Cost of illness due to typhoid fever in five Asian countries

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Summary
OBJECTIVE To generate community-based estimates of the public (paid by the government) and private (paid by households) costs of blood culture-confirmed typhoid fever in Hechi, China; North Jakarta, Indonesia; Kolkata, India; Karachi, Pakistan and Hue, Vietnam.

METHODS To measure out-of-pocket costs of illness and lost earnings, families with culture-proven cases were surveyed 7, 14 and 90 days after onset of illness. Public costs of treatment were measured at local health facilities using a micro costing (bottom-up) method.

RESULTS The costs of hospitalized cases ranged from USD 129 in Kolkata to USD 432 in North Jakarta (hospitalization rates varied from 2% in Kolkata to 40% in Hechi) and the costs of non-hospitalized cases ranged from USD 13 in Kolkata to USD 67 in Hechi. Where costs were highest (Hechi, North Jakarta and Karachi), the bulk of the costs of hospitalized cases was borne by families, comprising up to 15% of annual household income.

CONCLUSION Although these estimates may understate true costs due to the fact that higher quality treatment may have been provided earlier-than-usual, this multi-country community-based study contributes to evidence on the public and private costs of typhoid fever in developing countries. These cost estimates were used in a cost-effectiveness analysis of typhoid vaccines and will help policymakers respond to World Health Organization’s updated typhoid fever immunization recommendations.

KEYWORDS typhoid fever, cost of illness, survey, China, India, Indonesia, Pakistan, Vietnam

Introduction
Typhoid fever, a systemic infection caused by Salmonella enterica serotype typhi (S. typhi), remains an important public health problem in developing countries. In 2000, it was estimated that there were more than 21 million typhoid fever episodes worldwide, resulting in 216 000 deaths (Crump et al. 2004).

Though the World Health Organization (WHO) in the late 1990s recommended immunization of school-aged children in countries ‘at high risk’, using new-generation typhoid vaccines (the injectable Vi and the live oral Ty21a) (WHO 1998), few countries with endemic typhoid fever currently use new-generation typhoid vaccines. Decision makers lack country-specific information for evaluating these vaccines, including estimates of the costs that typhoid fever imposes on society (DeRoeck et al. 2005). Existing estimates use unreliable public health statistics or hospital-based data, country-level economic data, and assumptions about typhoid fever severity and treatment. Only one study (Bahl et al. 2004) provided community-based estimates of the costs of typhoid fever.
To improve this situation, the Diseases of the Most Impoverished (DOMI) program is generating good quality, country-specific data on disease burden, the economic benefits of preventing typhoid fever, vaccine safety and field effectiveness, and vaccine cost-effectiveness to inform rational decisions regarding the use of new-generation typhoid vaccines. This paper reports the DOMI program’s community-based estimates of the public (paid by the government) and private (paid by households) costs of laboratory-confirmed typhoid fever in five Asian study sites (Hechi, China; North Jakarta, Indonesia; Kolkata, India; Karachi, Pakistan and Hue, Vietnam). These data are timely, given the updated recommendations by WHO for the use of typhoid vaccines in endemic areas (WHO 2008).

**Methods**

The private and public cost studies were coordinated with prospective studies of disease burden (Ochiai et al. 2007). In Vietnam, the study site was the entire city of Hue, while the sites in Pakistan (Karachi), India (Kolkata) and Indonesia (North Jakarta) were urban areas. The study site in China (Hechi) included one urban and one rural township. The age groups under surveillance were selected on the basis of being the most appropriate target groups for typhoid vaccination: 5–18 year-olds in Vietnam, 5–60 year-olds in China, all ages in India and Indonesia, and 2–15 year-olds in Pakistan.

Patients who lived in the study areas, presented with fever of three days or more, and who had a positive blood culture test for *S. typhi* were eligible to participate in the study. Resistance to six antimicrobial agents (chloramphenicol, ampicillin, TMP-SMX [trimethoprim-sulfamethoxazole], nalidixic acid, ciprofloxacin, and ceftriaxone) was tested at all sites. The highest annual incidence rates of blood culture-confirmed typhoid among school-aged children 5–15 years old were seen in Kolkata (4.9 per 1000), Karachi (4.1 per 1000), and Jakarta (1.8 per 1000), while low to moderate rates were found in Hechi (0.3 per 1000) and Hue (0.2 per 1000). Given the estimated 50% sensitivity of blood cultures, actual incidence rates are likely to be double these rates.

**Measuring the private costs of typhoid fever**

To measure private costs of illness (COI), families with culture-proven cases were visited at home 7, 14 and 90 days after onset of illness. For adult cases, the patients themselves were interviewed; for cases in children, an adult familiar with both the episode and the household finances was interviewed. A single protocol and standard questionnaires were developed to ensure that comparable data were collected in each study site.

The questionnaires measured direct and indirect costs. Direct costs included the costs of medical treatment, medicines, laboratory tests, transportation, food, lodging, and the costs of special items such as foods or herbs. The indirect costs included the lost wages due to lost work time by the patients, their caregivers, and their substitutes. The indirect costs also included estimates of the productivity losses due to forgone nonmarket activities such as school, housework, and childcare (Table 1). The estimated monetary value of nonmarket activities depends on the subject’s age and occupation. Children’s losses were monetized as in previous studies (Asenso-Okyere & Dzator 1997; Cropper et al. 1999) because children are known to make important economic contributions to the household (Chima et al. 2003).

A substantially different method was used to obtain private cost estimates in Karachi. While a private COI survey was completed, free health care was provided to study participants at clinics set up by the DOMI project. Thus, the private COI survey collected unreliable information on health-seeking behaviour and expenditures and instead we relied on expert information to generate assumptions about the general population’s typical use of health care and used Aga Khan University Hospital data sources to construct costs. There were no available data sources to calculate indirect costs, so data collected in the private COI survey were used.

**Measuring the public costs of treating typhoid fever**

Public costs of treatment were measured at local health facilities using a micro-costing (bottom-up) methodology. First, data from public and private health facilities providing treatment were used to produce estimates of the cost of a day’s hospitalization, the cost of a clinic visit, and the average cost of medicines and diagnostic tests. This information was combined with data from a sample of patients who were treated to estimate the provider’s treatment cost per case of disease. Then, the portion of the total cost of treatment that was borne by the public sector was calculated as the provider cost of treatment minus the fees received from patients for their treatment. The fees received from patients were measured using the private COI data on direct costs paid to public health facilities for medicine, treatment, and laboratory tests.

Provider cost was drawn from facilities serving the disease burden study because they allowed for good access to records and they had data on culture confirmed typhoid infections, thus minimizing data collection costs.
Though public treatment cost studies in each country were not identical because of differences in the health care systems, availability of data, and the design of the DOMI projects in each country, similar components were measured to maximize comparability of findings. Table 2 summarizes the public health care system in each country and the facility sample that was used to estimate provider treatment cost (Stewart 2005; Riewpaiboon 2007).

Since China’s decentralized public health system operates as a fee-for-service system with little public funding, the public costs per episode were assumed to be negligible. In Karachi, expert local information was used to generate a set of assumptions about health care, and available data sources were used to construct costs for typical treatment regimes.

Total costs per episode of typhoid fever

The total costs due to an episode of typhoid fever were the sum of the private cost per episode and the public cost per episode. Because outpatient care and inpatient care have different cost structures, we obtained separate estimates of treatment costs for these treatment settings. We also report estimates by the patient’s age.

Since the COI study included only a portion of the cases that were included in the burden of disease study, and was conducted for a shorter period of time, the hospitalization rate for the cases in the COI study may not represent true hospitalization rates. Thus, the hospitalization rate from the burden of disease study was used (i.e. the percentage of patients who were treated as inpatients in the disease burden study). Hospitalization rates for adults ranged from 40% in Hechi to 2% in Kolkata, and the rate for children’s cases ranged from 40% in Hechi to 1% in Kolkata (Table 3).

**Expected annual costs of typhoid fever**

It is useful to look at these estimates from the perspective of an individual, or the public health system, that does not know whether an infection will occur. These expected, or ex-ante, costs are calculated as the product of estimated ex post cost per episode (i.e. costs incurred after an individual contracted typhoid) and the annual incidence rate (measured in the disease burden studies). These costs can be used to estimate the expected benefits of vaccination in a cost-benefit analysis of typhoid vaccines (Poulos et al. 2004).

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**Table 1** Components of ex post private and public costs

<table>
<thead>
<tr>
<th>Component</th>
<th>Private costs</th>
<th>Public costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct costs</td>
<td>Treatment—including: Diagnostic tests, Medicine, Examination, Bed charges*, Transportation, Nonmedical items—including foods and beverages used to aid treatment, Lodging and meals for other persons†, Other payments</td>
<td>Publicly borne costs of: An outpatient visit in a public clinic, A day of hospitalization in a public hospital, The medicines received by the patient in the treatment of the disease, The diagnostic tests used for patients with the disease.</td>
</tr>
<tr>
<td>Indirect costs†</td>
<td>Patient’s lost income/production§, Substitute laborers' net lost income/production§, Caretakers’ lost income/production, Other persons’ lost income/production</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

*If there is an overnight stay.
†These were most often persons who accompanied the patient when they sought treatment.
§The value of daily productivity was the product of an assumed age-specific wage and an occupation-specific wage. The assumed age-specific wages for adults, teenagers, and children were the patient’s daily wage, one-half the average patient daily wage, and one-quarter of the average patient daily wage, respectively. The occupation-specific wages for working on a farm, working at home, going to school, and leisure were 70%, 50%, 50%, and 30% of the assumed age specific wage, respectively. If the patient did not report their daily wage, it was replaced with the sample average.
¶These productivity losses also reflect time spent waiting and traveling to receive health care.
* A substitute is someone who did the patient’s or caregiver’s work for them while they were either sick or giving care. This is “net” because substitute laborers result in a net increase or decrease in lost productivity. On the one hand, they can increase losses if they are not able to perform their own work. On the other hand, they reduce losses when they replace patients lost labor. This item is equal to (substitute laborers’ own lost income/production) + (substitute laborers’ contributions to income/production by doing patients’ work).
All costs were measured in terms of local currency and converted to US dollars (USD) using the exchange rate at the midpoint of the study. These values were adjusted for inflation using the US Bureau of Labor Statistics’ consumer price index and expressed in terms of USD 2005. These values are not directly comparable across countries because of differences in incomes and prices across countries. We use purchasing power parity (PPP) exchange rates (obtained from the International Monetary Fund website) to adjust the \textit{ex ante} cost estimates.

Ethical review

The research protocols for both public and private costs were approved by the relevant institutional, national, and local ethical review boards. Voluntary consent was obtained from each subject in the private COI study.

\textbf{Results}

\textbf{Sample size and characteristics}

In total, 327 episodes of typhoid fever were used to compute private COI, 233 in children and 94 in adults (Table 3). On average, children’s and adults’ illnesses lasted 2–3 weeks (14–21 days for adults and 13–17 days for children) (Table 3). The average duration of illness in Hue was three days; however, the sample size in Hue is quite small (17 cases). The public treatment cost estimates rely on data from 149 episodes of illness – 11 in Hue, 55 in Indonesia and 83 in Kolkata.
The average total cost per episode of typhoid fever ranged from USD 15 in Kolkata to USD 132 in North Jakarta (Table 4a). The high costs in North Jakarta reflected the high costs of adult cases, which were more severe than children’s cases (adults were hospitalized more often—32%—than children—10%) (Tables 3 and 4b), and apparently higher treatment costs. The costs were nearly as high in Hechi (USD 126) and these costs were borne entirely by patients and their families.

The costs of hospitalized cases, which ranged from USD 129 in Kolkata to USD 432 in North Jakarta (Table 4a). The high costs in North Jakarta reflected the high costs of adult cases, which were more severe than children’s cases (adults were hospitalized more often—32%—than children—10%) (Tables 3 and 4b), and apparently higher treatment costs. The costs were nearly as high in Hechi (USD 126) and these costs were borne entirely by patients and their families.

The costs of hospitalized cases, which ranged from USD 129 in Kolkata to USD 432 in North Jakarta, exceeded the costs of non-hospitalized cases (Table 4a). The costs of children’s episodes, which ranged from USD 11 in Kolkata to USD 75 in North Jakarta, were lower than the costs of adults’ episodes in the two sites in which they were available (Hechi and North Jakarta) (Table 4b). Figure 1 shows that the private costs for hospitalized cases exceeded public costs in 3 of 5 sites.

The ex ante total costs ranged from USD 0.03 to USD 0.50 (Table 5). Ex ante costs for children ranged from USD 0.03 in Hue to USD 0.50 in Karachi. Ex ante costs for adults were USD 0.03 in Hechi, USD 0.04 in Kolkata, and USD 0.20 in North Jakarta.

### Direct and indirect private costs

In nearly all sites, the direct private costs (ranging from USD 6 to 101) exceeded the indirect private costs (in Kolkata, out-of-pocket expenses were lower due to reimbursements by the program) (Table 4). Treatment costs were the largest component of private costs at all sites (except for adult patients in Kolkata). In Vietnam, expenditures on food and beverage items accounted for 15% of private costs for typhoid fever in children, which was consistent with Kaljee et al.’s (2004) findings that typhoid fever in Vietnam was treated by purchasing foods that are perceived to have properties that help cure/alleviate symptoms (Figure 2).

Indirect costs ranged from USD 5 to 45, with higher costs for adults’ cases in which lost work time imposed greater costs on the household. For adults, the largest component of indirect costs was the patient’s lost...
productivity, ranging from 14 to 35% of private costs. For children, patient’s losses plus losses by caregivers accounted for a similar percentage of private costs.

### Provider and public treatment costs

Provider treatment costs were similar across sites, ranging from USD 100–181 for hospitalized cases and from USD 1 to 13 for outpatient cases (Table 6). Provider treatment costs were not estimated separately for Karachi.

The public treatment costs (provider treatment costs minus patients’ payments) for hospitalized and non-hospitalized cases were, respectively, USD 116 and USD 1 in Hue, USD 90 and USD 10 in North Jakarta, USD 100 and USD 2 in Kolkata, and USD 17 and USD 0.1) in Karachi.

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**Table 4a** COI per episode of typhoid fever, by type of patient and study site (all ages) (2005 USD)

<table>
<thead>
<tr>
<th>Study site</th>
<th>Hue n = 17</th>
<th>Hechi n = 58</th>
<th>N. Jakarta n = 107</th>
<th>Karachi n = 66</th>
<th>Kolkata n = 79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost per hospitalized case</td>
<td>157</td>
<td>215</td>
<td>432</td>
<td>210</td>
<td>129</td>
</tr>
<tr>
<td>Average cost per outpatient case</td>
<td>38</td>
<td>67</td>
<td>57</td>
<td>38</td>
<td>13</td>
</tr>
<tr>
<td>Hospitalization rate</td>
<td>28%</td>
<td>40%</td>
<td>20%</td>
<td>10%</td>
<td>2%</td>
</tr>
<tr>
<td>Weighted average costs (hospitalized and outpatient)</td>
<td>38</td>
<td>126</td>
<td>106</td>
<td>53</td>
<td>11</td>
</tr>
<tr>
<td>Private costs</td>
<td>33</td>
<td>101</td>
<td>61</td>
<td>45</td>
<td>6</td>
</tr>
<tr>
<td>Direct</td>
<td>5</td>
<td>26</td>
<td>45</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Indirect</td>
<td>33</td>
<td>0</td>
<td>26</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Public costs</td>
<td>71</td>
<td>126</td>
<td>132</td>
<td>55</td>
<td>15</td>
</tr>
</tbody>
</table>

**Table 4b** COI per episode of typhoid fever by age group, type of patient and study site (2005 USD)

<table>
<thead>
<tr>
<th>Study site</th>
<th>Hue n = 17</th>
<th>Hechi n = 23</th>
<th>N. Jakarta n = 73</th>
<th>Karachi n = 66</th>
<th>Kolkata n = 54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cost per hospitalized case</td>
<td>157</td>
<td>117</td>
<td>301</td>
<td>210</td>
<td>145</td>
</tr>
<tr>
<td>Average cost per outpatient case</td>
<td>38</td>
<td>34</td>
<td>50</td>
<td>38</td>
<td>10</td>
</tr>
<tr>
<td>Hospitalization rate for children’s cases</td>
<td>28%</td>
<td>40%</td>
<td>10%</td>
<td>10%</td>
<td>1%</td>
</tr>
<tr>
<td>Weighted average costs (hospitalized and outpatient)</td>
<td>38</td>
<td>67</td>
<td>53</td>
<td>53</td>
<td>8</td>
</tr>
<tr>
<td>Private costs</td>
<td>33</td>
<td>57</td>
<td>30</td>
<td>45</td>
<td>5</td>
</tr>
<tr>
<td>Direct</td>
<td>5</td>
<td>10</td>
<td>23</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Indirect</td>
<td>33</td>
<td>0</td>
<td>22</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Public costs</td>
<td>71</td>
<td>67</td>
<td>75</td>
<td>55</td>
<td>11</td>
</tr>
<tr>
<td>Total costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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As with private costs, the public costs of inpatient treatment were higher than the costs of outpatient treatment. In contrast to the private cost results, the public costs of treatment were greater for children than for adults. Even in North Jakarta, where adult cases were more severe than children’s cases, the public costs of treatment of inpatient treatment were higher for children than adults.

Cost of drug resistant cases
In Hue and Kolkata, the only sites for which drug sensitivity results could be matched to private COI data, about 35% of the matched cases were sensitive to all antibiotics and over half were resistant to nalidixic acid. In general, drug resistant cases had higher-than-average total COI, but the differences were not statistically significant.

Discussion
This multi-country community-based study of the public and private costs of typhoid fever provides detailed and robust estimates of the COI of typhoid fever and contributes significantly to what is known about the costs of typhoid fever. The studies tracked blood culture-confirmed cases for up to 90 days and describe costs across a range of epidemiological and health care settings. The use of a single research protocol ensured comparability. Although previous studies measured the costs of unspecified diarrheal disease (Lerman
et al. 1985; Forsberg et al. 1993), they lacked the specificity needed to assess disease-specific interventions. Punjabi’s (1998) estimates of the aggregate costs of typhoid fever are likely to be biased because they rely on public health surveillance and hospital-based data and assumptions about treatment patterns and costs. Only Bahl et al. (2004) measured the costs of blood-culture confirmed typhoid fever at the community level. They found that the average COI per episode of typhoid fever in an urban slum in New Delhi, India was USD 101 (in 1996 USD).

This study found that private costs of treatment are usually greater than the public costs of treatment and represent a significant burden on households. The average private cost of a non-hospitalized case was 13% of average monthly household income in Kolkata (USD 84), 23% in North Jakarta (USD 207), and 55% in Hechi (USD 121). The average private cost of a hospitalized case was 35% of income in Kolkata and over 100% in North Jakarta and Hechi. This represents 1–15% of annual household income. Private costs in this range have been found to be catastrophic for poor households that have poor health, lack access to health care, and do not have access to mechanisms to pool risks (Xu et al. 2003; Su et al. 2006). This burden on families is not captured by studies that adopt a provider perspective. There was no evidence that typhoid fever incidence or costs were correlated with household income or expenditures in Hue, Kolkata, or Hechi, where income data were available.

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**Figure 2** Components of private direct costs for hospitalized and outpatient cases.

**Table 6** Provider costs per case, private expenditures to public facilities, and public treatment costs per case (2005 USD*)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Treatment setting</th>
<th>Hue USD</th>
<th>Hechi USD</th>
<th>N. Jakarta USD</th>
<th>Karachi USD</th>
<th>Kolkata USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ages</td>
<td>Hospitalized</td>
<td>123</td>
<td>181</td>
<td>n.a.</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‘Net public’ treatment costs</td>
<td>116</td>
<td>90</td>
<td>17</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private expenditures to public facilities</td>
<td>7</td>
<td>91</td>
<td>n.a.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Outpatient</td>
<td>Provider treatment costs</td>
<td>1</td>
<td>13</td>
<td>n.a.</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private expenditures to public facilities</td>
<td>0</td>
<td>3</td>
<td>n.a.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‘Net public’ treatment costs</td>
<td>1</td>
<td>10</td>
<td>0</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>Provider treatment costs</td>
<td>35</td>
<td>47</td>
<td>n.a.</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Private expenditures to public facilities</td>
<td>2</td>
<td>21</td>
<td>n.a.</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‘Net public’ treatment costs</td>
<td>33</td>
<td>26</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Hospitalization rate (%)</td>
<td></td>
<td>28%</td>
<td>20%</td>
<td>10</td>
<td>2%</td>
<td></td>
</tr>
</tbody>
</table>

*The 2005 exchange rate is 15 300 Vietnamese dong per USD.
†For outpatient treatment, it was estimated that 70% of slum populations and 90% of the other population would use the private sector for primary health care of the diseases being studied. Slum populations would have little choice but to use public hospitals if hospitalization was required.
While the costs vary by site, total costs were higher for adults cases than childrens, they were higher for hospitalized cases than non-hospitalized cases, and direct private costs accounted for the majority of total private costs. This reflects the fact that the typhoid fever incidence rates were higher for children, who have lower current economic productivity and that cases were mild enough for adult respondents to perform their usual activities during more than one-half of their illness, on average. The average total number of lost work days due to an episode of typhoid fever was 6% of sick days in Karachi, 25–30% of sick days in Hechi and Kolkata, and 50–60% of sick days in Hue and North Jakarta (Table 4).

While the costs of drug resistant cases were not statistically significantly different from the costs of sensitive cases, we note that, like Bahl et al. (2004), we found that the drug resistant cases in had higher costs. This suggests that the economic burden of typhoid fever may be even greater in countries with high and increasing drug resistance.

Our cost estimates may underestimate true costs for several reasons. Many respondents indicated that their families seek treatment in the private sector at some point during an illness and if private treatment was under-represented in these studies (since most study facilities were public), then private cost estimates would be too low. Also, households borrowed money to pay for treatment in 14–49% of cases. These cost estimates do not include any of the interest payments or transaction costs that were incurred when families borrowed money, nor do they measure the costs borne by employers and insurers. Other reasons there may be a discrepancy between our estimates of public cost and true public costs include the fact that data quality available at public sector health facilities in developing countries is generally poor and making assumptions about how public health expenditures are allocated across services was required.

The study design may have distorted costs by offering a standard of care and a price of care that were not representative of existing health care. Since the public cost study relied on a few facilities in the study areas (and DOMI-run facilities Karachi and Kolkata), these costs may not be representative of the overall health public health care provision system in the study country. In all locations, the DOMI study included an information campaign to inform the study population about symptoms that should be treated and where to seek care. This information campaign probably encouraged early treatment of cases, which may have reduced the incidence of severe and expensive cases.

Using total cost savings as a measure of the benefits of disease prevention understates the economic impact because it does not include the benefits of preventing premature death, the discomfort of pain and suffering, and any expenditures made by households, communities and governments to prevent typhoid fever (e.g. drinking water treatment, information campaigns). The DOMI program’s willingness-to-pay studies have generated more comprehensive measures of benefits for typhoid (Cahn et al. 2006; Cook et al. 2007), as well as cholera (Lucas et al. 2007; Kim et al. 2008).

These data are likely to yield more accurate economic analyses of typhoid fever interventions and were used in a cost-effectiveness analysis of the Vi polysaccharide vaccine in the DOMI study sites (Cook et al. 2008).

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References


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