article. The original review article was supported by a consultancy funded by the World Health Organization. No other funding sources were used in compilation of this article.

**Disclosures**

The author has received research support from various competitive funding bodies, including the Australian National Health and Medical Research Council and the US National Institutes of Health, along with consultancy funding from the World Health Organization. There are no other conflicts of interest to report.

**References**

16. Agarwal AK, Yunus M, Ahmad J, Khan A. Rheumatic heart disease in

14. World Health Organization. WHO Global Programme for the Prevention

disease in school children. J Epidemiol Community

24. Regmi PR, Pandey MR. Prevalence of rheumatic fever and rheumatic
diseases in rural area of Hmawbi and urban Yangon city. Asia Pacific J

22. Joardar MR, Faruq QO, Haque S. Prevalence of RF and RHD in rural
Bangladesh. Doct


9. Marijon E, Ou P, Celermajer DS, Ferreira B, Mocumbi AO, Jani D,


7. Periwal KL, Gupta BK, Choudhary V. Rheumatic heart disease: a school

6. Jose VJ, Gomathi M. Declining prevalence of rheumatic heart disease in

5. Marijon E, Ou P, Celemajer DS, Ferreira B, Mocumbi AO, Jani D,
Mukhopadhyay A, Das S, Dasgupta A. Clinical presentation of

20. Guzman SV. ISFC/WHO/UNESCO Joint Project on RF/RHD Prevention
and Health Promotion in School Children. Country: Philippines: Guidelines
for the Plan of Operation for Phase 1. Manila, Philippines: Foundation for

19. Wilson M, Ly W. The natural history of rheumatic heart disease in the
third, fourth, and fifth decades of life: 1; prognosis with special reference

rheumatic fever/rheumatic heart disease cohort: twelve-year experience.
Indian Heart J. 2002;54:54–58.

17. Guzman SV. ISFC/WHO/UNESCO Joint Project on RF/RHD Prevention
and Health Promotion in School Children. Country: Philippines: Guidelines
for the Plan of Operation for Phase 1. Manila, Philippines: Foundation for

16. Agarwal AK, Yunus M, Ahmad J, Khan A. Rheumatic heart disease in

15. Avashri G, Singh D, Singh C, Aggarwal SP, Bidwai PS, Avasthi R.
Prevalence survey of rheumatic fever (RF) and rheumatic heart disease
(Rhd) in urban & rural school children in Ludhiana. Indian Heart J.

14. World Health Organization. WHO Global Programme for the Prevention
of Rheumatic Fever/Rheumatic Heart Disease in Sixteen Developing
Countries (AFGUND Supported): Meeting of National Programme

13. Periwal KL, Gupta BK, Choudhary V. Rheumatic heart disease: a school


Epidemiology of rheumatic fever and rheumatic heart disease in a rural

9. Marijon E, Ou P, Celemajer DS, Ferreira B, Mocumbi AO, Jani D,
Mukhopadhyay A, Das S, Dasgupta A. Clinical presentation of


7. Periwal KL, Gupta BK, Choudhary V. Rheumatic heart disease: a school

6. Jose VJ, Gomathi M. Declining prevalence of rheumatic heart disease in

5. Marijon E, Ou P, Celemajer DS, Ferreira B, Mocumbi AO, Jani D,
Mukhopadhyay A, Das S, Dasgupta A. Clinical presentation of

4. World Health Organization. WHO Global Programme for the Prevention
of Rheumatic Fever/Rheumatic Heart Disease in Sixteen Developing
Countries (AFGUND Supported): Meeting of National Programme


1. Bahadur KC, Sharma D, Shrestha MP, Gurung S, Rajbhandari S, Malla R,

0. Trop.</ref>


**Key Words:** rheumatic heart disease ■ Asia ■ burden of illness ■ epidemiology ■ echocardiography

---

**CLINICAL PERSPECTIVE**

With the exception of India, there have been few population-based studies of the burden of rheumatic heart disease in Asian countries; however, recent studies suggest that as with other developing regions of the world, rheumatic heart disease is an underappreciated cause of morbidity and mortality in children, adolescents, and adults in low- and middle-income countries of Asia. More importantly, it is likely that many cases of mild rheumatic heart disease remain undetected in Asian children, with the risk that these lesions will progress to clinical significance as these children enter adulthood. Aside from highlighting the need for better-quality data from Asia, the implications of these findings are that clinicians should have a high index of suspicion of rheumatic heart disease when seeing children in this region, even if they are asymptomatic. Moreover, the need for institution of formal rheumatic heart disease control programs and even for echocardiography-based screening of school-aged children should be considered.
Rheumatic Heart Disease in Asia
Jonathan R. Carapetis

Circulation. 2008;118:2748-2753
doi: 10.1161/CIRCULATIONAHA.108.774307
Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2008 American Heart Association, Inc. All rights reserved.
Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://circ.ahajournals.org/content/118/25/2748